THE AUSTRALIAN NAVAL ARCHITECT

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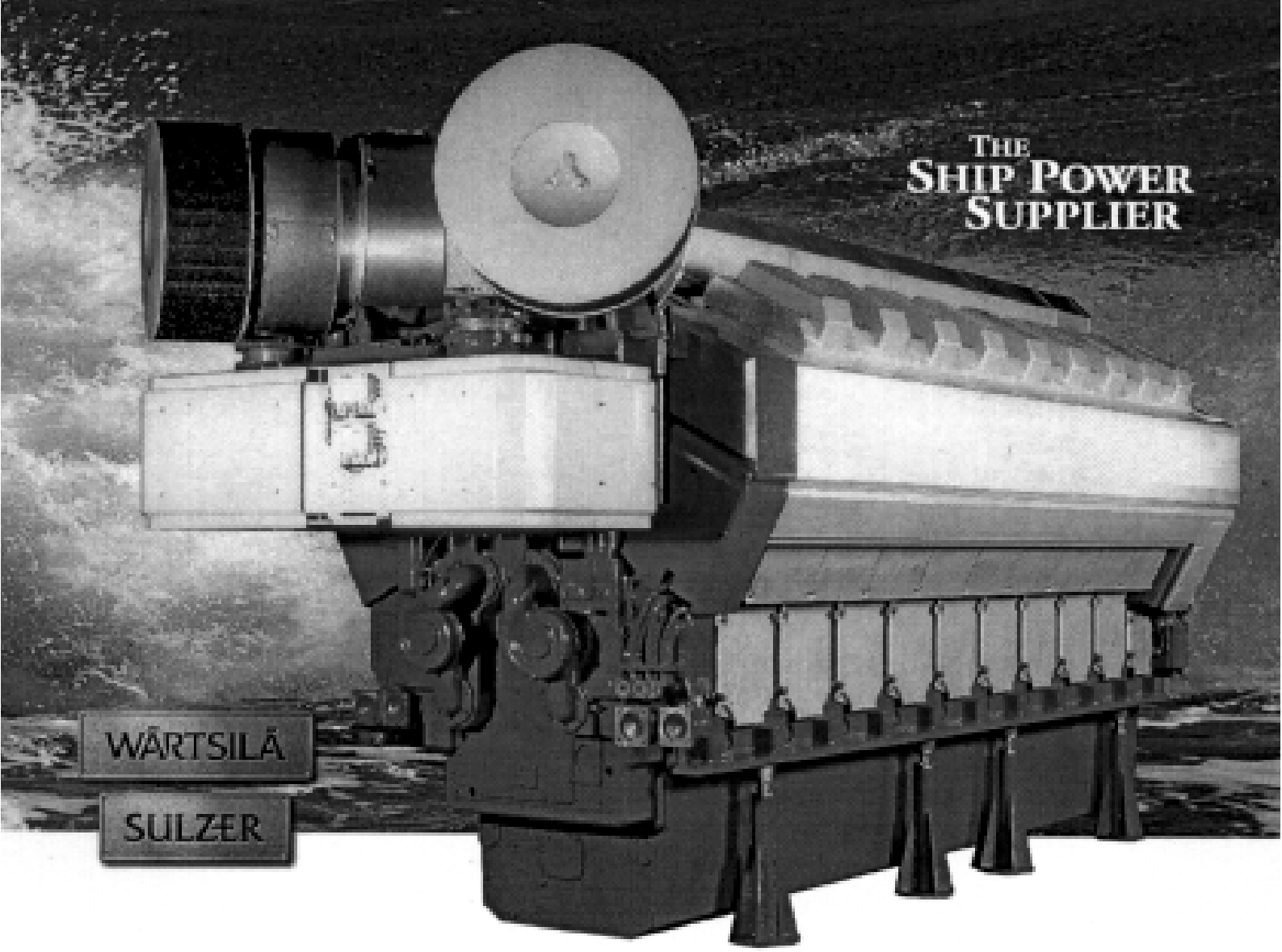

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THE AUSTRALIAN NAVAL ARCHITECT

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The Austal Auto Express 101 ferry *Euroferrys Pacifica* during trials off Western Australia (Photograph courtesy Austal Ships).

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From the Division President

The months since the February issue of this journal have been busy for the Division. In that time we have had, in order,

- The 2001 Annual General Meeting, including the results of the recent election of Division Council members;
- The Institution Annual General Meeting and Special General Meeting in London on 25 April; and
- The Institution Annual Dinner, also in London on 25 April, which included the presentation of his Diploma of Honorary Fellow to Australian Division member Bob Herd.

Division past-President Noel Riley and I were pleased to be able to attend the activities in London and to be present when Bob Herd received his award. This is a significant professional honour for Bob and for the Division.

An issue of concern which was debated at the Special General Meeting held in conjunction with the AGM was that of the use of the post-nominals AMRINA and ARINA by Associate Members and Associates. The Division Council believes that this has the potential for significant problems. Associate Members and Associates do not hold the full professional qualifications required of a Member and the use of post-nominals is seen as potentially misleading and open to abuse. The debate on this issue was extensive and robust but the resultant vote was in favour of the proposed change which accordingly is now incorporated into the Institution's By-Laws. This does not alter the Division Council's concerns and another way of addressing these will now have to be found.

At the Institution Annual General Meeting the result of recent elections for the Institution Council was announced. It is significant that the Council now includes persons resident in Australia, Greece, Denmark, Singapore and Canada in addition to the Presidents of the Australian and New Zealand Divisions *ex-officio*. This is a further development of RINA as an international body and can only be to the Division's advantage.

The Division Council has been informally advised that Dr Martin Renilson will shortly be leaving the AMC for a position at DERA in the UK. I'm going to miss him! He has been a member of the Council for quite a few years, and has always been a strong proponent of what he thought was right and a fairly direct critic of what he thought was wrong. I wish him well in his future endeavours and look forward to seeing him in Australia again some day.

At the Australian Division Annual General Meeting the result of the recent election for Division Council was announced. I congratulate and welcome on-board as new members Andy Tait (NSW) and Tim Dillenbeck (NSW). I also congratulate and welcome as re-elected members Rob Gehling (ACT), John Jeremy (NSW) and Jim Black (WA). Rob Gehling has also agreed to be Division Vice President for the coming twelve months. Our thanks are due to these people for their willingness to serve on the Division Council — I certainly appreciate it. I look forward to a fruitful and productive year.

Bryan Chapman

The President of the Institution, Mr David Goodrich, congratulating Bob Herd (right) on his Honorary Fellowship at the annual dinner in London.

Letters to the Editor

Dear Sir,

I would like to take this opportunity to express my appreciation to the editors of *The Australian Naval Architect*, Messrs John Jeremy and Phil Helmore, for the truly outstanding effort that they invest in the production of this Journal.

The work required to collect the articles, news items and technical papers is surely enormous. This is followed by the painstaking effort in assembling the material and generating the final text for the journal, editing and proof reading it. Even after that stage, there is the necessary liaison work with the printers and the post office.

The fact that *The Australian Naval Architect* is published four times a year, with perfect regularity, with an exceptionally accurate standard of typesetting, and with such a high technical level, is a real tribute to John and Phil, for which all Australian members of RINA must be very grateful.

Lawry Doctors

Dear Sir,

I read with interest the comments in a recent issue of *The ANA* about the use of water-filled U-tubes to measure the angle of heel during an inclining experiment, and an invitation for readers to comment on why such use should not be allowed.

I have never used a U-tube to record the angle of heel of a vessel, but I have used one many times to record the angle of dynamic trim. High-speed craft trim a significant amount when under way, and therefore it is common to fit flaps or trim tabs or other devices at the stern in order to control the trim. Many craft have also taken the next step, to activate these devices to turn them into active ride-control systems.

To measure the effectiveness of these devices I have been in the habit of setting up a U-tube on the lower decks, and I have records for eight vessels with measurements taken over several days of trials. It has always puzzled me why the level in the U-tube was always different at the end of the trial compared to the beginning. This is not a case of fuel usage and the boat changing trim, because this is easily corrected, and still leaves either a sinkage or a rise of the water level in the U-tube.

An obvious answer might be that the temperature varies through the trial period, and the water expands or contracts at a different rate to the tubing. This is probably true, but is it enough to explain the difference? I have previously been in the habit of using a food grade of polypropylene tubing (a clear plastic, similar to that obtained from any hardware store), and this is a reasonably flexible material. I wondered if the tube was expanding and allowing the water level to sink, but this did not account for the fact that sometimes the water level was higher.

On a recent trial I therefore used a U-tube made from Nylon pressure tubing (by Nylex). This is frequently used for low-pressure hydraulic systems, and is quite rigid. The walls cannot noticeably be deflected by hand pressure alone. The outside diameter is 9.5 mm, and the wall thickness is 1.5 mm. The total length of the tube was 17 m, with two arms each 4 m high, and a spacing between the arms of 9.6 m (it was quite a large U-tube). The tubing was secured to the available structure inside the vehicle space of a high-speed car ferry, such that there were no loops that could move under the vessel motion and perhaps affect the results, although it is not clear how such movement could make any difference to the water levels.

I monitored the level of the water in the U-tube at the beginning and at the end of each day's trials over a seven-day trial period, and recorded the ambient temperatures. The temperatures did vary because the start was usually very early in the day, and the finish was generally in the middle of the day. The results were as shown in Table 1.

These measurements were carefully made with the vessel stationary in the water, with the mooring ropes slack, and with the engines de-clutched. The water used was ordinary tap water, coloured with a red food dye. Great care was taken to ensure that there was no air entrapped in the U-tube during the filling process, and a close inspection before commencing measurements showed no air bubbles of any visible size. The volume of the

water within the tube was measured at the time of filling as 0.559 litres.

The temperature variations might explain the movement of the water level during the day time when the water level falls, but I am not certain of the coefficient of expansion of the tubing.

Figure 1 shows the relative heights (average of the forward and aft arm readings) over the seven-day period. There is a substantial drop during the first day, which slowly evens out and even appears to stabilise after about five days. My guess is that this is a result of air contained in the tap water that comes out of suspension during the day's movements.

I recommend that if a U-tube is used, then the water be oscillated in the tube for at least five days beforehand.

I will be conducting further trials shortly, and intend to use boiled distilled water for the U-tube in order to determine whether this makes any difference. I have considered using Scotch, because this helps to interpret the results, and there is an environmentally-friendly way to get rid of it afterwards. Unfortunately, the evaporation rate would probably spoil the results even more.

Tony Armstrong

Table 1
Water level and temperature measurements

Day	Start time	Finish time	Temp range	Water level over trial period
1	06:01	14:55	16–32	Fall 36.5 mm
2	05:03	12:16	16–30	Fall 6.5 mm
3	04:45	13:40	17–29	Fall 9.0 mm
4	04:38	12:35	16–26	Fall 6.5 mm
5	05:56	10:45	17–24	Fall 5.5 mm

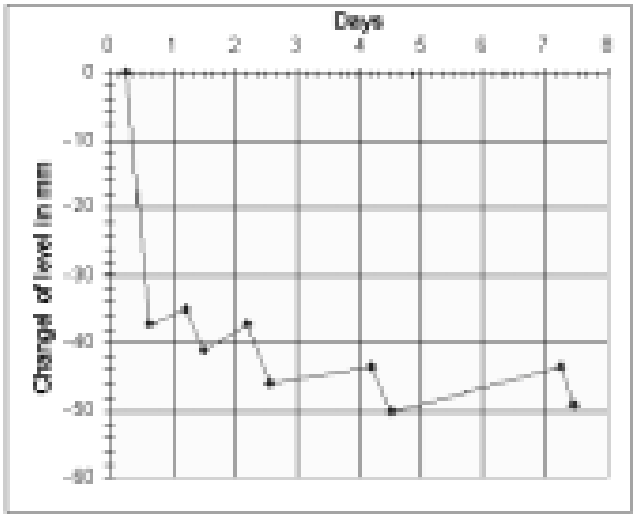

Figure 1
Water level of the average of fore and aft arms of a manometer, 9 600 mm apart, over a seven-day period.

Dear Sir,

I refer to the article *The Royal Australian Navy Stability Standard* by Peter Hayes included in the February 2001 edition of *The Australian Naval Architect*.

First of all, I would like to congratulate Peter on a very well written and informative article on the RAN's new stability standard. I do, however, have some questions that Peter may like to address for me.

My main concern is with Table 1 — Intact Environmental Requirements. It would seem that the Survival Environmental Maximum Wind Speed for RAN ships has been reduced from 100 knots to 67 knots. This is a significant reduction and to the best of my knowledge is much lower than that adopted by the RN and USN.

To allow the superstructure as part of the watertight envelope of the ship for stability calculations would not be realistic in all ships. The superstructure's structural integrity with regard to hydrostatic loading should be a determining factor. I remember that the aluminium superstructure on the FFGs was not considered as part of its watertight envelope because of its inadequate strength. However the steel superstructure on the Anzac ships, which was designed to sustain the full hydrostatic load, was accepted as part of its watertight envelope for stability calculations.

I note that the RAN has retained the 15%L damage requirement for ships greater that 30 m in length. In retaining this standard was any consideration given to the effect of modern torpedoes and mines on the ship's survivability?

Brian Robson

ELECTION OF R J HERD AS HONORARY FELLOW

The election of Bob Herd as an Honorary Fellow of The Royal Institution of Naval Architects was formally announced at the Institution's Annual Dinner in London on 25 April 2001. Bob travelled to London with his wife and daughter to receive the Award from the President of the Institution. The following is an extract from the President's speech:

'It is a tradition on occasions such as these for the President to look back on the past year's achievements of the Institution. It has again been a year in which the Institution has continued to successfully meet the challenge of being a forward looking, international, professional institution with a modern outlook, responsive to the needs of its members and the profession.

Membership rose again and is now at its highest since 1983. Student and Graduate Membership also rose during the year and the Institution now has links through Student Membership with over 40 universities and colleges world-wide. The RINA Student Naval Architect Awards, presented to Student Members who give the best presentation of their final year project, are now awarded to students in Australia, Greece, Singapore, Canada and the UK. The Institution is grateful to those companies whose sponsorship make these Awards possible, and I hope that sponsorship may be found to extend the awards, which provide a valuable link between industry and universities, to other countries.

At the end of the year, the Institution merged with the Naval Architectural Society of New Zealand to form the New Zealand Division of the Institution. The internationalism of the Institution is further demonstrated by its conference programme which over the year has seen conferences held in the UK, Sweden, China and Australia. And last year, together with the UK Maritime and Coastguard Agency, the Institution commenced a Formal Safety Assessment Study into the safety of bulk carriers. This major international collaborative project involves the UK and twelve other countries, and the Institution has been awarded a grant of •500k by the European Commission to fund and manage the work of the non-UK participating organisations. This is a new activity for the Institution, but which I believe is a fitting one for a modern professional institution.

But such achievements in the past year and in previous years do not just happen. They are the result of

the efforts of not only the Chief Executive and his staff but also those of the many members who give freely and willingly of their time to serve on the Institution's Council and committees, whilst in many cases continuing their busy professional lives. The Institution's standing as a leading international professional institution is due in no small part to their efforts. I am therefore very pleased to conclude my address this evening by acknowledging the contribution which one such member has made to the Institution and to the profession by announcing that the election of Mr Robert Herd an Honorary Fellow of the Institution.

In a professional life which has extended over almost half a century, Bob Herd has given exemplary service to both the maritime industry in Australia and to The Royal Institution of Naval Architects.

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

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

Bob Herd's service to the Royal Institution of Naval Architects in Australia has been equally long and distinguished. He has been a member of the Institution for almost 50 years; he was a founder member of the Australian Branch of the Institution of Naval Architects, later the Division of the Royal Institution of Naval Architects. He is a past President of the Australian Division. and was a member of the Australian Division Council for nearly 25 years. He is a founding member of the Victoria Section and has been, and indeed still is, an active member, serving on its committee on numerous occasions and in various posts. He has also been an active participant in many Australian Division conferences.

Without the contribution which members make through the time they give to the Institution's committees and its Sections, and their support for its activities, the Institution could not function as the highly respected intentional professional institution that it is today. The maritime industry also benefits from the dedication of those who give their time and experience to improving safety and professional standards in so many ways. Such individuals are exemplified by Bob Herd whose selfless and dedicated service to both the Institution and the maritime industry in Australia over many years is recognised by his election as an Honorary Fellow of the Royal Institution of Naval Architects, joining those other 87 Honorary Fellows elected in the Institution's history.

It is a coincidence but most appropriate that I should be making this announcement on ANZAC day. I am delighted that Bob Herd and his wife have been able to join us this evening, and it is my pleasure, on behalf of the Institution, to formally announce his election as an Honorary Fellow.'

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.

NEWS FROM THE SECTIONS

Western Australia

The Western Australia Section AGM was held on 28 March and marked the retirement of Tony Armstrong from the Chair, and Hugh Hyland from the Committee, in accordance with the Section regulations. Roger Best is our newest recruit to the Committee, which now comprises:

Chair	Kim Klaka
Deputy Chair	Steve Harler
Secretary	Jim Black
Treasurer	Damien Smith
Prof. Development	Tony Armstrong
Library	John Wood
Recruitment	Steve Harler
Social	Roger Best
Rep. on AD Council	Tony Armstrong
Conferences	David Lugg
Website Information	Steve Harler
ANA Information	Kim Klaka

It is pleasing to note that the average age of the committee members is barely 40, including one retiree.

Technical meetings have experienced a resurgence these last few months, with numbers averaging in the mid to high 30s. Some of this growth can be attributed to holding the events jointly with IMarE.

