# THE AUSTRALIAN NAVAL ARCHITECT

Volume 2 Number 3
October1998










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# THE AUSTRALIAN NAVAL ARCHITECT

Newsletter of
**The Royal Institution of Naval Architects**
**(Australian Division)**

Volume 2 Number 3
October1998

*Cover Photo:*

The minehunter *Huon* at sea off Newcastle during Contractor's Sea Trials (Photo courtesy ADI Limited)

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The Editor
The Australian Naval Architect
c/o RINA
Box No. 4762, GPO
SYDNEY, NSW 2001
AUSTRALIA
email: jcjeremy@ozemail.com.au

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The Australian Naval Architect
is on the
World Wide Web
at
www.rina.org.uk

# A NOTE FROM THE DIVISION PRESIDENT

Obviously this is my first contribution to The Australian Naval Architect as President of the Australian Division.That being the case, I figured that the first thing I should do is let you know what I hope to achieve during my term of office, which will end in March 2001. I thought I would do that by describing my idea of the world from a Naval Architect's viewpoint.

In my ideal world:

- Naval Architects will be respected by the community in general, and the maritime community in particular, as key contributors to the progress of the Australian maritime industry. They will occupy key positions in the industry, and in relevant government departments, and will play a significant part in the industry's development.

- Naval Architects will provide significant inputs to Government decision-making processes as they affect the maritime community, and their opinions will be actively sought by Governments in developing policies which will affect that community.

- There will be active and vibrant Sections of the Australian Division in all parts of Australia where there are significant shipbuilding or maritime industry communities. These Sections will offer full and varied technical and social programmes, and will provide a key networking service to their members.

- The service provided by the Division to its members will be such that every Naval Architect in Australia will want to be a member, and there will also be a significant membership of para-professional people, including drawing office personnel, technicians, production supervisors and others.

- The Division will enjoy strong links with other relevant professional bodies, particularly the Institute of Marine Engineers and the Institution of Engineers, Australia. It will join actively with these bodies in promoting the interests of the Australian maritime community and, where appropriate, in addressing issues of concern to the community in general.

The recent restructuring of the Australian Division, discussed elsewhere in this issue, provides us with the opportunities to work towards this ideal world. Sections of the Division are already in place in Western Australia, Canberra and New South Wales, with an interim Section in Hobart, and there are moves towards one in Victoria. It is my hope that as these sections develop they will provide members in their areas with improved opportunities for technical interchange and professional development. I hope that they will also be active social and networking vehicles, and will provide a focus for their local Naval Architecture communities.

The devolution of local responsibilities to the local sections gives the Division Council the opportunity to devote more of its time to issues of national interest. This means that time can be spent addressing issues such as Government policies, the direction of the Institution in Australia, the training and development of Naval Architects and the place of the Naval Architect in the real world.

I look forward to working with the Division Council, and with you, the Division membership, as we work to develop the ideal world. If your vision of the ideal world differs from mine, I'd like to hear about it, but please put it in writing. I'd rather not field a host of 'phone calls on the subject.

As a final few words, I want to acknowledge the work done by the outgoing President and Division Council in bringing the Division to its present stage of development. I know that some members of Council put many hours of work into the task, and outgoing President Noel Riley made several trips to London at his own expense to further the cause.

Finally, thanks to Alan Mitchell, who will retire from the Division Council later this year after more than a quarter of a century as Division Secretary/Treasurer. Alan, who was awarded the OAM in the 1998 Australia Day Honours list for services to the profession of Naval Architecture, has decided that he has other things in life to do. We thank him for his work done over all those years, and wish him well for the future.

*Bryan Chapman*

Australian Division President Bryan Chapman

## EDITORIAL

Australia has not been under direct military threat for over half a century. Thankfully, international terrorism has yet to target our people or infrastructure. In this island continent we are used to the changing cycles of drought and flood, and are prepared for the impact of those natural disasters on our economy, which for so many years depended heavily on our exports of primary products.

Our economy is also vulnerable to other unexpected events, the more so because of today's wider base of exports. Iron ore, coal and gas are obvious commodity exports, but manufactured goods are also a vital part of our source of income. Most of the goods and services we produce are traded within Australia, and this has probably helped to protect the economy from the full impact of the Asian economic problems. Nevertheless, one need look no further than the commercial shipbuilding industry to see how important exports are to its success.