On 21 March Alan Blunden, Editor/Owner of *Fast Ferry International* presented *A Summary of the World Fast Ferry Market*. The market looks fairly lean for the short-medium term, so this is when innovation must come to the fore in creating and capturing new markets.

On 28 March Richard Williams of Oceanfast gave a talk on *Luxury Motor Yacht Design*. This was held on board the latest Austal ferry *Euroferrys*.

By the time you read this there will have been further presentations from Dr Jinzhu Xia of Curtin University on *Flooding-induced Roll Motion of Ro-ro Vessels*, and from Stone Marine on *Propeller Design and Manufacture*.

Queensland

The Queensland Section held its quarterly Section Committee Meeting and its Annual General Meeting on 13 March at the Yeronga Institute of TAFE, teleconferencing with Cairns members. This meeting was followed with a technical presentation on *The RAN Minehunter Inshore Design Revisited* by Brian Robson.

The following were elected to the Queensland Section Committee for 2001.

Chair	Brian Robson
Deputy Chair	Geoff Glanville
Secretary/Treasurer	Brian Hutchison
Committee Members	Ross Burchill
	Ron Wright
	Milton Roberts
	Stephen Plummer
	Andrew Harvey

It was decided at the Section Committee Meeting that all future section committee meetings would be via teleconferencing and independent of technical meetings.

For the technical presentation, Brian Robson provided an interesting and thought-provoking presentation on his earlier involvement in the design of the RAN Inshore Minehunter. The presentation outlined the history of the minehunter design from its conception in 1975. The presentation also included a brief outline of the minehunter's operational requirements and project constraints. Brian covered aspects of the vessel's unique building facility and construction techniques and its materials development and model testing programmes. Also discussed was the vessel's final performance and subsequent changes that were found necessary after a very extensive operational trials period. The presentation, which included a twenty-minute video, attracted an audience of twenty members and visitors.

Our Cairns members hosted a very successful visit by RINA Chief Executive Trevor Blakeley to Cairns on 5 to 7 February. The Chief Executive was able to visit some of the local ship and boatbuilding facilities and had informal and very well-received meetings with members and potential members in the area.

Brian Robson

ACT

The RINA Chief Executive, Mr Trevor Blakeley visited Canberra on 9 February to meet local section members. An informal meeting was held at Campbell Park offices to discuss topics of current interest. Issues raised by the local members and addressed by the CEO ranged from the means by which Australian members can best access RINA services and activities, particularly on-line, to the difficulty in sustaining local activities and attracting new members to the section. Following the meeting, a number of members of the section jointed the CEO at a relaxed dinner at the Ainslie Football Club where discussions on both naval architecture and non-naval matters continued.

Prompted by discussions during the visit, the CEO subsequently wrote to candidate RINA members in the Canberra area seeking their consideration towards joining the Institution. This invitation was reinforced by a personal letter from the ACT Section chairman, Bert Thomson, who has pointed out the benefits of membership of a professional institution such as RINA.

Martin Grimm

New South Wales

The NSW Section Committee met on 1 February and, other than routine matters, discussed the wash-up of the budget from the Sydney Marine Industry Group Christmas (SMIX) Bash (while some monies are still owing, it is believed this will end up revenue-neutral); MARENSA participation in technical meetings; the cost of the Harricks Auditorium venue at IEAust (a satisfactory arrangement has been concluded with the IMarE); the technical meeting program for 2001 (our proposed program has yet to be married with the IMarE (Sydney Branch) proposed program); possible venues for technical meetings in 2001 (several are still under consideration); membership of the committee and committee positions (Phil Hercus, our Chair, has retired from the committee, and James Fenning, our Treasurer, will not be standing for re-election to that position although he has agreed to remain on the committee); and the date of the AGM (now set for Wednesday 28 March).

The NSW Section Committee also met on 6 March and, other than routine matters, discussed the wash-up of the budget from the Sydney Marine Industry Group Christmas (SMIX) Bash (only one sponsorship payment is now outstanding); MARENSA participation in technical meetings; membership of the committee and committee positions (Bob Dummett has agreed to accept a position on the committee and to take over the position of Chair, Jennifer Knox has agreed to take over the position of Deputy Chair in addition to that of Secretary, Todd Maybury has agreed to take over the position of Assistant Secretary, and Lina Diaz has agreed to take over the position of Treasurer); revisions to the technical meeting program for 2001 (our proposed program has been successfully married with that of the IMarE (Sydney Branch), and several meetings now need to have dates revised); and the venue for technical meetings in 2001 (after an extensive search we have now decided on the Rugby Club, close to Circular Quay).

The NSW Section held its third AGM on the evening of 28 March, following the March technical presentation at the new venue of the Rugby Club, Circular Quay, attended by seventeen with the outgoing Deputy Chair, Phil Helmore, in the chair.

Phil Hercus, in his final Chair's Report, touched on some of the highlights of 2000, which included nine joint technical meetings with the IMarE (Sydney Branch) with attendances varying between twenty-four and sixty, a successful ship visit to *Incat Tasmania* attended by eighty-five, and the highly successful SMIX Bash in lieu of a sit-down annual dinner attended by 170. He had retired from the NSW Committee due to work pressures and some gentle natural requests for a pace slower than that of the twenty-one-year-old he sees in the shaving mirror.

Phil Helmore proposed a vote of thanks to Phil Hercus for his leadership as the inaugural Chair of the NSW Section, and having given us the guidance on the committee which has given us a springboard for the future.

Phil Helmore presented the Treasurer's Report in the absence of our Treasurer due to pressure of

work commitments. The IEAust venue at Milson's Point had been our major cost for the year, and was more expensive than originally quoted. However, we had agreed with the ImarE (Sydney Branch) regarding the division of costs, and total expenditure had come in at $108 under our budget for 2000, i.e. in the black, but only by a whisker. SMIX Bash was funded entirely outside of Section finances. One of the advantages of the new venue at the Rugby Club is that of significantly lower costs for 2001.

There are a number of changes to the NSW Committee for 2001. In addition to the changes mentioned above, Paul O'Connor has resigned due to pressure of work, and Graham Taylor has agreed to accept a position on the committee. As a result, the committee for 2001 looks like this:

Chairman	Bob Dummett
Deputy Chairman	Jennifer Knox
Treasurer	Lina Diaz
Secretary	Jennifer Knox
Assistant Secretary	Todd Maybury
Rep. on AD Council	Phil Helmore
Members	Don Gillies
	Rod Humphrey
	Allan Soars
	Graham Taylor

Grahame Parker of Grahame Parker Designs gave a presentation on *The Design and Construction of Sydney's SuperCats* to a joint meeting with the IMarE attended by sixty-eight on 28 February on board SuperCat No. 2, *Susie O'Neill*, berthed alongside No. 3 (still fitting out) at the East Dock Wall at Australian Defence Industries, Garden Island. As the designer of the SuperCats as well as the RiverCats and Brisbane's CityCats, Grahame is well-qualified to talk about low-wash ferries in general.

Sydney Ferries called tenders two years ago for a number of vessels to run from Circular Quay to Manly in up to 2 m swells, or up the river to Parramatta, have a service speed of 24 knots loaded, and a wave wash of less than 250 mm in a depth of water of 3 m.

The SuperCats, which won the design-and-construct tender, have a length overall of 34.2 m, moulded beam of 8.5 m, lightship displacement of 50 t, deadweight of 20 t, and achieved 25 kn loaded on trials. They have aluminium hulls and sandwich composite superstructures and were built under a joint-venture agreement. Transfield built the hulls at Seven Hills from where they were floated down the river to Garden Island; Bass Boats built the superstructures at Garden Island; and Australian Defence Industries managed the project, mated the hulls and superstructures and did the fit-out at Garden Island.

Grahame illustrated his presentation with overhead projections of drawings of the vessels, and gave insights into many interesting details of the design and construction of the vessels. Interest in the talk may be gauged by the attendance, which was the highest for many years, and the length of the question time, which exceeded half an hour.

In proposing the vote of thanks to Grahame, John Jeremy recalled the dramatic changes which have taken place in ferry travel on Sydney Harbour since he began travelling thus over forty years ago. Ferries such as the timber double-ender *Lady Edeline* then, have been replaced by state-of-the-art aluminium/composite low-wash catamaran ferries such as *Susie O'Neill* now, and the design effort and synthesis required to generate such vessels has increased enormously. The proposal was carried with acclamation.

A/Prof Lawry Doctors of The University of New South Wales gave a presentation on *Hydrodynamics Without Tears: Recent Developments* to a joint meeting with the IMarE attended by fifty-four on 28 March at our new venue of the Rugby Club, Circular Quay. Lawry began his presentation with the background provided by his joint investigations with Grahame Parker ten years ago. Grahame tested the resistance and wavemaking of ten multihull vessels in different configurations at the AMC, and compared these with the results of Lawry's theoretical calculations. The results showed wave elevations along cuts taken at distances of 100 m, 200 m, 300 m and 400 m off the vessel's track.

Lawry knew that the audience would demand to see some equations, so he provided a selection of three simple ones which everyone could understand. There were no triple integrals or partial differentials to be seen and, hence, no lachrymation

Two Supercat Sydney Harbour ferries fitting out at ADI Garden Island in Sydney (above)
(Photograph Martin Grimm)

The wheelhouse of the Supercat *Suzie O'Neill* (below)
(Photograph Martin Grimm)

and the presentation lived up to its title.

In proposing the vote of thanks to Lawry, Bryan Chapman recalled the importance of the *impression* of speed and its consequences. While he was living in Seattle the Boeing jetfoils, which were built at Boeing's Renton plant at the south end of Lake Washington and Puget Sound, had to traverse the length of the lake and sound past some prime real estate to reach the sea. The vessels usually made the delivery voyage in displacement mode, without complaint from the residents. However, one vessel had to be delivered quickly to meet a deadline and the voyage was made foilborne, wherupon the phones ran hot with residents complaining about the devastating effects on their shoreline of the 'huge waves caused by that fast vessel'. This was despite the fact that the vessels were fitted with fully-submerged foils, and made far less wash when foilborne than in displacement mode! Bryan complimented Lawry on the clarity of his presentation and summarised the three things he had learned about minimising wave wash: build 'em long, build 'em narrow, and build 'em catamaran.

Greg Hellessey, Marine Technical Manager of the Australian Customs Service, gave a presentation on *The New Marine Fleet for the Australian Customs Service* to a joint meeting with the IMarE attended by thirty-nine on 24 April. Greg began his presentation with an overview of the task of surveillance and protection of Australia's 37 000 km coastline and 9 000 000 km^2 EEZ, and the fact that Coastwatch air support is essential. Ashmore Reef receives more than its fair share of publicity as the entry point for unlawful immigrants.

The previous fleet consisted of three 20-metre Minister-class monohull vessels, a 22-metre monohull and a 25-metre catamaran. Based on their operating experience with these vessels, Customs prepared a Request for Proposal which set out the performance parameters (mandatory and desirable), the proposal evaluation criteria, and a specimen contract.

Sixty-three RFPs were issued, resulting in thirteen serious offers, all from Australian shipbuilders (some under licence to overseas designers). This field was reduced to six after two-and-a-half hours of assessment because of not meeting the requirements. The subsequent selection of the final bid from the six took a further four-and-a-half months. The selection was assisted by use of the Heller System (Heller, S.R. 'On a Quantitative Expression For Cost Effectiveness and its Use", *Naval Engineers' Journal*, February 1973) to ensure value for money, and this was spelled out in the RFP. Several hundred criteria were used in the Heller weighting process, including both the design/performance criteria and the financing of the vessels, and ensured that the process was impartial and could be seen to be so. The vessels selected were therefore the best overall package; possibly not the best in every single area, but the best overall. Customs received compliments from most tenderers for the objectivity of their selection process.

The successful tenderer was Austal ships, with their aluminium monohull Bay-class vessels (see *The ANA*, May 1999 and November 2000). Brief particulars of the vessels are:

Length OA	38.2 m
Length measured	34.9 m
Beam	7.2 m
Draft	1.8 m
Main engines	Two MTU 16V 2000 M70 × 1 050 kW
Auxiliaries	Two 135 kW Cummins/Onan gensets

The bridge is deliberately compact, as this keeps "goofers" (sightseers) away. The galley is, similarly, small; all stainless steel and functional. The twin-berth cabins have a desk and two tallboys, and are spartan but comfortable. The vessels are fitted with two 1 900 L/d reverse-osmosis water makers, two active-fin stabilisers and two VeemStar 1 100 mm diameter propellers. The vessels do not operate from a home port, but go anywhere and everywhere. Crews fly in and fly out from wherever the vessels happen to be in the course of their operations.

As a finale, Greg sounded a note of warning to Government organisations which are watering down their technical expertise, because at the end of this road lies loss of the plot. If technical expertise is not maintained by purchasers, such as Customs and Defence, then they become open to exloitation.

Phil Helmore

COMING EVENTS

NSW Technical Meetings

Technical meetings are generally combined with the Sydney Branch of the IMarE and held on the fourth Wednesday of each month at the Rugby Club, Rugby Place off 31A Pitt St, Circular Quay, starting at 5:30 pm for 6:00 pm and finishing by 8:00 pm. The revised program of meetings remaining for 2001 (with exceptions noted) is as follows:

27 Jun	Janis Cocking, DSTO, *The Impact of Science and Technology on the Collins Class Submarines* (IMarE)
25 Jul	Robert Dane, *The Solar Sailor* (on board; at King St Wharf)
15 Aug	Alex Robbins, *Regression Analysis of a Parametric Series of Low-wash Hullforms* (RINA; at UNSW)
22 Aug	MTU Australia, *MTU Engine Developments* (IMarE)
26 Sep	Rob Tulk, *Aluminium Yachts and Ice bergs*
24 Oct	Greg Cox, *Compressed Natural Gas as a Marine Fuel* (IMarE)
** Dec	SMIX Bash
**	Date to be advised
IMarE	IMarE meeting
RINA	RINA meeting

ACT Technical Meetings

26 Jun Dr John Ritter, DSTO AMRL, *Collins Class Submarines*. This meeting is being arranged by MARENSA. Time and venue to be advised.

Sept Technical Meeting on an AMSA, Australian Customs or ADFA related topic is proposed.

Nov Annual Dinner, with guest speaker (to be confirmed).

Queensland Technical Meetings

The next technical meeting of the Queensland Section will be held on 4 July (commencing at 1730) in Cairns with teleconferencing to the Yeronga Institute of TAFE.

This meeting will be held in conjunction with the Asia-Pacific/Ausmarine East Conference and Exhibition. At this meeting Mr John Leslie, Managing Director of Flightship will give a presentation on *Ground-effect Craft*. The presentation will be held at the conference venue.

Asia-Pacific Fishing/Ausmarine East

The third Asia-Pacific Fishing Exhibition and conference is being combined with the new Ausmarine East exhibition and conference this year, and will be held on 3 to 5 July 2001 at the Cairns Convention Centre, Cairns. While originally intended as a purely commercial fishing event, Asia-Pacific Fishing very quickly became much more than that. More than half the visitors to the first two events came from sectors of the commercial and military marine industry other than fishing. As well as being Australia's largest fishing port, Cairns is also a major marine tourist centre and has significant naval and customs bases. It is also home to major shipbuilding and repair facilities and some very important fish-processing plants. Cairns is the centre of a very fast-growing fish-farming industry.

While the fast-growing and lucrative fishing industry will remain a major component of Asia-Pacific Fishing/Ausmarine East, the event will now cater for all the other important sectors of the Asia-Pacific marine industry. The associated two-day conference on 3 and 4 July is intended to be a practical event for owners, operators, designers and builders of commercial vessels. The cost is $750 which includes attendance at all conference sessions, a hardbound set of conference papers, a complimentary ticket to both the opening cocktail party and the dinner, as well as morning and afternoon teas and a light lunch on both conference days.

Further information may be obtained from the organiser, Baird Publications, on (03) 9645 0411, email marinfo@baird.com.au or on the website www.baird.com.au.

MarTec 2001

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

by the Wellington Branch in conjunction with the Sydney Branch. The theme of the conference will include latest developments, high-speed craft, fishing vessels, yachts and all aspects of the marine industry. Further information may be obtained from Mr Barry Coupland, phone +64-4-385 0408, fax 385 9258 or email barrian@actrix.gen.nz.

Pacific 2002

The Pacific 2002 International Maritime and Naval Exposition will include two conferences and an exhibition:

Pacific 2002 International Maritime Conference is being organised by the Royal Institution of Naval Architects, The Institute of Marine Engineers, and the Institution of Engineers, Australia.See page 17 for more information.

Sea Power 2002 — Naval Capability in the 21st Century Conference is being organised by the Royal Australian Navy.

Pacific 2002 International Maritime and Naval Exhibition is being organised by the Aerospace, Maritime and Defence Foundation of Australia.

All will be held at the Sydney Convention and Exhibition Centre, Darling Harbour, from Tuesday 29 January to Friday 1 February 2002.

Maritime Education Seminar

A Maritime Education Seminar will be held in association with Pacific 2002 at the Sydney Convention and Exhibition Centre, Darling Harbour on 1 February 2002. Offers of papers have already been received from Universities, TAFE and Naval Colleges, regulators, consultants, shipbuilders and shipowners. The opening address will be delivered by Prof. Chengi Kuo from Strathclyde University. Further information may be obtained from Laurie Prandolini on (02) 9878 1914 or email sbimare@msn.com.au.

Maritime History Seminar

A Maritime History Seminar will be held in association with Pacific 2002 at the Australian National Maritime Museum, Darling Harbour, on 1 February 2002. This Seminar will look at aspects of the history and preservation issues surrounding ship and boat building industries, machinery and equipment, and ports and harbours. In the morning sessions key speakers will give papers on these topics, and in the afternoon there will be a series of panel and discussion sessions on the issues raised. During the day there will also be an opportunity to go on tours of the Australian National Maritime Museum exhibition building, the Wharf 7 Maritime Heritage Centre (home to the Sydney Heritage Fleet and Australian National Maritime Museum collections) and *James Craig*, Sydney Heritage Fleet's restored three-masted barque. Further information may be obtained from Michael Crayford on (02) 9298 3745 or email mcrayford@anmm.gov.au.

Ships of the Australian, Canadian and United States navies off Queennsland in May during Exercise Tandem Thrust (US Navy Photograph)

GENERAL NEWS

HMAS *Warramunga* Commissioned

HMAS *Warramunga*, the Royal Australian Navy's third ANZAC Class Frigate was commissioned into service at Station Pier, Melbourne, on Saturday 31 March.

Built by Tenix Defence Systems at Williamstown in Victoria, *Warramunga* is the first ship in the world to be fitted with the latest generation of the Sea Sparrow Missile, and is the first RAN ship to carry the Navy's new Kaman Super Sea Sprite helicopter.

She is the second ship to bear this name, the first being a Tribal Class destroyer built at Cockatoo Dockyard in Sydney which served with great distinction from 1942 to 1959 in both the Second World War and Korean War. She was sold for scrap in 1963.

HMAS *Warramunga* derives her name from the Warumungu tribe which resides in the Tennant Creek area of the Northern Territory. Prior to her launch the Navy entered negotiations with and obtained approval from the tribal elders to amend the name as the first ship used that spelling.

Federal Court Decision Permits Submarine Propeller Modifications to go Ahead

Kockums of Sweden, designer of the Collins Class submarines, has been unsuccessful in its bid to prevent the Commonwealth shipping a Collins Class propeller to the USA for modification.

On 13 February this year, Kockums of Sweden, the submarine designer, lodged an application in the Federal Court, Sydney, seeking orders to prevent delivery of the submarine propeller to a US company for modification, on the grounds that it breached Kockums' intellectual property rights in the propeller design.

In a judgement handed down on 11 April, Justice Wilcox found in favour of the Commonwealth and held that the Commonwealth had every right, under the submarine build contract, to seek the assistance of a third party, as it has done in this instance.

Confidentiality agreements between Australian and USA authorities will ensure that design information embedded in the propeller is properly protected and Kockums, commercial interests are not compromised.

The Director General Submarines, Commodore Paul Greenfield said it was an important decision that supported the Commonwealth's right to maintain and support military equipment in the best interests of Australia.

'The ability to repair, modify or enhance any item of Defence equipment to meet operational requirements is fundamental to Australia's national security. Provided that in so doing the secrets and commercial rights of third parties or foreign governments are properly protected, as they are in this instance, the government must be free to act in the national interest to provide the most operationally effective equipment possible. Notwithstanding the decision of the Court, Kockums, as the designer of the Collins Class, has a very important role to play in the future support of the submarines', he said. 'Although we have been successful in this instance, we sincerely hope that we can move forward and quickly restore the prior mutual respect and strong working relationship that existed between Kockums and the Submarine Project Office.'

The propeller arrived in the USA on 14 April. The decision of the Court will allow improvements to be made to the submarine propeller without further delay.

HMAS *Jervis Bay* — Mission Complete

HMAS *Jervis Bay*, the fast catamaran leased by the Royal Australian Navy to ferry people and equipment between Australia and East Timor, has completed its mission with the RAN following the two-year lease period. Travelling at 43 knots fully loaded and 48 knots lightship, *Jervis Bay* usually crossed between Darwin and Dili in approximately 11 hours.

MARITIME TECHNOLOGY FOR THE 21ST CENTURY

PACIFIC 2002

INTERNATIONAL MARITIME CONFERENCE

ORGANISED BY
THE ROYAL INSTITUTION OF NAVAL ARCHITECTS
THE INSTITUTION OF ENGINEERS AUSTRALIA
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IN CONJUNCTION WITH

PACIFIC 2002 | ROYAL AUSTRALIAN NAVY

SYDNEY CONVENTION & EXHIBITION CENTRE, DARLING HARBOUR, SYDNEY, AUSTRALIA

29 - 31 JANUARY 2002

The theme for this important International Maritime Conference will be maritime technology for the 21st century, and will embrace all facets of marine design, technology and matters operational. Registration for the Conference will give access to the associated PACIFIC 2002 Exposition. The three day Conference will have two concurrent streams to enhance the choice for registrants.

One day workshop/seminars on the specialised topics of Maritime History (in association with the Australian National Maritime Museum & the Sydney Heritage Fleet) and Maritime Education (in association with the Australian Maritime College & the University of NSW) are being held on a fourth day – Friday 1 February.

The PACIFIC 2002 Maritime Exposition will be a focal point for discussion and display of the latest developments in maritime design and technology, and provide a meeting place for industry representatives to exchange ideas and establish personal and business contacts or renew those made at the very successful SEA AUSTRALIA 2000 Conference held at the same venue in February, 2000.

FOR FULLER DETAILS CONTACT

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'Affectionately referred to as the "Dili Express", HMAS *Jervis Bay* served Australia well and successfully filled a shortfall in the Navy's operational capability,' Chief of Navy, Vice Admiral David Shackleton said. 'This shortfall in capability has now been overcome with the introduction into service of the recently refurbished amphibious ship HMAS *Manoora* with the second of the class, HMAS *Kanimbla* coming into service later this year. Along with the decision to keep HMAS *Tobruk*, these refurbished ships will not only provide the capability, but far exceed that of HMAS *Jervis Bay*, to move troops and equipment.'

HMAS *Jervis Bay* was built in Tasmania and leased from Incat Tasmania for two years beginning in May 1999. During her two year charter to the Royal Australian Navy the ship completed 107 trips covering some 100 000 nautical miles, carried 20 000 passengers and 430 military vehicles. In addition, an impressive 5 600 tonnes of stores were shipped.

Major Defence Capital Equipment Projects

Thirty-eight major capital equipment projects totalling around $5.5 billion have been approved for Defence in the Federal budget presented to Parliament on 22 May. These projects will generate expenditure of around $509 million in 2001–02.

The major new projects include:

- lightweight anti-submarine warfare torpe does;
- additional Evolved Seasparrow Missiles (ESSM) for ANZAC frigates;
- an enhanced combat training centre for Army;
- an extension of the working life of the Caribou light tactical airlift; and
- additional point Ground Based Air Defence (GBAD).

The project to acquire additional Evolved Seasparrow missiles will integrate the missile system into ANZAC ships and purchase missile stocks. Australia is part of a consortium of 10 nations participating in the development of the ESSM to replace the NATO Seasparrow Missile (NSSM) as a primary anti-ship missile defence system. The ESSM system will enhance ship missile defence capabilities by providing both more effective missiles and a larger number of missiles per ship. This will increase the survivability of ANZAC ships and crews by improving defences against next-generation anti-ship missiles.

The purchase and integration of missiles, and the modification of existing vertical launch systems in ANZACs 05–07 (*Warramunga*, *Stuart* and *Parramatta*), was previously approved. This project will acquire and integrate ESSM on the last three ships (*Ballarat*, *Toowoomba* and *Perth*), and retrofit the system in the first two ships (*Anzac* and *Arunta*). The first elements of this capability are expected to enter service from 2004.

In addition to these major projects, the budget provides for the relocation of the Defence Science and Technology Organisation's Aeronautical and Maritime Research Laboratories from Maribyrnong to Fishermens Bend. The project will include the construction of research and laboratory facilities and allow the subsequent disposal of the Maribyrnong site. Construction is planned to commence in mid-2001 and be completed in late 2003.

Northern Territory News

Paspaley 4 will be the new mothership for the Paspaley Pearling Company. *Paspaley 4* is 51.3 m long and has a GRT of 1 220 and is built to USL Code Class 3B for NT survey. It will perform all virgin shell operations on the 80 Mile Beach in Western Australia and transport them to the various farms in the Kimberley and the Northern Territory.

Construction of *Paspaley 4* commenced in mid-April 2000 at Flekkefjord Slipp and Maskinfabrikk in the south of Norway. The vessel took shape in the huge hall that covered the building berth, where around twenty pre-fabricated sections were turned over and joined to each other, and then attached to a massive keel block, 40 metres long and with a weight of around 70 tonnes. She was floated out of the hall in November. *Paspaley 4* was due to arrive in Australia by the end of April.

Sri Srinivas

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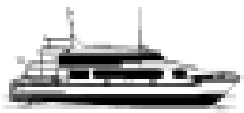

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CAIRNS – AUSTRALIA. JULY 3-5, 2001

Polarstern Delivered by WaveMaster

In March WaveMaster International Pty Limited re-delivered a 44 m aluminium passenger catamaran, *Polarstern* to its German owner, AG Ems, after an extensive refit and refurbishment at its Henderson shipyard. This was the sixth major refit completed by WaveMaster since 1997.

AG Ems purchased MV *Polarstern* (formerly *Caraibe Jet*) in mid-November 2000. WaveMaster was contracted to complete the refit shortly thereafter, with a requirement to deliver the ferry in time for shipment to Germany for the 2001 summer season.

The refit, conducted under survey by Germanischer Lloyd and in accordance with requirements of German marine authorities, involved:

- Refurbishing of the vessel's interior spaces;
- Redesign and rebuilding of all three passenger cabins;
- Design and construction of new passenger bathrooms and luggage storage rooms;
- Design and construction of a new crew mess room;
- Design and construction of three new crew cabins with sleeping quarters for seven persons and full bathrooms with showers; and
- Installation of a new staircase leading from main to upper deck.

In addition, significant work was done to reduce noise and vibration levels on board the vessel. The air-conditioning system was completely rebuilt by raising of ceilings and installation of ducted air throughout the vessel and fire protection was installed to international standards. New handrails were placed around the vessel, and new life rafts were fitted. Finally, the exterior of the ferry was repainted in the owner's livery.

Overall, AG Ems' main objective was to bring the catamaran into compliance with the IMO High Speed Craft Code, and WaveMaster worked closely with the owner throughout the refit project to achieve this goal.

Polarstern will operate between Emden and the islands Borkum and Helgoland in the North Sea.

The 44 m aluminium passenger catamaran *Polarstern*.

Euroferrys take Delivery of Austal built Ship

The first of Austal's Auto Express 101 ferries entered service in May 2001 for the Spanish operator Euroferrys across the Strait of Gibraltar. The 101 m *Euroferrys Pacifica* has the distinction of not only being the largest of Austal's flagship Auto Express car ferries yet to be built, but is also the largest high-speed catamaran in the world with diesel propulsion.

With the capacity for 951 passengers and 251 cars, the new high speed aluminium ferry will operate on the 16 n mile route between Algeciras on the southern coast of Spain and Ceuta in Spanish Morocco, completing six return crossings per day.

Euroferrys currently operates one 78 m fast ferry and two conventional ferries on two separate routes. With a 750 t deadweight capacity and the ability to carry semi-trailers, Austal's Sales Director, Chris Norman, said the capacity and flexibility of the Auto Express 101 will enable Euroferrys to replace the 78 metre fast ferry and one conventional ferry currently servicing the Ceuta route, thereby reducing operating costs whilst providing an improved service.

Austal's ability to customise to the owner's requirements was a major reason for succeeding with this order. Austal was able to satisfy Euroferrys requirements for fast turnaround times and the ability to carry substantial commercial vehicle loads on the route which, at only 16 n miles, is a high-frequency route. The vessel also features an Austal design innovation in the garage — a hoistable vehicle deck to facilitate a mix of vehicle and commercial/freight carriage.

Whilst previous Auto Express ferries have accommodated a 12 t axle load suitable for loading buses, the Auto Express 101 allows a 15 t axle load. Lane widths are 3.5 m and the bow door allows full utilization of the 341 freight lane metres.

The Auto Express 101's vehicle deck features approximately 1 190 lane metres including 341 freight lane metres. The hoistable vehicle deck (extending the full length of the vessel) has four hydraulically-operated sections which can be operated together or independently and can be raised or lowered in less than one minute. A typical vehicle mix aboard *Euroferrys Pacifica* would comprise 251 cars or 96 cars, and 16 semi-trailers (or 20 trucks).

Trial Results

Fitted with four Caterpillar 3618 engines generating 28 800 kW and the Seastate T-Max high-speed steering system, *Euroferrys Pacifica* comfortably achieved 37 knots with 500 t dwt at 90% MCR.

The vessel also features Seastate's active interceptors. Given the short and relatively sheltered crossing, the motion control system's forward foils were not installed but the system is designed to easily enable the full installation.

Interior Design

Austal worked closely with Euroferry's designer, Oliver Design of Spain, to customise the vessel's styling, both internally and externally, to create an attractive and contemporary vessel. The interior design aboard the *Euroferrys Pacifica* was skilfully crafted by Austal's interior outfit team to the highest standard, resulting in one of the most stylish and sophisticated outfits seen on any vessel today.

Oliver Design's Jaime Oliver said 'To better cope with the characteristics of this highly competitive route across the Gibraltar Strait, Euroferrys expressed the desire to introduce some distinctive and innovative changes to the standard design, particularly in connection with the external image of the vessel and the interior arrangement of the passenger areas.

From the beginning, there was a perfect understanding and collaboration between owner, shipyard and designer, resulting in a very smooth and early technical definition.'

The design brief took into account characteristics of the operation such as the short duration and the potential passenger mix, to ensure a superior service in terms of comfort and entertainment, while at the same time creating an environment in which onboard sales would be encouraged to maximise operational revenue.

Oliver Design created what Jaime Oliver termed the 'Park' concept, with a rich variety of ambiences and activities created by alternating sitting areas with shops, cafeterias, bars and game arcades. The effect is enhanced with terraced decks and vaulted ceilings in several zones and a mixture of seating styles — airline, lounges and café, contributing to the differentiation of the spaces.

The passenger accommodation is located on one main deck, a departure from previous Auto Express designs, with stunning interior design features throughout. One of the most eye-catching features aboard the vessel is a fibre-optic display of the Southern sky under the central atrium. From here, a central stairway leads to an outside observation area immediately aft of the wheelhouse where 60 non-revenue deck seats are located.

The use of panoramic windows forward and aft for the width of the superstructure and the incorporation of domes and skylights has made an important contribution to the use of natural light and enhanced scenic vision. The forward lounge is designated Business Class and features an owner's suite and VIP lounge. Onboard facilities include a boutique, duty-free shop, three bars and serveries and game arcades.

Crew accommodation, change rooms, mess and lounge areas are located between the bridge and the upper deck forward.

The spacious wheelhouse is comprehensively outfitted with the latest marine navigation and communication equipment including a suite of Kelvin Hughes ARPA radars and electronic chart navigation, a Vistar night vision anti-collision system and GMDSS A2 communication. The wheelhouse also features two modular lounge areas. The Austal-developed Marine Link system provides extensive monitoring of machinery and systems throughout the vessel as required by class. Whilst the main function of Marine Link is control and monitoring, it also has a powerful on-line documentation system to manage all user manuals and even the vessel's electrical drawings and documentation. Marine Link provides the customer with the flexibility to tailor the system to meet their needs, overcoming limitations inherent in proprietary third-party systems.

Four Marine Evacuation System (MES) stations are located forward and aft, to port and starboard and have been supplied by RFD. The systems can be activated locally or from the bridge. Harbour deployment trials successfully demonstrated the evacuation of 150 passengers from one station in 8 minutes and 18 seconds which was well under the required time.

Principal dimensions of *Euroferrys Pacifica* are an overall length of 101 m, immersed hull length of 88.7 m, moulded beam of 26.65 m and hull draft of 4.2 m. The propulsion package comprises four Caterpillar 3618 engines, four Reintjes VLJ6831 gearboxes and four Kamewa 125 SII waterjets. Classification is to Germanischer Lloyd ✠100A5, HSC-B OC3.