The recent gas supply interruption in Victoria illustrated how vulnerable our industry can be to problems with the supply of essential services. In the global economy, industry has to ensure that it is as competitive as possible and this means reduced stocks and work in progress. Production interruptions caused by the failure of essential services can have a very serious impact. As our governments continue the essential task of micro-economic reform, they must not loose sight of the need to ensure that the infrastructure upon which the economy depends is as secure as possible to limit the impact of disasters, natural or man made. That is one of the tasks we pay them for.

Industry, be it large or small, has its own responsibilities. As we approach the new century, one man-made threat has emerged – a threat that has received a great deal of publicity. The so-called millenium bug, or the Y2K problem. Whilst this technological vulnerability may mainly affect organisations with large mainframe computers running software written in the days when memory was expensive, it may affect all of us to varying degrees. Everyone should be alert to the threat and take the necessary precautions, for if only one in five organisations were affected in some way, the impact on our economy would be serious. There is no need for this to happen.

In coming issues *The Australian Naval Architect* will provide information that may help naval architects address the problem. There are only fourteen months to go.

*John Jeremy*

## LETTERS TO THE EDITOR

*Dear Sir,*

Congratulations to you and the editorial team in New South Wales on your first issue of *The Australian Naval Architect*. Following the high standards set by David Lugg and his Western Australian team cannot have been an easy task, but you have succeeded in producing yet another interesting, informative and entertaining newsletter.

Thank you also for passing on my thanks to those members of the Division whom I met and who made my recent visit so enjoyable. As I said in my letter, I hope that the recognition that communications need to be improved, both ways, will bring to an end the frustration and anger that has often been expressed in the ANA. May I echo the view of the previous editor that there is a need to let RINA members outside Australia know what is happening in the Division, and I welcome the efforts you are making to link the ANA with the RINA Web site. Can I also put in a plea again, for articles for *RINA Affairs*, particularly Section events.

And finally, may I hope that Noel Riley's tender wrist is feeling better (July ANA p.4). I think what I actually said was the President and Council would have

preferred not to have heard about such proposals for MOUs with another professional institution for the first time in the ANA, since they do have funding and constitution implications. But that said, they welcome such closer co-operation, however it is achieved.

I wish the NSW team success with future editions of ANA, particularly in attracting advertisers. For those who do, I will offer a 20% reduction in the cost of an advertisement in the Professional Directory sections of any of the RINA journals.

*Trevor Blakeley*
*Chief Executive*

*Dear Sir,*

Congratulations on a first class publication. I'm sure all the old hands (like myself) will be able to identify the photograph on page 33 of the July issue as being the launch from the State Dockyard on 29 February 1964, of the container ship MV *Kooringa*, for her owners McIlwraith McEacharn Ltd. She was completed and sailed from Newcastle to Melbourne on 4 June 1964, to inaugurate the fortnightly Melbourne to Fremantle "seatainer" service for which she was specially designed.

*Kooringa* was not the first dedicated container ship on the Australian coast. *William Holyman*, also from the State Dockyard, had beaten her by about three years, and containers of various descriptions were already in fairly widespread use, and had been for years, on the coast on other conventional general cargo and roll-on roll-off ships, particularly in the Bass Strait trade.

The difference was that *Kooringa* was thought to be — and probably was — the first purpose-built cellular container ship to be built anywhere in the world, and was promoted as a link in the door-to-door chain, the ultimate purpose of a cellular container ship.

*Kooringa* cost one and a half million pounds and another million was spent on the construction of special terminals at Melbourne and Fremantle, and on the provision of "seatainers" and other auxiliary equipment. She was a single screw motor vessel 413'9" overall, 55' beam and a mean loaded draft in service of 22'6" with a corresponding deadweight of 4353 tons. She exceeded 18 knots on trials and had a service speed of 16 knots.

The "seatainers" were of four fairly similar types, some refrigerated, but all were smaller than the now-standard 20' unit. The two largest could accommodate 14.5 tons of cargo and had a gross deadweight of 17 tons. For handling the "seatainers" *Kooringa* was equipped with two 71-ton travelling gantry cranes on deck.

*Kooringa* was eventually sold to the Hong Kong Islands Shipping Co. Ltd and left the Australian coast in early 1976 under her new name of *Island Container*, registered in Panama.