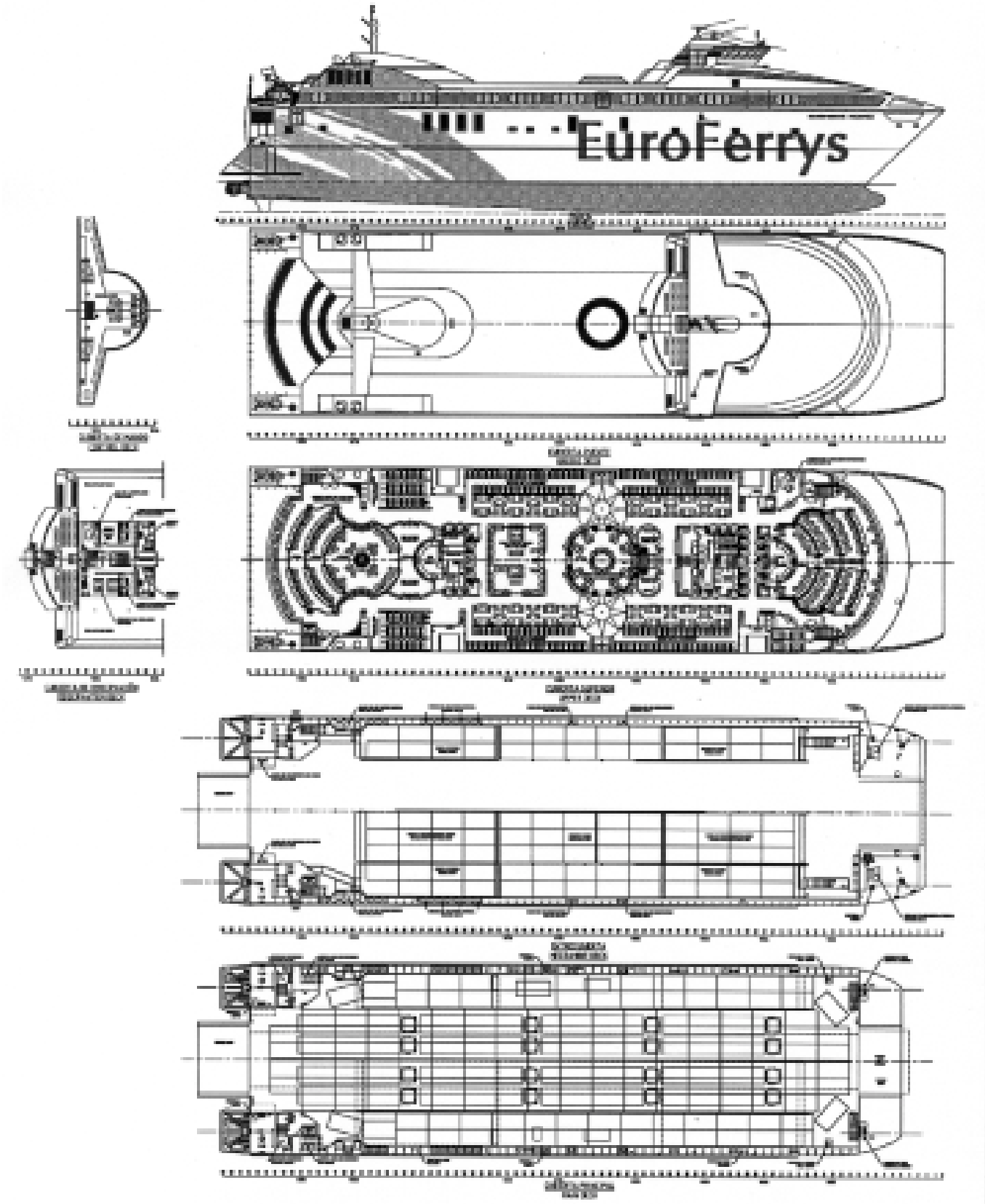
Queensland News

In North Queensland the export of vessels from the NQEA River Runner® range of low-wash ferries continues with the construction of two 30 m vessels destined for the UK to MCA survey and Lloyd's class. The first vessel has completed extensive trials off Cairns, showing excellent results with a speed of 25 kn fully loaded, 1.3L crash stop and impressive manoeuvrability. Wash results confirmed suitability for the highly sensitive and publicly scrutinised operational areas. A larger 37 m River Runner® 200 is also well under construction for operations as a VIP commuter and excursions ferry for the Thames River in London. The vessel features an aft wheelhouse and extensive panoramic windows.

Cairns Slipways yacht refits have increased significantly with major work on three motor yachts including *Double Haven*, *Montigne* and *Kokomo II*. Corfordo has two aluminium long-liners under construction for export to Samoa. Both vessels are single screw, one is 17 m in length and the other 20 m in length.

Cairns Custom Craft has delivered a 21 m aluminium dive boat to local operators. Powered by two 423 kW Cummins diesels with conventional shafting, this vessel can cruise with 50 passengers at 25 kn. Also under construction is a 12 m aluminium jet boat powered by two 298 kW Yanmar diesels.

Brian Robson



The General Arrangement of *Euroferrys Pacifica*.

New South Wales News

New Design

The past six months has been one of the busiest periods experienced at Incat Designs for a number of years. The USA market in particular has been extremely active for passenger catamarans in the 25 to 45 m range. In total, seven new catamaran designs, six for the USA (two recently launched), and one soon to start construction in Western Australia for an Indonesian client, are progressing across the 'drawing boards', i.e. the computer screens. This translates into approximately 450 t of aluminium alloy, fabricated into 290 m of vessel length, engined by 35 500 kW of brake power, carrying 2 700 passengers at an average speed of 31 knots!

New Construction

The first vessel, *Seastreak New York*, of a two-boat order for operators Seastreak, was recently trialled in the waters off Massachusetts, USA. Designed by Incat Designs and built by Gladding Hearn, the 43 m length OA catamaran can carry 400 passengers. She is fitted with four waterjets and a total main engine power of approximately 5 600 kW, and exceeded her trial speed in a fully-ballasted condition. The vessel has now been delivered to New York and will soon be operating on a commuter route in the Manhattan district.

Warren Yachts of Kincumber recently completed their biggest project ever, the building of the superyacht *Slipstream.* The 43.4 m vessel was launched by the NSW Premier, Bob Carr, in January (see *The ANA*, February 2000) and final fitout was recently completed at the superyacht marina in Rozelle Bay, Sydney. The vessel was subsequently craned onto a heavy-lift ship and, as we go to press, is on her way to Genoa, Italy.

Around and About

The entry into service of Sydney's new SuperCats on the Manly run has not been without drama. Reported incidents include shipping green water in significant waves, resulting in wet passengers, and two separate collisions with wharves. All attracted considerable media attention. Despite the press, passenger numbers have increased on routes where the SuperCats have been introduced. Meanwhile, *Collaroy* has returned to service following repairs after grounding at Little Manly, and *Narrabeen* has commenced refurbishment at Australian Defence Industries, Garden Island.

The Sydney boating community has lost a legend and one of its great identities with the death of Harold Halvorsen in November last year, just months after being awarded a Medal of the Order of Australia for his services to the Royal Australian Navy during World War II. In his 75-year career, Mr Halvorsen built 1 300 boats, including 247 for war-time service. When he died, the 90-year old master boatbuilder was still working as Chairman and Managing Director of Halvorsen Boats, which he established in 1946. The son and grandson of boatbuilders, Mr Halvorsen migrated to Australia from Norway as a cabin boy in 1924. Mr Halvorsen was remembered at a special service in November, attended by family members and hundreds of friends and boating community members.

The Sydney Heritage Fleet commenced work on May Day on the restoration of *John Oxley*, or 'John Oxide', as she is affectionately known for obvious reasons. She has lived aboard the Fleet's *Sea Heritage Dock* in Rozelle Bay for many moons, and is destined to be there for many more. Three floors and four frames have already been removed, used for templates, and the replacements have been fabricated. These will be fastened back into position, and the process repeated. When about eight frames have been replaced, the area will be re-plated. The whole process of re-framing and re-plating in sections will then be repeated so that structural integrity is maintained throughout the restoration of the hull.

James Craig will soon be a familiar sight out on Sydney Harbour following the recent issue of a survey certificate for Class 1E operations to carry 150 passengers and 25 crew in smooth waters. It is expected that the survey will be upgraded to Class 1C (carrying passengers up to 30 n miles offshore) when various requirements are completed later in the year.

Phil Helmore

Curtin

UNIVERSITY OF TECHNOLOGY

Associate Professor in Hydrodynamics

Centre for Marine Science and Technology

(Full-time – three years) Ref 3527

Founded in 1985, the Curtin University Centre for Marine Science and Technology (CMST) comprises a multi-skilled body of scientists and engineers committed to the development of technical ocean-related skills in Australia. The Centre has earned a reputation as a high quality marine technology research and development facility responsive to industry and government needs. CMST has recently been awarded a government funded Centre of Excellence.

CMST is seeking to appoint an Associate Professor in Hydrodynamics – a new position for the Centre. The position is intended to have a research and development emphasis allied with CMST's existing hydrodynamics activities which include numerical, model and field studies of the dynamics of surface and sub-surface vessels and ocean wave analysis.

Applicants should possess a relevant doctoral degree and have a proven track record in leading and obtaining funding for research and development programs. The appointee may also be considered to succeed the current Centre Director who is soon to retire.

Contact: further information can be obtained from Professor John Penrose, telephone (08) 9266 7380, facsimile (08) 9266 4799, Email J.Penrose@cmst.curtin.edu.au

Applications must address the selection criteria, quote the position reference number and include the names, addresses, telephone and facsimile numbers of three referees. **Selection criteria:** available on our Web at recruit.curtin.edu.au

Benefits: salary range $76,910–$82,122 pa. The total employment cost, including superannuation (UniSuper) is available for repackaging through the University's remuneration packaging service. Conditions for appointees include airfares and removal assistance.

Submit applications: Divisional Administrator, Division of Engineering and Science, Curtin University of Technology, GPO Box U1987, Perth, Western Australia, 6845. Telephone (08) 9266 2603, facsimile (08) 9266 2602.

Closing date: 6 July 2001. Curtin reserves the right to appoint by invitation.

Curtin is an Equal Opportunity Employer and provides a smoke-free work environment.

THE SOLAR BOAT RACE AND RINA WORKSHOP

For the second year running, the ACT Section of RINA in association with the Australian Science Festival has held a workshop in conjunction with the annual solar and advanced technology boat race on Lake Burley Griffin in Canberra. The SolACT SmartRace 2001 was held on Saturday 28 April and the workshop was held on the following morning. The Australian Science Festival once again provided notification of the event in their newsletter for race competitors and this year they also arranged for tent facilities to remain available at the race site and a BBQ after the workshop.

Once again, several presenters gave short overviews on various aspects of the design of solar boat entries. As far as possible, different presenters from those of the 2000 workshop were sought out to keep the themes fresh. Presentations included:

- A short introduction by Rob Simpson, the boat-race coordinator for the Australian Science Festival.
- *Overall boat design and safety considerations* by Graham Langdown of the Canberra Institute of Technology (CIT) 'Educator' team.
- *Resistance considerations and hullform optimisation* by Bruce McNeice, Secretary of RINA ACT Section.
- *Propeller selection* by Steve Downing of the Alternative Technology Association's *AmpCat 6* team.
- *Hints and tips on boat design refinement through trials and battery capacity monitoring* by Fraser Argue who entered this years winning *Styro Knot* monohull and also the *SolACT* catamaran.
- *Race strategy and battery monitoring* by Tom Rowlands of the Lake Tuggeranong College team.
- Closing remarks on *The future direction of the annual race* were made by Stewart Clode, the solar boat and car team coordinator with the college.

The workshop drew to a close at 12:30 pm and the 30 attendants were then provided a BBQ lunch by members of the Lyons Club. This allowed further time for enthusiastic discussions on solar and electric boat design.

Meanwhile, this year the SolACT SmartRace saw the first occasion in which a hydrogen-fuelled boat made an appearance. Trevor Peterson was allowed to make a demonstration run in his speed boat *Basic Instinct* prior to the start of the other classes of entries. This conventional planing boat was fitted with a hydrogen-powered outboard engine supplied by Mercury. Not unexpectedly, it increased by around 10 knots the maximum speed so far achieved in the race through other propulsion options.

In the Competition A Class (Lead Acid batteries), Fraser Argue in association with Telopea Park School convincingly demonstrated the advantage of using a lightweight battery-powered monohull entry, *Styro Knot* to win by a comfortable margin over both the trimaran *GreenChoice* (first in Competition B Class) and the catamaran *AmpCat 6* (second in Competition A Class). Murray Baker also once again demonstrated the substantial endurance which can be achieved by using a converted battery-powered 4-man rowing shell in the unlimited Open Class category. His *Great Southern Energy Express* team achieved speeds averaging between 9 and 10 knots for the entire five-hour race.

Martin Grimm

A cute 3 m long entry named *Strev* by Alex Revel of the University of Technology Sydney in the Open General Class powered by batteries and a 24 V 300 W DC electric motor (above)
(Photograph Richard Elliott)

A selection of craft in the Competition and International classes lining up prior to the start of 2001 SolACT SmartRace at 10am (below)
(Photograph Richard Elliott)

THE NWBS TRIHULL

Steve Quigley, Managing Director
Robert Tulk, Senior Naval Architect
North West Bay Ships

1. The NWBS Story

North West Bay Ships (NWBS) was born four years ago around the concept of a new generation in ferry design, being of a trimaran configuration. Of course, this is not a new concept, trimarans having been around for a long time and, indeed, the Patents Office abounds with foil-assisted trimaran concepts dating back fifty years. In recent years, the sailing scene in Europe has seen considerable high-technology development in the Open 60 Class trans-Atlantic trimaran racers. NWBS sought to take these and other existing concepts and adapt them to the commercial ferry industry and, in the process, refine the design to suit this new purpose.

2. Design Concept

In 1997 the industry was moving towards larger high-speed vessels, of the order of 45 m plus and carrying up to 450 passengers. Speeds of 25 kn in the eighties and 35 knots in the early nineties were replaced by owners' demands for 40 knots plus. New routes were being developed on the basis of this speed increase, covering longer distances and often crossing open areas where sea conditions could at times be fairly onerous.

The starting specification for NWBS was developed in this environment and, in basic terms, encompassed the following:

- HSC Code Category B vessel capable of 40 kn;
- Passenger vessel only, up to 500 pax, in high-standard European outfit;
- Comparable or better sea keeping qualities;
- Environmentally sensitive;
- Increased fuel efficiency; and
- Striking design.

Of these, the last two were considered the most important. For a new shipyard to be competitive against other world-class yards in Europe and Australia, it was considered that a 5% minimum increase in fuel efficiency would be necessary, together with a visually-appealing design different from the existing catamaran forms.

The trimaran configuration was selected early in the process for further development following preliminary comparisons against catamarans and monohulls. It was hoped that a design could be found that enabled the best aspects of both monohulls and catamarans to be combined, without itself having any major flaws. To this end, the following possibilities were identified:

- A trimaran has a long slender central hull that should provide opportunities to target fuel efficiency and increased performance.
- Superior sea-keeping abilities of monohulls in very rough weather.
- Superior sea-keeping abilities of catamarans and monohulls at various headings.
- A trimaran configuration allows large deck areas similar to a catamaran.
- A trimaran would provide a striking design, being visually different from existing designs in the marketplace.

3. Resistance Testing

Prior to making the commitment to proceed with construction of a full-scale vessel, over three years of intensive research and development was carried out. Initially, numerical computations were made at The University of New South Wales, covering a wide variety of trimaran forms, focusing on the centre hullform and the size and location of the side hulls. The two best-performing centre hulls and side hulls were selected and 1:35 scale tank testing was conducted at the Australian Maritime College. A 10 m self-propelled model was constructed following the AMC testing in order to fully evaluate the concept.

The 10 m model was fully tested for resistance at the open-water AMC test facility. A shore-based winch with a 2 km long tow rope was utilised to measure the drag over a range of speeds and displacements.

One of the joys of working on new projects is the opportunity to do some crazy things. For NWBS this involved some wild rides in the Southern Ocean on the 10 m model, in extreme seas of 3 m (15 m at ship scale). It was essential to test the full spectrum of the operational characteristics of this hullform to ensure that there were no unforeseen handling characteristics or latent problems that may have surfaced at a much later date. Comparisons to riding a Malibu jumped to mind as the model accelerated to 25 kn plus down the front of large waves.

Test results were beyond expectations, resulting in sufficient confidence for NWBS to proceed with a major capital investment programme.

4. Shipyard

NWBS established a state-of-the-art shipbuilding facility on the shores of North West Bay in Margate, some 20 minutes south of Hobart. The building bay is totally enclosed, providing a 50 m clear-span fabrication area with 20 m overhead clearance, complete gantry crane coverage, and with under-floor reticulated air, gas and electrical supplies.

The North West Bay Ships shipyard in Tasmania

5. Construction and Classification

Det Norske Veritas was chosen as the classification society for the vessel. A combination of DNV's high-speed vessel experience, together with experience gained on the Royal Navy Triton (a 90 m 28 kn trimaran built for military evaluation), resulted in beneficial discussions on the concept and the design methods best suited to this type of vessel.

The vessel has been designed to DNV ✠1A1 HSLC Passenger R1 EO Category B classification. Construction material is aluminium for both hull and superstructure. The superstructure is mounted on rubber isolators to reduce noise and vibration transmission from the hull to the passenger cabin. Noise measurements during trials confirmed a 20 dB difference between the hull deck and the passenger deck, indicating that the MacKay mounts were performing to expectations.

Several new aluminium extrusions were developed to enable large pre-welded panels to be constructed prior to fitting into place, which produced not only labour savings, but also allowed very light curved surfaces to be formed without welding deformation.

6. Principal Particulars

Principal particulars of the vessel are as follows:

Dimensions

Length OA	54.50 m (excluding jet fender)
Length WL	52.14 m
Beam	15.30 m (excluding fender)

Deadweight

Passengers	484 at 75kg	36.30 t
Crew and effects	15 at 100kg	1.50 t
Fuel	14 060 L	11.95 t
Fresh Water	2 500 L	2.50 t
Sullage	2 500 L	0.00 t
Stores		4.00 t
Total		56.25 t

Machinery

Main Engines	Three MTU 16V4000 2320 kW at 2000 RPM
Gearboxes	Three Reintjes VLJ 930 HR/HL
Waterjets	Three KaMeWa 63 (2xSII, 1xBII)
Generators	Two Cat 3306
Bow Thruster	Two HPS thrusters

7. Fitout and Equipment

The wheelhouse is configured in a space-efficient cockpit arrangement. Separate bridge wings provide exceptional vision fore-and-aft when docking. The electronics in the wheelhouse are configured to comply with IMO Category B requirements and include Kelvin Hughes radars, C-Plath navigational equipment and electronic chart navigation, Sailor GMDSS radio and communications systems, and Phillips CCTV. The engines are fitted with MTU MCS-5 Type II monitoring and controls.