*Merv Palmer*
*Canberra Section*

The container ship *Kooringa*, completed by the State Dockyard, Newcastle in 1964
(Photo courtesy Michael Pearson)

*Dear Sir,*

Referring to the July 1998 edition of *The Australian Naval Architect* page 33, the vessel is MV *Kooringa* which was indeed the worlds first cellular containership to be constructed from the keel up. Matson line had converted older vessels to containerships in the Hawaii/US trade but all of these vessels were conversions. The size of containers used on *Kooringa* originally were dimensionally the same standard size used by the Matson Line i.e. 16'-8" x 8' -0" x 8' -0".

A closer look at the photograph reveals the sponsons for carriage of the two gantry cranes which were fitted originally to this vessel.

In around 1970 she was converted by Mitsui Tamano Shipyard, for the carriage of the then new internationally - agreed standard for containers of 20'-0" length. At the same time the cranes were removed and the sponsons deepened to the level of the waterline to improve the vessel's stability in a seaway.

We have recently passed on to the Newcastle Maritime Museum photographs of this vessel. We still hold some plans at Holyman of this notable vessel.

It finished its service after a long life some years ago when I think it was named the *Island Trader*. Perhaps others can verify that.

*Ed Ironside*

*Dear Sir,*

I will shortly be attempting a commemorative re-creation of Sir A C Gregory's 1855-56 Expedition in the Victoria River region of the Northern Territory.

The modern expedition will attempt to locate the camp sites on the original venture and will adopt as far as possible the same arid country exploration techniques using pack horses and navigation by sextant, chronometer and artificial horizon.

The organisers are attempting to purchase an artificial horizon of the traditional type, i.e. a boxed mercury flask with a glass housing or the boxed smoky glass plate with adjustable legs and spirit level.

These types of horizons were very common in the days of sail, being used for star and sun sights when the horizon was obscured, and for marine surveying. They still occasionally appear in maritime auctions. We would prefer to purchase a horizon in good working condition.

If readers have an artificial horizon of this type they wish to sell could you please contact me on the addresses shown below.

Home Phone: (02) 9907 9610 Fax: (02) 9907 8232
Email: 100234.63@compuserve.com

*Kieran Kelly*
*Commander*
*North Australian Exploration Expedition 1999*

# NEWS FROM THE SECTIONS

## Canberra

There was a healthy attendance at the July meeting of the section when Roger Duffield gave an overview of his thesis concerned with the squat behaviour of ship models traversing shallow water with stepwise depth variations. Tests conducted at the AMC towing tank were correlated with a numerical approach as part of this project. At least 15 more people are now familiar with the concept of a depth Froude number and the unusual behaviour of ships navigating in shallow water at various depths and speeds.

On 22 July, the IEAust Canberra Division, Mechanical Branch in cooperation with the Marine Engineering Society of Australia (MARENSA) arranged for a presentation to be given by CDRE Tim Cox, Director General Maritime Development, on the Defence Force Development Process and major new naval projects. This meeting was held at the IEAust headquarters. CDRE Cox gave some of his views on where improvements could be achieved in major naval acquisition projects including greater input from the operators of the equipment.

Dr Adrian Moritz of the Maritime Platforms Division of DSTO Aeronautical and Maritime Research Laboratories (AMRL) kindly agreed to give a presentation to the local RINA section on *DSTO Research into Polymer Composites for Naval Platforms* in conjunction with a scheduled visit to Campbell Park Offices on 17 August. Adrian's presentation provided a good overview of the applications of composite materials to naval ships focusing particularly on manufacturing processes and the characteristics of such materials

when subject to shock and exposure to fire. Various test samples showing the fire resistant behaviour of composites with surface treatments were displayed.

A further meeting arranged by IEAust in association with MARENSA was held on 8 September at the IEAust headquarters when Janice Cocking of the Maritime Platforms Division of DSTO AMRL gave a presentation on *Air Independent Propulsion for RAN Submarines*. Janice reviewed the various forms of air independent propulsion which have been considered as alternatives on submarines and the merits of these options.

Planning for this year's annual joint dinner with IMarE will be initiated in the coming weeks. The intention is that this dinner will be held in November. Further notification will be provided to the local members once arrangements have been made.

*Martin Grimm*

# New South Wales

## Inaugural Meeting of NSW Section

A meeting of NSW members was held on 31 August at the Lane Cove Club to formalise the New South Wales Section of RINA. The section had previously been operating on an interim basis under the chairmanship of Alan Mitchell and secretariat of Prabhat Pal.

The attendees were short on numbers (particularly younger members) but they made up for it in enthusiasm. After discussing the section, the following committee was elected: Phil Hercus (chair), Paul O'Connor, Noel Riley, Todd Maybury, Don Gillies, James Fenning, and Phil Helmore (delegate to the Australian Division Council). James Fenning has agreed to take the position of treasurer; a secretary has yet to be found.

## Philosophy

The committee held its first meeting on 10 September and discussed major items of interest in the formation of the section. Philosophy and direction took up a considerable amount of time, and the overwhelming consensus was that the operation of the section must appeal to recent graduates. To that end, topics for technical meetings must be relevant to the recent graduates, and/or cutting edge technology. Other ideas were canvassed, and some of these will be put into operation next year. The committee has three recent graduates (all who showed up), and their views will be invaluable in making events attractive.

## Meetings

As we go to press, two meetings have been arranged for the remainder of 1998:

On 7 October Ken Warby, the current holder of the world water speed record, gave a presentation *High Speed on the Water* to a joint meeting of the Institute of Marine Engineers (Sydney Branch), the Institution of Engineers Australia (Maritime Panel) and RINA NSW. The meeting was an update on his new boat and the path to a world water speed record. He was supported by Lawry Doctors, who tested Ken's first record holder, *Spirit of Australia* in the wind tunnel, and together they provided insights to some of the aerodynamic, hydrodynamic and powering challenges. See also the separate update article in this issue.

On Wednesday 28 October, a joint meeting of the Institute of Marine Engineers (Sydney Branch) and RINA NSW will be held at the Portside Centre, 207 Kent St, Sydney, at 5:30 p.m. for 6:00 p.m. Rob Tulk and Chris de Roza of Incat Designs will give a presentation *The BC Ferries Catamarans*. Three of these huge fast catamarans have been ordered by BC Ferries, Canada. The vessels are 122m long and carry 250 cars and 1000 passengers at a service speed of 37 knots.

Prior to this, the RINA has recently held three combined meetings with the Institute of Marine Engineers (Sydney Branch):

On 22 July Alan Taylor, Environment and Crisis Systems Manager for BHP Transport, gave a presentation *Ballast Water: Minimising the Risk of Harmful Organisms and Pathogens*. He addressed the problem of harmful aquatic organisms in ballast water, the background, and how it is being addressed via International (IMO) Regulations, the Australian Voluntary Guidelines and the Australian Coastal Ballast Water Guidelines. Australia is a leader in this field, and had a major input to the IMO Regulations.

On 26 August Kevin Porter of Lloyd's register of Shipping gave a presentation *The European Recreational Craft Directive.* This directive (94/25/EC) specifies the new regulations with which recreational craft must comply after 16 June 1998 before they can be sold for use with in the European Union. Under the directive, each Union member state must implement the regulations, and these spell out the requirements which builders and designers must meet, and the attestation modules which manufacturers may use to demonstrate compliance. There was an excellent roll-up of younger members at the meeting; this, of course, had nothing to do with an assignment which had been set for the third-year naval architects at UNSW!

On 23 September Romeo Carinci, Project Engineer for Alstom Australia Ltd (formerly GEC-Alsthom), gave a presentation on *Diesel-electric Propulsion and Integrated Control System for the RAN Hydrographic Ships.* He had a drawing of the vessels on display, and the talk was well illustrated with slides. Alstom Australia has operated as the packager/design co-ordinator, with assistance from the propulsion experts Alstom Fluids et Mecanique in France. Together they have provided a complete twin-shaft diesel-electric propulsion system for the *Pacific*-class hydrographic vessels, coupled to a sophisticated integrated control system. The two vessels, built by NQEA in Cairns, are HMAS *Leeuwin* (already commissioned), and HMAS *Melville,* (nearing completion and beginning trials).

**E-mail Addresses**

The first mailing of notices of meetings from the NSW Committee was done by both e-mail and post as a trial. E-mail has a number of advantages, not least being that you receive notices more quickly and it saves the costs of postage, printing and stationery. If you are resident in NSW, have an e-mail address and:

(a) did not receive the first notice by e-mail but would like to, then please advise James Fenning <james_fenning@incatdesigns.com.au> of your address.