Passenger cabins are fitted out to a European standard, with toilet and bar facilities on both decks. The upper deck is configured for first class passengers, whilst the lower deck can be divided into a forward and aft cabin if desired.

A Maritime Dynamics ride-control system is fitted to the vessel. NWBS wanted a ride-control system that would pay for itself and the trimaran configuration permits this. The foil system provides partial lift to the vessel, and is configured to control pitch, roll and heave.

8. Trials

Under conditions of inclement weather and a sea breeze of 35 knots, the vessel achieved speeds within $\pm$1 kn of theoretical predictions. Final out-fitting and fine-tuning of the vessel will occur in May in order to optimize the speed potential of the vessel. It is anticipated that increased fuel efficiency between 20 and 25% will be achieved over comparable catamarans and monohulls.

The sea-keeping trials were undertaken in Storm Bay in conditions of 2.5–3.0 m significant wave height

The trimaran on trials (Photograph courtesy NWBS)

and 40–50 knots of wind. The trimaran exhibited phenomenal qualities attributed to its effective single-hull slender monohull status in bow and stern seas with the wide-spanning foil system providing excellent roll reduction in beam seas. There were none of the jerky motions evident on vessels with high GM's and no slamming or harsh jarring accelerations as is evident in some vessels. One interesting handling characteristic is that the vessel heels into a turn, giving the helmsman a sensation of flying. Turning circles at full speed have a radius of approximately four times the ship length.

The vessel is fitted with an acceleration monitoring system that generates a wheelhouse alarm if pre-set acceleration levels are exceeded. The speed vs wave height curve allows 40 kn in a 1.8 m significant wave height sea. The trials indicated that higher sea states may be possible, as acceleration levels rarely exceeded 50% of the limits.

Another exciting outcome of the sea trials was the wash generated. Our camera crew continued filming from a dinghy as we thundered past at full power and full displacement at a mere 10 m away. The fact that they remained standing is a good omen for our wash measurement trials that are scheduled as part of Phase 2 trials in late May.

9. Bow thrusters

One of the more interesting outcomes of the trials was the maneuverability of the trimaran with the bow thrusters. At the design stage we were very concerned about the potential maneuverability problems associated with two steering jets very close together in the centre hull, thus providing a small turning moment. In addition, the side hulls were expected to contribute to resistance to slow speed turning. To overcome this, two bow thrusters were installed in the bow of the centre hull. Maneuverability turned out to be excellent and the vessel will be slipped to remove one of the bow thrusters, thus removing some 400 kg of thruster, hydraulics and control gear, and entrained water.

The downside of the thrusters is that in certain sea states there is some noise emanating from the tunnels at full speed. There is very little information in Australia on what the opening shape should be for tunnels which are transverse to the flow at high speeds. If anyone is aware of any tests we would be very pleased to hear from them. Alternatively, this could provide an interesting computational flow thesis topic for a final year student.

10. What's Next?

NWBS have secured a contract for the first of a number of 33 m catamarans to be built for Fantasea Cruises, based on Hamilton Island. These vessels are unique in that they must perform two primary roles, these being as a ferry operation between islands and as a tourist operation out to the barrier reef. This requires a vessel with low-wash characteristics that can also operate in a 3 m sea state. These requirements are generally at opposite ends of the design spectrum and some compromise, together with a clever design, is required to ensure that both roles are adequately catered for. These vessels are a perfect complement to the trimaran, and will enable NWBS to continue production whilst Phase 2 of the trimaran sea trials is finalised.

FROM THE CROW'S NEST

BV–RINa Link

The formation of a new European mega-classification society has moved closer with the the alliance between French class society Bureau Veritas and its Italian counterpart, Registro Italiano Navale. Bureau Veritas executive vice-president Bernard Anne said 'We are very peased to have reached an agreement with RINa which will build on our experience of working together in Unitas, and which will form the foundation of a future world-ranking European classification society.'

If the due diligence gives positive results, then RINa will be linked with BV through two companies. The first will incorporate all RINa's main

business and will be controlled by the RINa Foundation with a 51% shareholding and BV holding the remaining 49%. The second company will take over RINa's industrial and certification business and will be controlled by BV.

Bureau Veritas employs more than 10 000 people in 150 countries around the world, and its marine division classes more than 6 500 vessels totalling 37 million GT. Registro Italiano Navale employs more than 650 people in 55 countries around the world, and classes more than 2 000 vessels totalling 15 million GT. RINa claims particular expertise in cruise and ferry passenger vessels and high-speed craft.

The new partners stressed that there would be no immediate radical shake-up. The alliance would preserve the identity of both classification societies and focus initially on technical cooperation in the marine field. The alliance is expected to be concluded after a 3-month period under a letter of intent signed in February.

Lloyd's List DCN, 8 February 2001

AICH to Dissolve

The Amicale Internationale Capitaines au Long Course Cap Horniers (AICH, the International Cape Horners World Congress) decided at their meeting in Mariehamn, Aland Islands, Finland, in September 2000, that the Amicale should be dissolved.

The Amicale was founded in St Malo, France in 1937, and grew to boast more than 2 500 members in 1975. However, with no source of younger members, involuntary retirements, and the advancing years of the elders making travel to congresses more difficult, it was felt that the end should be dignified.

As a result, the 2001 congress will be held in Valparaiso, Chile; the 2002 congress in Nyborg, Denmark; and it is apposite that the final congress will be held in 2003 in St Malo, France, where the first congress was held.

The Cape Horner Journal, February 2001

Wheelhouse Simulator for Fishing Vessels

A portable wheelhouse simulator for training fishing vessel crews has been developed by South Australian-based Sydac Pty Ltd. The simulator is a modular classroom-based training aid comprising a master console, instructor station and vision projection system. Designed for the Australian Fishing Academy at Port Adelaide, the simulator includes all the instruments and controls typically found on a modern fishing vessel. 'Out-of-the-wheelhouse' vision is provided using computer-generated imagery giving high fidelity in forward, side and rear views. The simulator, which costs $500 000, draws on Sydac's experience in developing innovative simulators for the railway, air and road industries. The simulator predicts vessel performance in terms of speed, heading, fuel consumption, and manoeuvrability. Extensive tests have been carried out on fishing vessels to validate vessel models.

Engineers Australia, February 2001

Wave-piercer Cuts Rescue Times in Half

It looks like a cross between a submarine and a chisel—but French naval architects say their bizarre new design for a lifeboat will halve the time it takes to reach a ship in trouble. Using wave-piercing technology more common to high-speed catamaran ferries, the 22-metre-long craft (a monohull) will have a top speed of 55 knots. Currently, the fastest lifeboats plying Britain's coastal waters have a top speed of 25 knots.

'The bow will cut through the waves like a blade,' says Gildas Plessis, one of the boat's designers at Plessis Marin, based in Machecoul, near Nantes. Just like a fast ferry, the lifeboat will be propelled by two powerful waterjets. Plessis anticipates that in rough seas the vessel could be submerged by up to 5 metres as it travels under the crest of a wave before re-emerging in the trough. The lifeboat would have a crew of four and be able to rescue up to a dozen people at a time. In calmer seas, rescuers could leave the craft's rear on jet skis towing floating stretchers, say the designers.

The vessel's lightweight hull will be built from a

sandwich of glass fibre and PVC bonded with epoxy resin. Plessis aims to test a model in a tank within the next year. 'If the tests are OK, we hope to see our first wave-piercer built in 2002 or 2003,' he said.

The company is also working on a military version which could be used as a landing craft. In this case, Plessis says, the hull would be reinforced with Kevlar—which is used in bulletproof vests—and carbon fibre to help protect the craft against gunfire.

New Scientist, 17 February 2001

The Race: Record Circumnavigation

The Race is a non-stop, unrestricted sailing sprint around the world which started on 31 December 2000 from Barcelona, Spain. Boats were required to pass through Cook Strait in New Zealand on their way through the Southern Ocean, to keep them above the icefields. Entries included *Club Med* and two sister ships, *Innovation Explorer* and *Team Adventure*, the maxi cat *Playstation*, and two older, renovated record-breaking catamarans, *Polpharma Warta* and *Team Legato*.

On Saturday 3 March 2001 the maxi catamaran *Club Med,* skippered by New Zealander Grant Dalton and Frenchman Franck Proffit, completed a record-breaking circumnavigation of the world. *Club Med's* time of 62d 6h 56m 33s meant that she covered the 27407.9 nautical miles at an average speed of 18.3 knots, a daily average of 439 nautical miles! The biggest 24 hour distance was a new world record of 655.2 nautical miles, at an average speed of 27.3 knots. *Club Med*'s circumnavigation represented a 26% gain in speed over the previous record holder, the 27m trimaran *Sport Elec*.

Principal particulars of *Club Med* are as follows:

Length OA		33.5 m
Beam		17.5 m
Displacement		20 t (approx)
Mast height		41.5 m
Sail Area	Upwind	610 m^2
	D'nwind	800 m^2
Crew		14

Full results for The Race can be found at the website www.therace.org.

Vendee Globe: Record Circumnavigation

The fourth edition of this French-organised, solo, non-stop around-the-world race came to a conclusion in March. Frenchman Michel Desjoyeaux stormed to the finish on his Open 60 monohull *PRB*. His time of 93d 3h 57m 32s sliced 12 days off the previous record held by Frenchman Christophe Auguin. Remarkably, he was followed 24 hours later by Englishwoman Ellen MacArthur on board her New Zealand-built Open 60 *Kingfisher*. She had match raced him all the way up the Atlantic. Although MacArthur arrived 24 hours after Desjoyeaux, she had sailed 480 miles further over the course, so her overall average speed of 12.02 knots was higher than his 11.94 knots.

The average speed of these Vendee Globe solo sailors in their 18 m monohulls was higher than the average speed of the winning boat in the last Whitbread Race, *EF Language*, a 19.5 m monohull with 12 crew which averaged 11.22 knots around the world.

Principal particulars of *PRB* and *EF Language* are as follows:

Name	*PRB*	*EF Language*
Type	Open 60	Whitbread 60
Length OA	18.28 m	19.5 m
Beam	5.46 m	5.25 m
Draft	4.5 m	3.75 m
Displacement	9.2 t	13.5 t
Sail Area		
Upwind	300 m^2	200 m^2
Downwind	560 m^2	500 m^2
Crew	1	12

Full results for the Vendee Globe can be found at the website www.vendeeglobe.com.

The Editors extend their thanks to Felix Scott, UNSW Naval Architecture student, for providing the copy for The Race and Vendee Globe records.

Herald of Free Enterprise Postscript

Fourteen years have now passed since the disastrous loss of *Herald of Free Enterprise* on leaving the port of Zeebrugge, Belgium. It is not well known that almost twenty parties were involved

in the salvage of the vessel and each was under the impression that their part had priority. There was therefore heavy conflict of interest and the Court of Commerce in Bruges appointed Captain Roger Ghys, a Belgian Government ship surveyor, as the Court Surveyor to give advice to the court and to the salvors, and to supervise the salvage. Under Belgian maritime law, a court surveyor may not release his own version of events until ten years have passed and the permission of the main party involved has been obtained. Captain Ghys has now released his report on the incident, *The Tragic Capsizing of* Herald of Free Enterprise. The report is noteworthy for the insights which it gives into the causes of the loss of the vessel, and into the difficulties faced and overcome by the salvors. Copies of the report may be obtained from Neil Cormack on (08) 8248 1780 or Phil Helmore on (02) 9385 5215 or email p.helmore@unsw.edu.au for the cost of photocopying and postage.

Admiral Karpfanger Postscript

The four-masted barque *Admiral Karpfanger* (ex *L'Avenir*) was lost with all hands in the vicinity of Cape Horn in March 1938 with a cargo of wheat in bags en route from Port Germein, South Australia, to Falmouth, UK, for orders under the Hamburg-Amerika flag. The subsequent Maritime Court of Inquiry in Germany had little to go on, but decided that she was seaworthy on leaving port. The real cause(s) of the loss remained a mystery and hotly debated. Two recently-released reports have cleared up the mystery.

Neil Cormack has recently completed a report, The Four-masted Barque *Admiral Karpfanger*: Stability Data (January 2001). His analysis of the stability of *Admiral Karpfanger* is thorough, complete, and based on witnessed data. What is frightening is the stability curve with the forward well deck flooded and a wave crest at amidships (as could reasonably be expected around Cape Horn), the *maximum GZ* is 0.06 m (0.2 ft) at 30° and the range is only 43°! This is not a condition in which you would want to round the toughest cape in the world!

Captain Roger Ghys has also recently published his final report, The Tragic Loss of *Admiral Karpfanger* (*Le Courrier du Cap*, June 2000). His analysis of the probable cause of the loss of *Admiral Karpfanger* is also thorough, complete, and based on witnessed data. He investigates each proposed cause of the loss in detail, and concludes that the vessel's stability (as analysed by Neil Cormack) was insufficient for the passage, but that there were other contributory effects which would not (by themselves) have caused the loss.

Copies of either report may be obtained from Neil Cormack on (08) 8248 1780 or Phil Helmore on (02) 9385 5215 or email p.helmore@unsw.edu.au for the cost of photocopying and postage.

Phil Helmore

Admiral Karpfanger in her former life as the cargo-cum-cadet ship *L'Avenir* under the Cie Maritime Belge flag (Photo courtesy Neil Cormack)

EDUCATION NEWS

Curtin University

Earlier this year the Western Australian government approved the establishment of Curtin University's Centre for Marine Science and Technology (CMST) as a Centre of Excellence. The Centre conducts research and development in hydrodynamics, marine acoustics and underwater technology. The establishment of CMST as a Centre of Excellence underpins a commitment to provide excellence in R&D for the marine industry.

Under the Centre of Excellence scheme funding from the WA government, Curtin and industry sources in excess of $2 million over three years will provide a substantial boost to research infrastructure. As part of the projected growth in naval architecture activities, the Centre has appointed Dr Jinzhu Xia as a Research Fellow. Jinzhu has previously held research positions with the University of Western Australia, the Danish Maritime Institute, the Technical University of Denmark and the China Ship Scientific Research Centre. Currently there are 10 postgraduate research students at CMST and the Centre is actively seeking more. A recent recruit is Kristoffer Grande, who has started a master's degree in ship hydrodynamics after completing his undergraduate naval architecture studies in Norway last year.

Kim Klaka

The University of New South Wales

Undergraduate News

The naval architecture students and staff held a get-together on Thursday 22 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 program 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 a record fifteen students in the third year and six in fourth year, most of whom attended. Four post-graduate students came along as well as the three full-time staff, and it was a bonus to see Noel Riley of the part-time staff there too. A broad mix, and some wide-ranging discussions ensued.

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

Bronwyn Adamson	H2/1
Dougal Loadman	H1
Adam Solomons	H1
Kian Poh Yong	H2/2

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

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 Nicholas Hutchins.

The Baird Publications Prize 2 for the best performance in Ship Structures 1 to Hason Ho.

The Royal Institution of Naval Architects (Australian Division) Prize for the best ship design project by a student in the final year to Sean Ilbery for his design of an 86 m aluminium semi-swath passenger and car ferry for the trans-Bass Strait route between Melbourne and Devonport.

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

Congratulations to all on their fine performances.

Post-graduate and Other News

Simon Robards, currently doing his PhD at UNSW under the supervision of A/Prof. Lawry Doctors, continues his research into accurate linearised wave resistance prediction. His aim through this research, is to adjust the theoretical wave resistance of high-speed vessels to more closely match measured wave resistance. For this research he is using A/Prof. Doctors' HYDROS program, written in Fortran77, which calculates the hydrostatics and hydrodynamics of numerous types of

vessels. Simon has since updated the HYDROS suite of programs to be compatible with a PC system, and has also updated the source code language to Fortran90. He is currently working on extending his database of ship model data to be used in the regression process. Ultimately the aim is to have a set of correction factors, based on the regression of the model data, which can be used in the preliminary design process for the calculation of wave resistance of any high-speed hull form.

Jubeom Lim is nearing completion of his Master of Engineering Science project. He has been investigating the drawing of propellers using the high-end solid-modelling and CAD package, ProEngineer. He has concentrated on generating drawings of series propellers using the minimum information, and has brought this to a good level. One of the side benefits of solid modelling is that once the model is generated, the input of the material density and the click of a button results in the output of the polar moment of inertia of the propeller (in air); a big saving, as anyone who has done a polar moment of inertia calculation will testify. A further refinement will be to add the polar moment of inertia of the entrained water.

The Sixteenth International Workshop on Water Waves and Floating Bodies was held this year in Hiroshima, Japan, on April 22 to 25. This subject is of special interest to Australian naval architects, because of potential damage to the banks of rivers and seashores by high-speed ferries. A total of 47 papers was presented by attendees from around the world, including Australia, England, France, Italy, Japan, Russia, New Zealand, and the USA A/Prof. Lawry Doctors presented his work on the relative merits of monohulls and catamarans, as well as the effects of the higher speeds, where wave generation is generally (but certainly not always) greater. Of particular interest were two papers in which were analysed the importance of acceleration/deceleration of the ferry and the effect of uneven river profiles on the wave generation. Interested readers may contact Lawry on (02) 9385 4098 or email l.doctors@unsw.edu.au for further information on the technical papers.

Phil Helmore

Lawry Doctors

HMAS *Brisbane* and USS *John S McCain* off the Queensland coast in May during Exercise Tandem Thrust (US Navy photograph).

ON THE MINIMUM STABILITY OF A SHIP
A TECHNICAL NOTE

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1. INTRODUCTION

As a key factor of ship safety, stability has always attracteded the attention of naval architects. More and more elaborate methods are now employed to examine complex phenomena associated, for example, with damage stability of passenger ferries or stability of small craft. Although the computational methods are now rapidly developing, it is also important to make sure that all the traditional means of hydrostatic analysis are properly exercised. The purpose of this note is to discuss a known method that enables us to evaluate *the minimum hydrostatic stability* of a ship. The minimum stability approach, originally developed more than 40 years ago, may play an important role in the stability analysis of contemporary ships, but nowadays it is largely ignored.

2. TRADITIONAL APPROACH

A well-known approach to the stability analysis is based on the evaluation of the transverse stability diagram, commonly referred to as the GZ-curve. The diagram represents the righting arm GZ as a function of heel angle and, after being multiplied by the ship's displacement, gives the transverse stability moment.

An additional condition usually incorporated in hydrostatic software is that of 'free trim'. It is known that if a vessel is heeled transversely from the upright position then longitudinal asymmetry of the hull generates a longitudinal (trimming) moment, which reduces to zero if the vessel is also free to trim. The corresponding change in trim angle can be obtained by using an additional equilibrium condition that requires the total trimming moment to be zero in the final stage of inclination. In other words, the longitudinal moment acting on the inclined ship must be 'excluded' i. e. set to zero. Thus, the ship is considered to be subjected to the transverse moment only, and the purpose of calculation is to find the dependence of this moment on heel angle, with the trim angle being left free. The importance of the free trim condition, which sometimes is also referred to as 'constant trim moment', for accurate estimation of transverse stability is well recognised, in particular for ships with raised forecastle decks, long flat decks aft and relatively low freeboard. An interesting example of comparison showing extraordinary reduction in transverse righting arms for crab boats was presented by Storch (1978).

This approach has formed the basis for most stability standards for various types of ships and marine vehicles, but it is certainly restricted to transverse stability. An obvious reason for such a restriction is that the transverse stability moment, which is known to be much less than the longitudinal one, is also believed to be the *minimum moment* that the ship can develop to counteract an external action. However, there is a distinction between the transverse and the minimum stability of a ship, at least for an arbitrary ship form and large heel angles.

3. MINIMUM STABILITY APPROACH

To formulate the minimum stability approach, it is convenient to exploit a simple rule of classical mechanics that the moment acting in a certain plane can be represented by a vector directed perpendicularly to that plane. This vector can be resolved into components, for example *Mx*, *My*, *Mz* which are parallel to the corresponding coordinate axes as shown in Figure 1. The component *Mx* is the transverse moment, whereas the condition $M_Y = 0$ is equivalent to the 'free trim' condition.

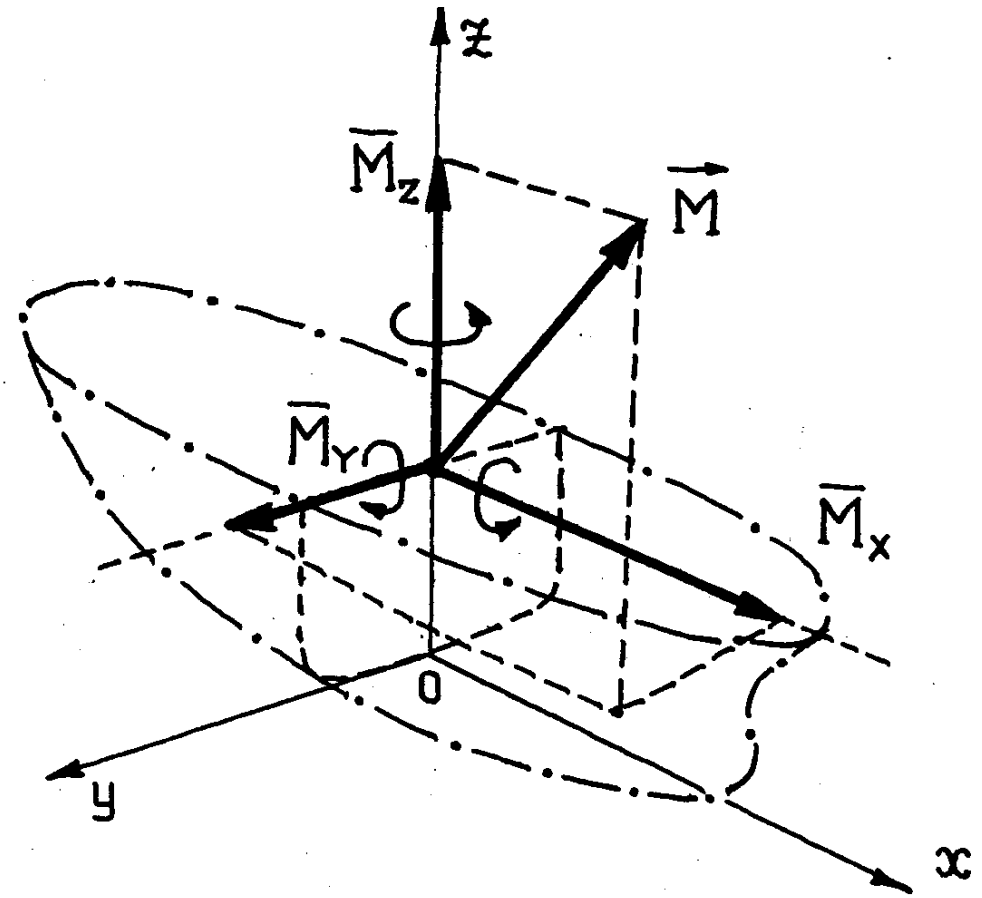


Figure 1

Resolution of the moment vector into components

It can be inferred from this that the traditional approach is not unique, because the total moment can be resolved into components in an infinite number of ways, and evaluating M_X with the component M_Y excluded we take only one of possible choices. Moreover, taking into account asymmetry of the inclined ship at large heel angles, the possibility of large trim, immersion of the deck, superstructure, etc., there is no guarantee that the transverse moment calculated in such a way provides the minimum value among all the options. The number of these options can be reduced to certain extent by recognising the fact that the moment produced by weight and buoyancy forces acts in the vertical plane, and therefore has no vertical component. Thus, the vector of such a moment lies in the water plane, where it can be resolved into two components only. The principal problem, therefore, is to find suitable resolutions and to establish conditions, under which the magnitude of the resultant vector takes the minimum value.

The general method for evaluating the minimum ship stability was developed by Vlasov, Professor of the USSR Naval Academy (Vlasov (1956). In particular, Vlasov formulated and solved the following two problems:

Problem 1

Consider a ship (of an arbitrary unsymmetrical form, with damage or not) floating in the equilibrium position. Assume that the ship is inclined to a given (large) angle but in *various possible directions*. Among all such inclinations, find the water plane corresponding to the minimum value of the total moment of weight and buoyancy forces acting on the ship (this moment is hereinafter referred to as the *total stability moment*).

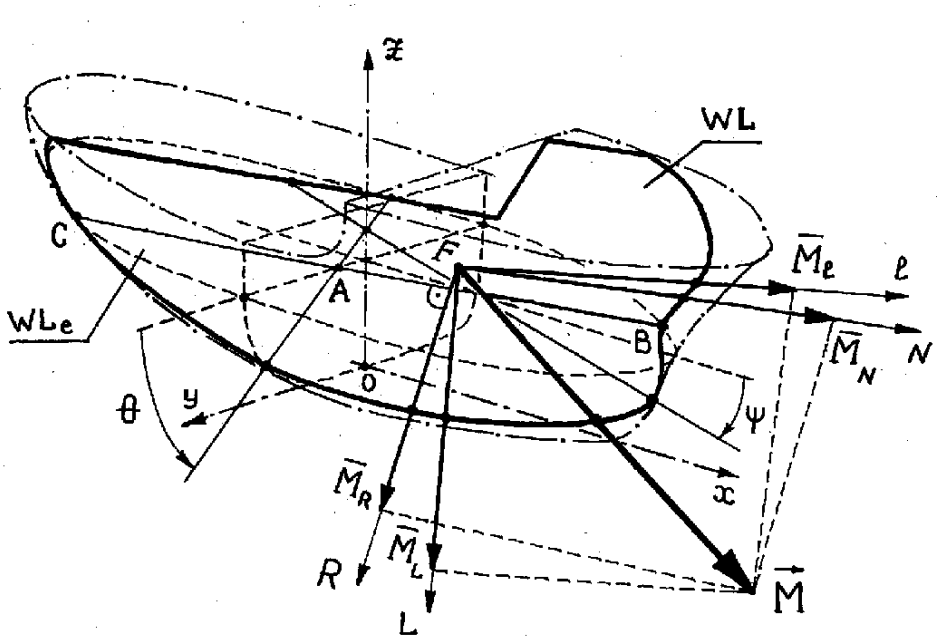
Note that this is not the transverse moment and the water plane is generally different from pure transverse inclinations. If such a water plane is found and the corresponding total moment is evaluated for

various angles of inclination, then it can be plotted against the inclination angle (or heel and trim angles) to give *The Diagram of Minimum Moment.* This diagram is not limited to transverse moments, and shows an absolute minimum of the stability moment developed by ship, or what is of the same magnitude, the minimum external moment required to incline the ship.

Problem 2

On the same premises as above, consider dynamic inclinations of a ship to a given large angle and find the water plane corresponding to the minimum work done by the total stability moment. If this water plane is found, then the value of the work done plotted against the inclination angle gives *The Diagram of Minimum Work*. Once again, this is not limited to transverse inclinations, and shows an absolute minimum of work done by the total stability moment, or what is of the same magnitude, the minimum energy of an exciting action required to incline dynamically and, finally, to capsize the ship.

Vlasov established mathematical conditions for both cases, and developed guidelines for evaluating the above diagrams. Without going into details his findings can be briefly summarised as follows.



NOTATIONS:

θ, ψ - Heel and trim angle respectively

WL_e - Equilibrium water plane

WL - Current water plane

CAB - Line of intersection of water planes WL and WL_e

F - Centroid of the water plane area WL

Fl, FL - Minimum and maximum inertia axis of WL respectively

FN, FR - Axis parallel and perpendicular to CAB respectively

$\bar{M}$ - Vector of the total stability moment

Figure 2

Components of total stability moment in the water plane

3.1 Diagram of Minimum Moment

The minimum moment criterion can be *approximately* met if the component M_L of the total stability moment ***M*** (the component acting along the axis of the maximum inertia of the current water plane area) is excluded at each intermediate inclination step (Figure 2). Then, the remaining component M_l, acting along the minimum inertia axis, gives the desired value of the minimum total moment. In other words, to evaluate the Diagram of Minimum Moment one must continuously 'incline' the ship about her current ***Fl*** axis, the axis of the minimum water plane inertia, whereas the condition $M_L = 0$, along with other geometrical relations between the angles, must be used to determine current angles of heel and trim.

Vlasov indicates that this procedure is approximate, but the error must be negligible provided the increment in angle is relatively small. At the same time, Vlasov also gave the general criterion and showed how to evaluate the correction if the above approximation turns out to be rough for some particular ship form.

3.2 Diagram of Minimum Work

The minimum work criterion is met if the component of the total moment M_R acting along the line *FR*, which is perpendicular to the line *CAB*, the line of intersection of the current water plane and the equilibrium water plane, is excluded (Figure 2). Then, the remaining component M_N gives the corresponding moment and the work of this moment is the desired minimum work. In other words, the ship must be 'inclined' about her current *FN* axis, whereas the condition $M_R = 0$, along with other relations between the angles, must be used to obtain current heel and trim angles.

It follows from the above that the transverse moment M_X is replaced by moments M_l and M_N respectively, whereas the free trim condition is also replaced by more general conditions $M_L = 0$ and $M_R = 0$. The two 'minimum water planes' and the corresponding numerical procedures are different from each other, unlike the usual stability calculation, where the Dynamic Stability Curve is simply obtained by integration of the GZ curve. Numerical implementation of these algorithms is more complex than that for the traditional approach because the equilibrium equations for the inclined ship are now expressed with respect to axes that are not fixed, but moving, when the ship is being inclined. The position of these axes is unknown *a priori* and must be also determined by calculation. These difficulties however can be overcome if the iteration procedure is specially adapted (Vlasov 1956).

4. POTENTIAL APPLICATIONS

A key difference between the Minimum Stability Diagrams and the approach presently used by designers and regulatory authorities is that the latter aim to evaluate the transverse stability moment, which measures the resistance of a ship to *transversely applied loads*. The former allows the vertical plane of an external load to deviate from the transverse direction, and determines the exact minimum value among all such loads or energies. It is worth noting also that the minimum stability approach is fundamental and can be applied to any ship or other floating structure of an arbitrary form.

The two approaches are identical if the geometry of the ship, in particular the waterplane, is symmetrical about the longitudinal axis at any current angle of heel. Then, both the maximum inertia axis and the line *FR* coincide with the transverse axis of the waterplane area. Such a ship, however, will never experience any trim under transverse inclinations, so that the 'free trim' condition becomes trivial. Except for a few specific cases, for example a rectangular pontoon with zero trim or a body of revolution, such conditions are rarely satisfied. The stronger the asymmetry is, the less the minimum moment and the work to be compared with the transverse stability characteristics.

It is difficult to give quantitative estimations at the present stage. For many conventional cargo ships, for example, where asymmetry is concentrated at the very forward and aft regions, the minimum intact

stability must be very close to the transverse stability calculated for the 'free trim' condition. From the safety standard viewpoint, the traditional approach should be considered as a reasonable approximate description of the more complex phenomenon, which in many practical cases works really well. Probably for this reason, as well as the complicated numerical implementation, no detailed studies have been undertaken on this subject in civil naval architecture, at least to the author's knowledge.

Following Vlasov's work, the minimum stability approach was discussed in several textbooks on ship hydrostatics published in Russian in the 1960s, but without numerical results and detailed comparisons being produced; these publications are not referenced here. More than 20 years later, Jakic (1980) addressed the problem again and attempted to develop a new theory, being probably unaware of Vlasov's solution in its original form. Jakic concluded correctly that ship stability at large angles of inclination cannot be adequately described by just the transverse stability arm, and proposed to incorporate the minimum stability approach into international regulations. However the analysis of the minimum criteria by Jakic was not entirely consistent; for the Minimum Moment Diagram he re-derived the approximation proposed earlier by Vlasov, whereas for the minimum dynamic stability his conclusions were incorrect.

Nowadays, Minimum Stability Diagrams are usually not included in hydrostatic software, and the topic is not even mentioned in most textbooks. At the same time, evaluation of these diagrams might be necessary for some ships of contemporary types, e.g. ships of strongly unsymmetrical form, as well as for small craft where stability must be calculated up to 180 degrees of heel and the validity of the traditional approach can hardly be justified. Examples of such applications are:

- Evaluation of the minimum stability of yachts and small craft in general, including estimation of the up righting/self-righting properties of yachts. The minimum stability approach accounts completely for asymmetry in the current waterplane geometry, large trim angles and, even more importantly, for possible deviations of the external load from the transverse plane.
- For some large contemporary ships, intact stability assessment at large heel angles might also require calculation of the minimum stability diagrams. An offshore supply vessel with a relatively short hull and well-developed superstructure located forward is a good example of this type.
- Damaged stability analysis of any merchant or warship, in particular when the waterplane area is, or becomes, strongly unsymmetrical under inclinations. An example of this type is the large angle stability of a ro-ro vessel with side damage, especially when the waterplane enters the vehicle deck.

By their definition, Vlasov's diagrams provide us with the most complete information on the minimum stability of a ship that can be obtained by means of hydrostatic analysis. Correspondingly, the diagrams can be applied to any analysis associated with large inclinations of a ship under random sea loads, including calculations performed in order to evaluate existing or new safety standards.

ACKNOWLEDGEMENT

The author would like to thank Mr. Phillip Helmore, Technical Editor of *The ANA*, for his review of the original manuscript, useful comments, and bringing to the author's attention the publication by Jakic (1980). The views expressed in this article are those of the author and should not be regarded as representing those of the Centre for Oil and Gas Engineering, UWA.

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Supercavitation and Underwater Speed

Of late it has become increasingly apparent that the world's major naval powers are developing the means to build entire arsenals of innovative underwater weapons and armadas of undersea watercraft able to operate at unprecedented speeds. This high-velocity capability — a kind of 'warp drive' for water — is based on the physical phenomenon of supercavitation. This fluid-mechanical effect occurs when bubbles of water vapour form in the lee of bodies submerged in fast-moving water flows. The trick is to surround an object or vessel with a renewable envelope of gas so that the liquid wets very little of the body's surface, thereby drastically reducing viscous drag. Supercavitating systems could mean a quantum leap in naval warfare that is analagous in some ways to the move from prop planes to jets or even to rockets and missiles.

The Russian navy has already deployed a rocket-powered supercavitating torpedo — the *Shkvall*, or 'Squall' — which 'flies' through the water at 100 m/s (194 kn). Russia is looking to sell an impoverished version of the weapon to other countries and, already, the *Shkvall* has turned up in France, China and Iran.

Although current funding levels for supercavitation research are said to be modest (around $50 million in the US, for example, the list of potential supercavitating weapons and naval vessels is extensive and altogether startling. It includes high-speed underwater bullets aimed at mines, homing torpedoes, boats — even low-flying aircraft and helicopters — from submerged gun-pods that look like the turrets on World War II-era aerial bombers. Other possibilities include high-velocity anti-ship and anti-torpedo torpedoes and 'mid-range unguided engagement breakers', which are larger weapons intended to force an end to a conflict between two submarines. Also envisioned are small, superfast surface craft as well as nuclear-capable subsea missiles designed to neutralise entire aircraft-carrier battle groups.