(b) received the first notice by e-mail but would prefer postage, then please advise James Fenning (e-mail as above).

*Phil Helmore*

# Victoria

Victorian members of RINA and others in the local marine industry were recently invited to have a few drinks and discuss the possibility of forming a common interest group to meet on a regular basis. The proposed aims of such a group include:

- To act as a catalyst for a more cohesive marine industry in Victoria,
- To provide an opportunity to socialize and catch up with old friends,
- To provide a forum for technical discussion and the interchange of ideas.

As a result, a healthy turn-out of neneteen took the opportunity to catch up with friends and chat about the industry. The venue, a North Melbourne pub, provided an informal setting for a relaxed discussion. It was particularly pleasing to see the attendance of student and recently graduated engineers.

One issue raised involved the option of forming an active Victorian Section of RINA. As a preface to the discussion, incoming President of RINA (Australian Division), Bryan Chapman, provided a brief overview of the current restructuring of the Australian Division and the procedures for establishing a Victorian Section of RINA. While attendees saw the establishment of a Victorian Section as a future possibility, it was agreed that this option should not be progressed prior to a more positive participation of members at existing forums (e.g. IMarE).

At the end of the evening, the following principal conclusions/actions were recorded:

1. As a first step, the need to encourage a greater participation of RINA members (and others in the marine industry) in the existing IMarE technical meetings. To facilitate this a small organising committee volunteered to arrange with ImarE for our more active involvement.
2. A desire to reconvene this marine industry "discussion group" around Feb/Mar 99 to assess our progress with the IMarE meetings and to further share ideas of mutual interest. It was suggested by a number of those present that the next meeting should trial a new format (to stimulate discussion) where attendees are invited to provide a short informal presentation of recent technical activities of interest to the group.

While this common interest group is in its embryonic phase, there has been good support for the concept, not just from Naval Architects but from a wide cross-section of the industry. Many have suggested a real need for such a group. I look forward to seeing you at the next "gathering" and IMarE meetings in the meantime.

*Mark Smallwood*

## WANTED
## A VOLUNTEER

The Editorial Committee of The Australian Naval Architect is seeking someone to join the team to manage the advertising for the ANA. This essential job will help ensure the future of the publication.

*Contact John Jeremy or Phil Helmore*

# COMING EVENTS

## Short Course in Naval Architecture

The Australian Maritime College will hold a short course *Introduction to Naval Architecture* from Wednesday 4 November to Friday 6 November 1998. The course aims to introduce the principles of naval architecture to professionals working in the maritime industry. It covers terminology, hydrostatics, stability, resistance, propulsion, dynamics, design, structures, materials and machinery. The course will be presented by college staff and a practising naval architect. Comprehensive course material will be provided and extensive use will be made of the College's specialised facilities. Further information may be obtained from the short course manager at the Australian Maritime College, R. Holmes, phone (03) 6335 4852, fax 6326 3790, e-mail r.holmes@search.amc.edu.au or web-site www.amc.edu.au/staff/events/events.html.

## Workshop on High-speed Ferries

The Australian Maritime Engineering CRC is organising a workshop *High-speed Ferries* to be held at The University of New South Wales from Monday 12 to Wednesday 14 July 1999. This workshop will have experts from industry, the regulatory authorities and academia giving presentations on feasibility analysis, general arrangement, resistance, powering, motion analysis and control, structural analysis, mathematical modeling and optimisation, safety regulations, classification society rules, design principles, and contracts and specifications for high-speed ferries. Further information may be obtained from Dr Prabhat Pal, phone (02) 9385 4092, fax 9663 1222 or e-mail p.pal@unsw.edu.au.

## STAB2000

The Seventh International Conference on Stability of Ships and Ocean Vehicles is being organised by the Australian Maritime Engineering CRC and will be held in Launceston from Monday 31 January to Friday 4 February 2000. The objective is to promote a full exchange of ideas and methodologies regarding the stability of ships and ocean vehicles of all types. You will have received a copy of the Call for Papers with this issue of *The Australian Naval Architect.* Please note that the deadline for submission of abstracts has been extended to 30 November. Further information can be obtained from the conference secretariat at the AMECRC Launceston, phone (03) 6335 4885, fax (03) 6326 6261, e-mail stab2000@crc.amc.edu.au or web-site www.amc.edu.au.

## Sea Australia 2000

This major conference will be held in Sydney from Monday 20 to Wednesday 22 March 2000. Organised by the RINA, IMarE, IEAust and the AMECRC, the Sea Australia 2000 Congress will cover a wide range of topics relevant to the new millennium, including innovations in marine design, novel proposals for propulsion, trends in port handling facilities, developments in offshore industries, safety regulation and the marine environment. You will have received a flyer for the Congress with this issue of *The Australian Naval Architect.* Further information can be obtained from the conference secretariat, Ms Anne Lewis at ICMS Ltd, phone (02) 9976 3245, fax 9976 3774 or e-mail seaaust2000@icms.com.au.

## UNSW Naval Architecture Reunion

A reunion of all UNSW naval architecture graduates, current students, and past and present staff will be held to coincide with the University's 50th Anniversary celebrations early next year.

The planning committee has met and has pencilled in Saturday evening, 27 March 1999 for a dinner to be held in the Terrace Room in the Squarehouse at the University. First thoughts are that this should be a sit-down buffet-style dinner, as this will promote mingling of the years. Partners are especially welcome, to meet the crowd you used to hang out with, and for us to meet them.

The date fits in well with the "Back to the University Weekend", planned for 20 and 21 March, and with the events either side of that weekend. The School of Mechanical and Manufacturing Engineering has pencilled in a "Reception" for sometime during the year, but no arrangements have yet been made. Basser College is having its reunion dinner on Saturday 20 March (see their web-site); the other residential colleges have not yet made plans.

A reunion web-site has been created to provide updates as they happen, and for people to register their interest. The site is at www.ozemail.com.au/~dkay/unsw-navarch/. Please visit the site and register your interest and contact details (if you haven't already done so). If you don't have access to the web, please phone (02) 9385 5215 or fax 9663 1222 your details to Phil Helmore.

More than one-third of all our graduates have been

reached by e-mail, but we don't want to stop there. We would like to make a special effort to contact everyone, and will need your help. Please pass this message on to all graduates and staff for whom you have contact details, or who are in your employ. We suggest that, in particular, you try and contact everyone who was in your year(s).

*Dave King*

**The Royal Institution of Naval Architects (Australian Division)**
**Western Australia Section**

Presents a one day conference in conjunction with the Ausmarine Exhibition

# *Fast Sea Transportation*

Thursday 5 November 1998, from 0900 to 1630
First Floor, Victoria Quay Function Centre & Exhibition Centre
1 Cliff Street, Fremantle, WA 6160

**PROGRAM**

*Effect of Pitch and yaw on waterjet impeller performance* A Hughes – Southampton University, UK

*Multiple Criteria optimisation and selection of high speed Ro-Ro ferries at the concept stage* K Hutchinson – University of Newcastle, UK

*Intelligent regression of resistance data for hydrodynamics in ship design Dr L J Doctors* – AMECRC, University of NSW

*A Preliminary design and propulsion prediction method for waterjet propulsion systems* Dr Ing Kourosh Koushan – Marintek, Norway

*Corrosion control of waterjet propelled aluminium vessels* D Moran – Corrintec Ltd, UK

*Cavitation tunnel – Experimental and numerical developments* Dr P Brandner – AMECRC, Australian Maritime College

*Fast freight ferries as an instrument of modal shift from road to sea* – A Baird and Dr G Callaghan – Napier University, UK

Conference fees: $80.00 for RINA Members, $65.00 for students, $120.00 for non-members

(Morning and afternoon teas, a light lunch and printed papers included)

To register, phone Ann Smith on 08 9266 7380 or fax 08 9266 2377 or mail a cheque to RINA WA Section, PO Box 193, PALMYRA, WA 6157

***The assistance of Baird Publishing and the RINA UK for providing venue and speakers is gratefully acknowledged.***

# GENERAL NEWS

## MINEHUNTER PROGRESS

The keel of *Diamantina*, the fifth of the six minehunters being built by ADI Limited, was laid at Newcastle NSW on 4 August by the Secretary of the Department of Defence, Mr. Paul Barrett. Whilst the facility in which these ships is only four years old, progress with the project has been rapid. The first ship *Huon* began a six-month program of sea trials in June. The trials will be mainly conducted off the NSW coast but *Huon* will also visit North Queensland and Jervis Bay during the program. Trials of the second ship *Hawkesbury* are scheduled for early 1999. *Hawkesbury* was the first hull to be built in the Newcastle facility and has been followed by *Norman* and *Gascoyne*.