Further information may be found on the *Scientific American* website www.sciam.com/0501issue/0501ashley.html.

Virus Protection Updates

The importance of updating virus definition files regularly has been mentioned previously in *The ANA*. However, the importance of updating the virus protection software itself was reinforced for one of your editors recently. Having changed brands of protection in October 2000, this editor had software less than a year old, and had been downloading definition updates religiously every week on work and home computers.

In March, due to an unfortunate combination of events, the home computer caught a dose of the Matrix (MTX) virus which arrived by email. This little nasty not only sets up to send copies of itself by email (with no subject line) to everyone you send subsequent emails to, but it blocks access to the major virus protection sites and, worst of all, modifies the Windows registry. The less-than-year-old software recognised the presence of a virus but was unable to eradicate it; that required the latest version. Ten days of spare-time eradication got rid of the virus, but left a computer which could not boot into Windows! The only way to fix the registry problem was to completely re-load Windows.

The lesson is clear: update the software itself regularly as well as the virus definition files.

Useful Virus Protection Site

A site which has proved useful in the eradication of a number of viruses is Trend Micro's site at www.trend.com. It has a virus encyclopaedia, an online virus scanner (which you can use *after* your computer becomes infected), and a number of other utilities. Even better, it is not one of the high-profile sites, and is therefore not blocked from access by viruses which incorporate this feature.

Resistance Predictions On-line

For those involved in predicting the resistance of ships, the United Ship Design and Development Centre's website in Taiwan will give you bare-hull

predictions for your vessel on-line, if your vessel is of the right form. Most of the site is in Chinese, but enough is in English for it to be useable. Four series are represented; the Taylor Standard Series, Series 60, FRP Series and SR-45 Series (I haven't heard of the last two either!) Visit http://itis.usddc.org.tw/resist.htm. Submit the details of your vessel, and click on the left button at the bottom, and bingo! Up comes the resistance prediction for your vessel.

Phil Helmore

INDUSTRY NEWS

14 Cylinders and Increased Power for the Sulzer RTA96C

Wärtsilä Corporation has increased the power outputs available from Sulzer RTA96C low-speed marine diesel engines by some four per cent, and also added a 14-cylinder model to bring the maximum output available up to 80 080 kW (108 920 bhp). The higher powers and the 14-cylinder engine are intended to meet the requirements of shipowners and shipbuilders for both today's large, fast post-Panamax container ships and the next generation of larger ships of up to 10 000 TEU.

The RTA96C now gives 5 720 kW (7 780 bhp) per cylinder maximum continuous output at 102 rpm. Thus the power output of the 12-cylinder RTA96C is increased from 65 880 kW (89 640 bhp) maximum continuous output to 68 640 kW (93 360 bhp).The RTA96C is the most powerful in the Sulzer RTA series of low-speed marine diesel engines. To date, a total of 84 RTA96C engines with eight, nine, ten, 11 and 12 cylinders in-line are in service or on order, having an aggregate output of 4 754 MW (6.47 million bhp).The increased outputs of the RTA96C engines are made possible by the very satisfactory service experience with the large number of RTA96C engines currently in service since the first began operation more than three years ago in October 1997. For example, engines in service are achieving diametral cylinder liner wear of the order of only 0.03 mm/1000 hours.

The new RTA96C engines have the same dimensions and masses as the existing RTA96C engines built to the latest design standard. They also have exactly the same brake specific fuel consumption (BSFC) and cylinder lubricating oil feed rate. Their times between overhauls are expected to be three years for major components. The NOx emissions of the RTA96C are within the limits set by the IMO regulation in Annex VI of the MARPOL 73/78 Convention.

First Wärtsilä Marine DF Engines Order

Wärtsilä Corporation has received the first order for Wärtsilä 32DF marine engines. PGS Production in Norway has contracted for two Wärtsilä 18V32DF engines to be installed in the FPSO (floating production, storage and offloading) vessel *Petrojarl I*.

The two engines, each developing 3 720 kW at 720 rpm, will be supplied as complete generating sets. They will burn wellhead gas. Built specifically as an FPSO vessel for North Sea service in 1986, *Petrojarl I* has been fitted with various additional equipment over the years. The two Wärtsilä-engined sets will therefore add necessary electricity generating capacity. They are currently being installed during a planned major drydocking before the vessel takes up a three-year contract on the Glitne field in the North Sea. The vessel will return to service in summer 2001, with the first oil expected to be produced at the end of July.

The choice of engines for *Petrojarl I* was influenced by the fact that the vessel will operate under Norwegian jurisdiction where a carbon dioxide tax is levied on power production in the offshore sector. The efficiency of the power plant thus has a significant impact on the operational costs of the oil fields. As the operator's requirements also include low NOx emissions, the Wärtsilä 32DF engine emerged as

the first choice for this installation.

PGS Production already employs Wärtsilä GD (gas-diesel) engines on two other FPSO vessels. *Petrojarl Foinaven* has four Wärtsilä 16V32GD engines and four Wärtsilä 18V32GD engines, while *Varg* has four Wärtsilä 18V32GD engines. These have all given good service experience which has contributed to the decision to order the Wärtsilä 32DF engines for *Petrojarl I*.

The Wärtsilä 32DF engine type provides an alternative to the Wärtsilä 32GD type for using gaseous fuels in marine installations. The 32GD type has been highly successful in the offshore market with 38 engines in service and on order. The first Wärtsilä 32GD engines were delivered in 1989 and individual engines have more than 70 000 running hours.

The Wärtsilä 32DF engine has been introduced to marine applications to meet the requirements of a new safety class for installations with a gas pressure of less than 10 bar in a single-pipe arrangement. Class approval in principle for this safety concept is now in hand, and a class-approved control system based on the Wärtsilä WECS 8000 electronic control system has been introduced on the Wärtsilä 32DF marine engine.

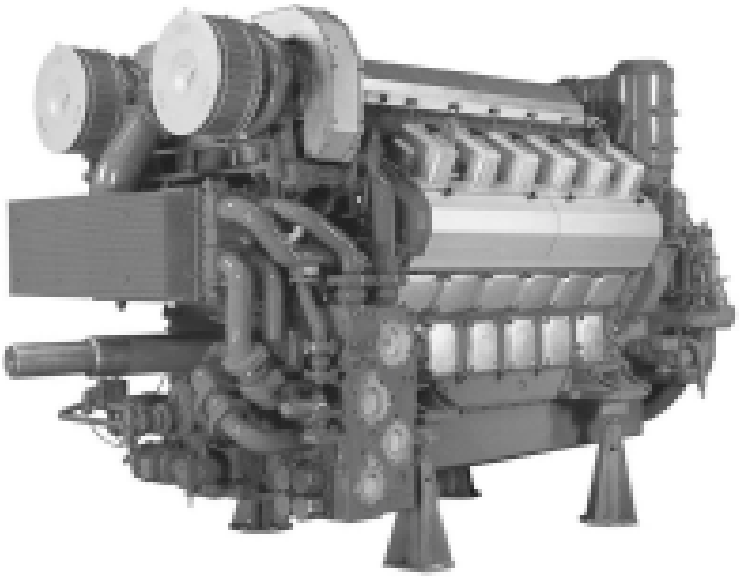
Wärtsilä 200 main engines for Finnish Frontier Guards patrol vessels

Wärtsilä Corporation has received the contract to deliver four Wärtsilä 12V200 diesel engines for two patrol vessels of a new class for the Finnish Frontier Guard. These new Telkkä class vessels are being built as part of the fleet renewal programme. They are multi-purpose vessels capable of carrying out search and rescue, and oil leak anti-pollution missions in the Baltic, in addition to the traditional maritime surveillance function.

The two Telkkä class vessels were recently ordered from the Finnish shipyard UKI Workboat Ltd. They are due to be commissioned in 2002 and 2004. Each will have a pair of Wärtsilä 12V200 diesel engines, with a combined maximum continuous output of 5 000 kW at 1 500 rpm.

The size of the vessels, overall length 50 m and 400 tonnes displacement, sets restrictions on the weight and size of the engines, hence high-speed engines such as the Wärtsilä 200 were specified. On the other hand, speed requirements called for a relatively large installed power.

This order represents a major breakthrough for the Wärtsilä 200 engine to the naval and governmental ship market. Several particular features of the Wärtsilä 200 engines were in favour of their selection. The Wärtsilä 200 represents modern technology, and they have a high maximum continuous output without time limitation, a high level of automation with a ready interface for remote monitoring, full compliance with the IMO NOx emission regulation, long times between overhauls, and the possibility to do any overhaul without removing the engine from its seating. Another important contributing factor was that Wärtsilä's after-sales service network has good coverage in the vessels' intended operating areas.



FORENSIC NAVAL ARCHITECTURE

SOME MARINE CASUALTIES
EXERCISES IN FORENSIC NAVAL ARCHITECTURE

(PART 7)

Robert J. Herd

13. ADVENTURES IN MARITIME LAW (Continued)

In the earlier portion of this section I began to explore the question of 'truth' and its place in inquisitorial and adversarial legal processes.

As a rule, the expert witness has not been present at the incident which is the subject of the inquiry in which he is involved. Generally he has to rely on the evidence of eyewitnesses to provide the bases on which he develops a hypothesis, using his knowledge of naval architecture and his past experiences.

I have found that being present when evidence is being given provides a better appreciation of what is said than just reading the transcript afterwards. In my experience barristers will not cross-examine a technical expert cold. A report or proof of evidence is usually circulated to the parties in good time for them to appreciate what is being said and, if thought desirable, to consult their own experts who may advise but not necessarily themselves appear as witnesses.

One barrister with whom I had worked gave a report of mine to a nautical colleague for comment, but advised him he probably would not disagree with what was said because he knew how my mind worked!

On occasions I have had to read my report in the witness box for incorporation into the transcript, as well as be examined and cross examined and I learnt, over time, to be very careful with words, and to try to write with T C MITS (the celebrated man-in-the-street) in mind.

For example, on one occasion I said that the stability of a vessel was minimal. What did I mean by minimal? Limits also proved difficult. On another occasion I said the ship lost should have had a range of positive stability of 40º if not more. Would 39¾º be acceptable? 39½º? 39¼º? and so on.

I note with interest that, under the new UK rules [8] encouragement is being given for matters to be dealt with on the basis of a report alone, with possible questions based on that report for clarification if found necessary. Hence the stress being given by the Institution on training in both report writing and court room practice.

It is imperative to remember that one's first duty is to the Court, to be independent and objective, and not to the party who calls you and pays you a fee. This may involve giving evidence which is not necessarily beneficial to your client.

In one case involving a fire in a passenger vessel, three of us spent a day closeted with a barrister and a solicitor discussing our views on the incident, indicating the sort of evidence we would give if called. At the end of the day we were thanked for our time and assistance, but we would not be called. It was interesting to note that the judge in his judgement raised the very questions on which we had wished to give evidence.

The problems of the relationship between experts and the adversarial system have been explored in a recent article which raises some of the issues involved and which makes profitable reading [18]

Eric Tupper [7] raises a possible situation of which I have had no experience:

'There is a danger that, even where the main parties in a dispute have agreed not to sue any expert

adviser, whatever the outcome of a case, other parties may suffer financial loss as a result of the rulings made. These other parties may then attempt to recover such losses from anyone involved with the case. It is therefore important that advisers have adequate third-party indemnity cover'.

On a personal level, I have found a great need for self-control (particularly when being hectored by an aggressive barrister), the ability to think quickly and correctly on one's feet and, at times, the ability to calculate or draw in the witness box. With long and involved questions, with many suppositions or qualifications, it becomes necessary to ask for the question to be repeated, two or three times if necessary, while thinking one's response through carefully. It is necessary to listen carefully each time the question is repeated — sometimes the question changes with repetition!

Trying to stay within one's area of competence is sometimes difficult. On one occasion my answer was objected to on the basis that I'd never been to sea. Once the judge established that I had, I was permitted to answer the question. In a collision and sinking case I was asked a question involving the behaviour of the helmsman. I was prepared to answer on the basis of my own experience as a helmsman. However the question was disallowed by the judge on objection without my being consulted.

Difficulties sometimes arise due to dogmatism on the part of the witness. I recall a witness who was convinced his ship was travelling north when all the evidence and the other witnesses stated it was travelling south. He was not prepared to concede there could have been the faintest chance he was wrong.

My approach generally has been to allow that all things are possible but some things are more possible than others. In the *Sedco Helen* inquiry it was put to me that the gas blowout would have heated the sea to the extent that the welding of the shell plates would have melted, letting in the sea, rather than that a section of shell plating had been torn out!

I've always endeavoured to take questions no matter how seemingly puerile, at face value, because there could well be a sting in the tail yet to come!

In an inquiry into a foundering, the judge made a number of recommendations. These were considered by the Department's technical officers. Some were accepted and some rejected for good reasons. At a subsequent inquiry, the barrister who had appeared for the Departmental representative at the first inquiry appeared for another party at the second inquiry. It was evident that some of the recommendations had not been given effect in the second ship. I was asked why not? The judge in both cases was the same. I explained to him the consideration given to his recommendations and the reasons for rejecting some. He obviously accepted this explanation as no further reference was made.

At a subsequent inquiry into a capsizing, the parties agreed to accept me as an expert on behalf of them all, which I took as a sign that my endeavours to be independent and objective had been appreciated.

The credence to be attached to forensic science has been called very much in question in Australia in recent years. I do not believe, however, that doubts exist on the reliability of forensic naval architectural evidence.

Justice Gordon Samuels [19] was of the view that 'criticism of forensic procedure related primarily to the restrictions which the rules of evidence placed upon the scientist's, and the doctor's,' accustomed method of explanation and description. The need to deploy closely reasoned opinion by means of question and answer, and the danger of fatal disconnection if the interrogating counsel is inept or the judge's interventions unduly copious are not designed to promote lucidity'.

The three cases in Australian legal history which stand out as worthy of study but which are too involved to elaborate on here, are the Thorne, Splatt and Chamberlain cases.

The issues, complications and contradictions are explored in some detail by Freckelton [16], Brown and

Wilson [20] and Bryson [21]. These works are well worth study by any who may be involved in the presentation of technical evidence in either inquisitorial or adversarial proceedings.

It is abundantly clear from these works that the trustworthiness of forensic science is not helped by disagreement between experts about the fundamentals of their science.

14. POSTSCRIPT

It has been my aim to interest, entertain and, hopefully, educate the reader in the art and science of forensic naval architecture, using the experiences I know best, i.e. my own.

I appreciate that each naval architect who becomes involved in legal processes will build up his own store of experiences.

Should the reader become so involved, may I extend my very best wishes for the successful prosecution of his art.

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PROFESSIONAL NOTES

Class Societies Launch Sweeping Safety Initiatives

American Bureau of Shipping, Det Norske Veritas and Lloyd's Register recently announced a series of initiatives to further improve the safety of international shipping. The three classification societies have agreed on ten actions that will strengthen the classification profession and make poor quality vessels easier to identify and act upon.

The past twelve months have highlighted an apparent weakness in the ability of classification societies to respond to critical issues facing the shipping industry. While continuing to support IACS, the three societies will refocus much of their considerable resources on the important quality issues facing the profession and the wider shipping community. The objective of the cooperation is to speed the pace and enhance the quality of decisions in order to meet the expectations and demands for safer shipping.

Agreement has been reached amongst the three societies on ten critical issues:

- A common scheme for identifying, targeting and monitoring possible substandard vessels.
- Align ISM with other safety management control measures by linking future issuance of SMC Certificates to the classification of the vessel. The objective will be to phase out over time the split responsibility that now exists when one society classes the vessel while another judges compliance with the ISM Code. With immediate effect, the three societies will for all vessels instruct the surveyors to report at regular annual class surveys whether the conditions are such that an extraordinary ISM audit onboard is recommended.
- Strengthen the Transfer of Class Agreement so that the losing society shall deal with Conditions of

Class and outstandings before completion of change of class.

- Introduce an early warning system to exchange information on sister ships.
- Require two surveyors in attendance for all special surveys for tankers and bulk carriers above 15 years of age (third special survey and beyond).
- Co-operate with respect to use of exclusive surveyors.
- Establish common basic design criteria for ship design, including hydrodynamic loads and corrosion margins for standard ship types.
- Harmonise Condition Assessment Programs.
- Introduce common standards for training and qualification of surveyors.
- Increase transparency of information by establishing common formats for onboard and ashore information and increase the amount and quality of information available on the Internet.

The other members of IACS are encouraged to adopt the ten initiatives. However, the adoption of the proposed measures by all IACS members is not a prerequisite for timely implementation by the three societies.

Joint ABS/DNV/LRS *News Release,* 15 March 2001

Marine Survey 2001 Conference

The first Marine Survey Conference organised by the National Marine Safety Committee has proved to be a great success and has prompted calls for the conference to become an annual event.

The conference, believed to be the first of its kind in Australia, took place on 6 and 7 March 2001 at the Sea World Nara Resort on the Gold Coast. The event was attended by 150 government and private marine surveyors. The aim of the conference was to engage surveyors on issues relevant to their operations, safety, and how to meet responsibilities and liabilities. It was also an opportunity to explain the National Standard for Commercial Vessels which will replace the Uniform Shipping Laws Code.

Feedback form the surveyors who attended the conference praised the content, the presenters, and the NMSC. The NMSC has received feedback from around half the delegates to date, with 93% rating the conference as good, very good or excellent, and with almost unanimous support being given for the conference to become an annual event. Most delegates reported that the sessions dealing with duty of care were very useful.

The NMSC is keen to obtain input from surveyors on what they would like to see covered in future conferences. The NMSC will continue to keep surveyors briefed on developments in the NSCV and on any emerging professional or development aspects which are relevant to those in the industry.

The NMSC is currently planning another professional conference for those working in the fields of marine training and assessment, which will aim to tap into the specialist interests of those in this sector of the industry.

Safety Lines, April 2001

NMSC Workshop on Fast Craft

The National Marine Safety Committee will hold a Workshop on the National Standard for Commercial Vessels, Part F (Fast Craft) following release of the draft standard for industry comment sometime in June. If you are interested in the NSCV rules for fast craft, then keep an eye on www.nmsc.gov.au for

details of both the release of the section for industry comment and the workshop.

NSCV Intact and Damaged Stability

The sections of the National Standard for Commercial Vessels concerned with intact stability (Part C Section 6b) and damaged stability (Part C Section 6c) have thus far taken a low profile in the National Marine Safety Committee's work plan. However, they are hull-up on the horizon. The intact stability section is due to recommence serious consideration in the third quarter of this year, and the damaged stability section to commence in the first quarter of next year. Keep an eye on www.nmsc.gov.au for details of these sections becoming available for industry comment.

Phil Helmore

New NSRP Reports

The following reports have been published in electronic format by the US National Shipbuilding Research and Documentation Centre:

NSRP 0563 (N6-98-2) *Methodology of Part Standardization,*Bath Iron Works

The purpose of this document is to introduce the basic requirements for the design and implementation of a Part Standardization Program within the shipbuilding and marine design communities. The adoption and use of this type of program within these industries will be instrumental in reducing design and materials costs across shipbuilding programs, and reducing overall life-cycle and support services costs for the life of the end products affected. Although the initial design and deployment of this type of program requires concentrated focus and sustained support, the return on investment can be significant in the areas of material, design, construction and life-cycle costs. Other savings can be gleaned from reductions in procurement, warehousing, administration, and other associated activities.

NSRP 0580 (N7-95-3) *Single-pass One-sided Submerged Arc Welding,*R. Doerksen, NASSCO

The objective of this project was to develop and demonstrate an experimental submerged arc welding (SAW) technique(s) and procedure(s). This report summarizes the results of the development, qualification, and production implementation of a new welding procedure and welding backing system for shipboard erection weld joints in the flat position. The report documents that the procedure for 11/16" (17.5 mm) plate passed all testing requirements and was approved by ABS; that this procedure was then demonstrated in production and 10 joints were successfully welded; that the development work also produced acceptable welding techniques for 5/16" (7.9 mm) plate thickness; and that the backing system was used for over 177 test welds and 10 production welds without deterioration or damage. Suggestions are also made for future improvements.

NSRP 0581 (N3-95-5) *Cost-effective Enclosure of Surface Preparation and Coatings in Floating Dry Docks,* D. Ward, Alaska Ship and Drydock, Inc.

The main questions posed by this project were: can current dry-dock enclosure practices be improved on, and can tensile structures be adapted to surface preparation and coatings operations in dry docks without negatively impacting other concurrent ship repair processes? Initial work suggested that a cost-effective enclosure system had not yet been developed. The project then studied the emerging technology known as tensile architecture, and the application of tensile design principles to the problem of enclosing ship repair processes on or in floating dry docks. Beyond merely listing a menu of enclosure ideas, the report also attempts to provide information that will be useful to both the rigger assembling enclosures in shipyards and to the architects and engineers who will be challenged to create an innovative industrial tensile structure.

To find the downloading site, click on the 'New Reports' link under the 'Documentation Center' link at NSnet (http://www.nsnet.com/), or 'Search' on 0563, 0580 or 0581 in the report number line. You will need a password to access the report; click on the 'Register' button if you don't have one yet.

NAVAL ARCHITECTS ON THE MOVE

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

Bronwyn Adamson, a recent graduate of The University of New South Wales, has taken up a position with Bass and Flinders Cruises and is working on board their cruise vessels on the Georges River while studying for her coxwain's ticket at TAFE.

Graeme Bourke has taken up a position with Tenix Defence Systems in Williamstown, Vic.

Gillian Carter, a recent graduate of the Australian Maritime College, has taken up a position with Australian Motor Yachts in Brisbane.

James Davies, a recent graduate of the Australian Maritime College, has taken up a position with Kvaerner Offshore in Perth.

Steve Davies has moved on within Australian Defence Industries and has taken up the position of General Manager Naval Programs in the Major Programs head office at Garden Island.

Keith de Graauw continues in his position with the Royal Australian Navy but has moved from Perth to Canberra.

Roger Duffield has moved to Glasgow on a six-month secondment from the Department of Defence Navy Systems Command to the BAE Systems Type 45 design team.

Paul Duncan, a recent graduate of the Australian Maritime College, has taken up a position with Australian Maritime Technologies in Melbourne.

Nigel Finnerty has moved on from the Royal New Zealand Navy and has started consulting in Greymouth, New Zealand.

Dougal Harris has completed his PhD degree at Curtin University and has taken up a position with the Wolfson Unit for Marine and Industrial Aerodynamics at Southampton University, UK.

Teresa Hatch has moved on from O'Brien Maritime Consultants and has taken up a position with the Port Hedland Port Authority.

Aneri Kaitara has taken up a position with Marine and Industrial Safety Inspection in Wellington, New Zealand.

Simon Kelly, a recent graduate of the Australian Maritime College, has taken up a position with Logistic Technologies International in Melbourne.

James Livesley has taken up a position with the Northern Territory Department of Transport in Darwin.

Dougal Loadman, a recent graduate of The University of New South Wales, has taken up a position with Sinclair Knight Merz in Williamstown, providing the technical support on the Anzac-class frigate construction.

Brett Murrie has moved on from The Metacentre and has started his own consultancy in Brisbane.

Alex Nolan, a recent graduate of the Australian Maritime College, has taken up a position with Bakewell-White Yacht Design in Auckland, New Zealand.

James Nolan, a recent graduate of the Australian Maritime College, has taken up a position with the Western Australian Department of Transport in Fremantle.

Brett Oldham finished off his ten years in the Royal Australian Navy at the end of 1998, and thinks that he may have been the last uniform to go through the naval architecture course at UNSW, before the uniforms switched to ADFA. In the RAN, Brett worked as a Marine Engineering Officer on the FFGs for a few years. That was followed by a bit of engineering maintenance and then into technical intelligence (underwater acoustics, à la *The Hunt For Red October*, which is more like vibration analysis than hydrodynamics). So after not really using any serious naval architectural theory, he could tell them how badly they had stuffed up with the Collins-class subs. Between maintenance and intelligence work he became involved with Oracle databases, did some postgraduate IT Management work and is now IT contracting in Brisbane. Brett says that it is very lucrative and much better than chasing around the ocean on the grey-funnel line!

Jon Pattie has moved on from the Queensland Department of Transport and has started his own consultancy, SeaLife Designs, in Brisbane.

Randall Peterie, a recent graduate of the Australian Maritime College, has returned to the Royal Australian Navy, posting unknown.

Xuan Pham, a recent graduate of the Australian Maritime College, has commenced a higher degree by research at the University of Glasgow in Scotland.

Shaun Phelps has been travelling and working in IT since he graduated from The University of New South Wales, as well as doing special-purpose machine design with CAD. He says that he hasn't done any work using his naval architecture degree and is now realising that he needs a change in direction. He is looking for jobs requiring network administration experience in addition to a degree in naval architecture.

Aminur Rashid, a recent graduate of the Australian Maritime College, has taken up a position with the stability group of the Directorate of Navy Platform Systems in the Department of Defence in Canberra.

Greg Seil graduated with his PhD in waterjet flow from UNSW in 1998 and has since been working at the Rolls-Royce Hydrodynamic Research Centre (formerly known as the Kamewa Hydrodynamic Research Centre) in Kristinehamn, Sweden. Greg's work is primarily focused on using computational fluid dynamics for the calculation of flow in waterjets and Mermaid pods. Greg says that a lot has happened to the organisation since he joined Kamewa AB, which was then owned by Vickers plc. Vickers subsequently took over Ulstein, creating Vickers Ulstein Marine Systems, the largest marine propulsion group in the world. Vickers was itself taken over by Rolls-Royce at the end of 1999. The company is now known as Rolls-Royce AB, a subsidiary of Rolls-Royce plc. Greg received two RINA prizes for his paper on waterjet flows in April this year (see *Membership* in this issue).

Richard Sheppard has moved on in within the Royal Australian Army, finishing his appointment as the Engineering Manager for Army Marine Equipment, which ranges from the LCM8 barges and 20 m aluminium trawler-type vessels through to the special-forces fast RIBs and diving equipment. He says that the job was interesting and definitely very challenging. He also had to do some stability, resistance and free-surface calculations at times! He has taken up the position of National Fleet Manager for Army Marine Equipment, which is more involved with the financial, co-ordination and inventory aspects.

Dave Sherwood has moved on from Austal Ships and has taken up a position as a project manager with Nigel Gee and Associates in Southampton, UK. He says not to be fooled by the 'project manager' job title — he is still designing boats!

Adam Solomons, a recent graduate of The University of New South Wales, continues in his position as a naval architect with the Defence Material Organisation, Maritime Systems Division, Centre for Maritime Engineering at Pyrmont. However, he has embarked on a one-year leave-without-pay and is touring the world.

Jude Stanislaus has moved on from software developer PD Labs (formerly Sparksoft) and is now consulting in Sydney as JS Engineering Consultancy. He includes classification society Bureau Veritas among his clients.

Alistair Verth has moved on from North West Bay Ships and completed a short consultancy assisting Kamira Holdings on a job in Malaysia before taking up his current position with Pacific Jets in Melbourne.

Shaun Yong, a recent graduate of The University of New South Wales, has taken up a position with his brother's company, Ron Manufacture Pte Ltd, in Singapore. The company specialises in the construction of aluminium boxes, canopies for trucks and all types of engineering work such as bending, cutting, welding, spray painting and logo writing. Friends may wish to check out the company website, www.ronmfr.com.sg, for further details of what Shaun is up to.

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

MEMBERSHIP NOTES

AD Council Meeting

The Australian Division Council met on 7 February, with teleconference links to all members, the President, Bryan Chapman, in the chair in Sydney and the Chief Executive, Trevor Blakeley, attending in Sydney. Matters, other than routine, which were discussed included the RINA/IEAust Joint Board; the Australian Division's web-site (approval was given in principle for the relocation and expansion of the site); MARENSA; a report from the President on the RINA Council meeting which Mr Riley and he had attended by teleconference; the concern of the Division at safety features of the Sydney to Hobart Yacht Race (especially structural integrity, stability and training — a letter to RINA Council will be despatched); the lack of industry participation in the re-writing of the USL Code (the Division has not been kept informed of developments); and the award of the Walter Atkinson Prize for 2000 (approval was given for its award in 2000 and subsequent years when funds are available.

AD Annual General Meeting

The Australian Division held its AGM on the evening of 28 March at the NSW Section's new venue of the Rugby Club, Circular Quay, attended by fifty-one with the President, Bryan Chapman, in the chair.

Bryan, in his President's Report, touched on some of the highlights of 2000, which included Bob Herd's elevation to the rank of Honorary Fellow of the Institution for his services to naval architecture, and the quality of *The Australian Naval Architect* which continues to improve due to the efforts of John Jeremy and Phil Helmore. He also thanked the retiring members of the Division Council, Jim Black, Werner Bundschuh, Robin Gehling, Phil Hercus, John Jeremy, and Ian Laverock for their significant contributions to Council. He made special mention of Phil Hercus for his continuing efforts over many years and, in particular, for his guiding hand in the recent restructuring of the Division, and on the Future Directions sub-committee.

Allan Soars, in his Treasurer's Report, outlined the main areas of expenditure and highlighted the fact that the Division had returned a surplus of some $6912, the first surplus for many years and a most pleasing result.

The Secretary, Keith Adams, in the matter of elections to the Division Council, announced that nominations had been received from Jim Black, Tim Dillenbeck, Robin Gehling, John Jeremy, and Andrew Tait. As the number of nominations received (five) was less than the number of vacancies (six), those nominated were all elected without the need for a ballot, and will now serve on Council for a two-year term.

Updated RINA Website

The updated RINA website has gone live at the usual location, www.rina.org.uk, and contains a number of improvements over the original site. For one, the updated site is content rich, low on graphics, and loads quickly. For another, the branches and sections are all easily accessible from the same location.

There is a members' section, which is accessed by a username and password. These are set up during an initial registration, and your initial password is generated automatically and emailed to you. On subsequent logins, you then have access to the members' area, which includes updating your personal details (address, username and password, etc.) online, the discussion forums for posting questions, answers and discussion, entering RINA Affairs competitions, ordering RINA merchandise, etc.

There is an expanded Australian Division, which you reach by following the links to Institution/Branches/Australian Division, and the Australian sections are now all represented. This part of the site is in the process of having information uploaded as the Australian webmasters become more skilful in using the editor. The Australian Division Council and the Section Committees have been loaded, and the NSW Section has had the year's program of meetings completed. Click on the Program of Meetings (near the top of the NSW Section page) to see what is coming up. Click on the title bar of the May technical meeting, and you

will see the details of the meeting. There are news sections and forums for each Section, and these will gradually be made operational. Watch this space, we are raising steam!

There is now an Appointments Vacant page for the Australian Division, and the first request, from WaveMaster International looking for naval architects, was posted on 1 May. Click on Appointments Vacant (on the Australian Division page), and the AV page with headings and brief descriptions appears. Click on the title bar for any appointment, and the whole notice with contact details appears. Vacancies can now be posted overnight so, if you are looking for a sea change, bookmark this page and check it regularly.

If you have not yet visited the updated site, check it out; it's worth it!

Bronze Medal and Calder Prize to Greg Seil

The RINA has awarded Greg Seil their Bronze Medal and the Calder prize for his paper *Computational Fluid Dynamics Optimisation of Flush-type Waterjet Inlets*, which was published in the 2000 Transactions (coming soon). The Bronze Medal is awarded for a paper which is accepted for publication by the Institution and, in the opinion of Council, merits such distinction. The Calder prize is awarded for the best paper on the subject of small or high-speed craft by an author under the age of thirty.

Greg's paper was based on the work he undertook for his PhD at The University of New South Wales. The awards are good news for Australia because they confirm independently the value of the waterjet-related research which was undertaken by UNSW and UTAS.

Greg was presented with his awards at the RINA AGM in London on 25 April this year, and attended the Annual Dinner at the Royal Lancaster Hotel at the Rolls-Royce table. See *Naval Architects on the Move* in this issue for brief details of Greg's other doings.

Members will recall the recent award of Bronze Medals to Martin Renilson and Andrew Tuite, and the Calder Prize to Andrew Tuite in 1999 for their paper *The Effect of Principal Design Parameters on Broaching-to of a Fishing Vessel in Following Seas*, which was published in the 1998 Transactions.

Phil Helmore

RINA Austal Awards

Austal Ships have generously agreed to sponsor the RINA Awards at the University of New South Wales and the Australian Maritime College. The Awards, to be called the RINA Austal Awards, will be presented to the students who give the best presentation of their final year project. The awards will be worth A$500.

RINA Student Naval Architect Awards are now sponsored by companies in Australia, UK, Canada, Singapore and Greece. The Awards, which are based on written and oral presentation as well as technical content, serve to emphasis the need for naval architects to be able to communicate their ideas beyond the drawing board.

Vale Ted Jacobs

It is with sadness that *The ANA* records the passing of Ted Jacobs on 20 March 2001, aged 74. Ted amassed a wealth of experience with the General Overseer and Superintendent of Inspection at both HMA Naval Dockyard, Garden Island, and Cockatoo Island. He specialised in the refit of the T-class submarines, and then spent time on the building of the Oberon class submarines in Greenock, Scotland, where he impressed even the Scots with his practical knowledge and application.

Ted Bell

MISSING IN ACTION

Missing in action since the last edition of *The ANA* is Mr N. Barratt, last heard from in Newnham, Tasmania.

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

FROM THE ARCHIVES

The story of the Commonwealth Government Line of Steamers is an interesting part of Australia's maritime history. The Line came into existence in 1916 at the instigation of the Prime Minister Mr W. M. Hughes, with the acquisition of fifteen British tramp ships. During the First World War, considerable efforts were made to build a fleet of cargo ships for the Commonwealth Line including a number of ships built in the USA and Australia in wood. The steel ships built in Australia were mostly D and E class steamers. Four D class were built at Cockatoo Island, Williamstown and Walsh Island in Newcastle. Thirteen E class were built in these yards and at a yard in Adelaide set up by Poole and Steele.

The last of the ships to be built in Newcastle was *Eromanga*, shown below at her launching on 12 March 1921. This ship was very complete and some furnace fires were actually alight as the ship entered the water. She started sea trials on 19 April 1921and left Newcastle for service on 25 April, only six weeks after launching. She was the last significant ship built at Walsh Island, which closed in 1933. *Eromanga* was sold in 1926 to AUSN Co. and renamed *Maranoa*.

The Commonwealth Government Line of Steamers ceased to exist in 1928 when the remaining ships, *Esperance Bay*, *Hobsons Bay*, *Jervis Bay*, *Largs Bay*, *Moreton Bay*, *Fordsdale* and *Ferndale* were sold to the White Star Line for £1.9 million.