In July the Government announced that five consortia had been short-listed to proceed to the next stage of the bidding process for the sale of ADI Limited. The Government's decision on the billion dollar Guided Missile Frigate (FFG) Upgrade Project is expected later this year. As an ADI tender is one of two being considered for this project, arrangements and timing for completing the ADI sale will be determined in the light of that decision. The sale of ADI is unlikely to be concluded before the second quarter of 1999.

*Huon* on trials off Newcastle
(Photo courtesy ADI Limited)

## WORLD WATER SPEED RECORD UPDATE

Twenty years ago, on 8 October 1978, Ken Warby put his name on the world water speed record with a speed of 275.8 knots (511.1 km/h) in *Spirit of Australia* on Blowering Dam, NSW. Since then there have been several attempts to raise the record, two people have died in their attempts, but none has succeeded.

Ken has almost completed a new boat to raise his own record. The boat is 8.7 m (28.5 ft) long and is powered by a Westinghouse J34 jet engine (as fitted to the Lockheed Neptunes in the 1960s), but with an afterburner added to increase the power to 6710 kw (9000 hp). For comparison, *Spirit of Australia* was 8.5 m (28 ft) long and had the same engine (without afterburner) delivering 4470 kW (6000 hp). Ken is still in need of a major sponsor, and would like to make the runs before the Olympic fever hits.

Ken was in Australia for the 20th Anniversary of his record as the guest of the Australian National Maritime Museum. He gave a technical presentation to a combined meeting in Sydney (see NSW Section News in this issue) with Lawry Doctors, and spoke at the Classic and Wooden Boat Festival at the ANMM.

Michael Tait, a keen follower of the world water speed record, has voluntarily created an official web-site for Ken at `www.visualtech.com.au/kenwarby`. This site has a significant amount of information on it, together with links to Ken's home page at `w3.one.net/~warbyinc`, newspaper articles, photos, a copy of *Spirit of Australia*'s UIM Certificate, etc.

*Phil Helmore*

# SYDNEY HARBOUR REGATTA 1998

The first test event to be conducted in preparation for the Sydney Olympic Games in 2000 was conducted on Sydney Harbour between 19 and 27 September. The Sydney Harbour Regatta for Olympic classes was the largest regatta ever held in Sydney. Entries in the international event came from 34 countries with many of the Atlanta medallists competing. It involved 250 boats and some 350 athletes sailing ten events for eight classes.

The aim of the regatta was to test the Olympic sailing site, the racing schedule, harbour management and communications, and the Olympic Sailing Base in Rushcutters Bay. It was a useful opportunity for the 530 staff and volunteers to work together for the first time.

There were six race 'fields of play' spread from the Opera House to two areas at sea off Sydney Heads, and classes were rotated between these areas as appropriate to provide experience in the varying conditions and to provide challenge for the competitors. Harbour traffic and ferries were strictly controlled during the events and, despite the unfortunate grounding of the ferry *Narrabeen*, the procedures worked well and proved that the management of a world class event of this type is possible in Sydney.

SOCOG is spending some $11.5 million creating a world-class sailing venue in Rushcutters Bay. The works have included the construction of a temporary marina, four pontoons for use as launching ramps, the demolition of derelict buildings, the restoration of heritage-listed buildings that were once part of HMAS *Rushcutter*, and the provision of infrastructure, services, paving and landscaping. Whilst the base is quite small, it worked well during the regatta with an excellent spirit developing amongst staff, competitors and volunteers. Unfortunately, with vocal local resident opposition to further development of Rushcutters Bay for sailing purposes, most of the facilities provided for the Olympics are temporary, and the continuing legacy for yachting will be small. Nevertheless, the experience in the management of international sailing to Olympic standard that will be gained by the

Race management boats securing at the Olympic Sailing Base in Rushcutters Bay after a days racing on Sydney Harbour (Photo by John Jeremy)

many volunteers from the five Sydney yacht clubs that provided the race management teams will be of lasting benefit. These volunteers were supplemented by some experienced race officers from interstate and New Zealand, and they were observed and supported by a number of senior ISAF officials.

The success of the regatta endorsed the selection of Sydney Harbour as the Olympic sailing venue and proved yet again that, regardless of local conditions, the best sailors win events. The weather was kind, but sufficiently varied to test the competitors and the site in light and heavy conditions.

Overall, participants from 15 of the 34 competing nations went home with medals. Australians Chris Nicholson and Ed Smyth won the gold medal in the 49ers, the new Olympic class, with the silver and bronze going to Americans. Darren Bundock and John Forbes won the gold medal for Australia in the Tornados. Australia also won the silver in the Tornado class, silver in the mens' Mistral sailboards, Europe Dinghies for women, and bronze medals in the Mistral sailboards for women and the Lasers. Details of the results can be found at `www.sydney-olympic.org`.

There will be another test regatta in Sydney in September 1999 when the Star class will also participate. It will be the final major rehearsal for the main event the following year.

*John Jeremy*

Gold medal winners Chris Nicholson and Ed Smyth with their support boat (above).

Mistral sailboards powering away from the start in an early race in the series (below)
(Photos by John Jeremy)

# UNUSUAL SYDNEY VISITOR

An unusual ship visited Sydney in August this year. Too high to get under the Sydney Harbour Bridge, it towered above its berth at Garden Island. The ship was the world's largest scientific drill ship *JOIDES Resolution*, which is on a perpetual mission to explore the evolution and structure of the Earth as part of a $90 million per year ocean drilling program of international research involving 22 nations including Australia. Australian participation is lead by University of Sydney geologist Professor Jock Keene. The ship schedule and drill sites are planned years in advance by the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES) and the operation is administered through the Texas A&M University.

Before coming to Sydney the ship had been drilling in an active fault zone east of Papua New Guinea known as the Woodlark Basin. The Woodlark Basin lies on the boundary of two tectonic plates and is one of the few places in the world where new ocean floor is being created.

*JOIDES Resolution* began life as SEDCO/BP 471 and was renamed after Captain Cook's ship HMS *Resolution*. The 143 metre long ship is fitted with a derrick standing 61.5 metres above the waterline. During drilling operations the ship is dynamically positioned by 12 thrusters and the main propulsion system. The rig can suspend up to 9,150 metres of drill pipe to an ocean depth up to 8,235 metres. The drill pipe is lowered through a 7 metre wide 'moon pool' and each length of pipe is 28.5 m long and weighs about 874 kg. It takes about 12 hours to lower 5.5 km of drill string, which rotates in its entirety during coring operations.

The deepest single hole penetrated in the ship's operations since December 1985 was 2,111 metres, and the greatest water depth 5,980 metres. After the Sydney visit the ship set out to explore the south west Pacific Ocean and the sediments deposited by the Deep Western Boundary Current which runs at between 2,000 and 5,500 m with a current flow about 100 times that of the Amazon. The sediments there are expected to help understand the processes of global warming. The earth has undergone global warming many times in the past. The sediments provide a record of the last 2.5 million years during which the earth has been subjected to 50 cycles of glaciation followed by deglaciation, the last period of glaciation ending only 15,000 years ago.

*JOIDES Resolution* at Garden Island
(Photo by John Jeremy)

# EXPENSIVE BULKHEAD

The United States Department of Defense recently announced that Newport News Shipbuilding and Drydock Co., Newport News, Va., is being awarded a US$7,931,706 (about A$13.4 million) modification to a previously-awarded contract for the new attack submarine (NSSN) construction engineering and planning contract. This modification is for long lead construction of the aft reactor compartment bulkhead. This effort will assist in the verification of design sharing from the design yard Electric Boat and support construction of the second NSSN submarine. Work will be performed in Newport News, Va., and is expected to be completed in March 2000.

The lead ship in this class of attack submarines, to be named USS *Virginia* (SSN 774), will be built by Electric Boat.

Members with some experience or knowledge of nuclear submarine construction will probably understand, but others may wonder how it is possible to spend so much money on a single bulkhead.

# PATROL BOATS FOR SINGAPORE

Last year a joint venture company Asia-Pac Geraldton was formed comprising Geraldton Boat Builders and Asia Pacific Shipyards to build a series of twenty fast aluminium patrol boats for the Singapore Police Coast Guard. When the first Australians arrived in Singapore last October to start work on the project the shipyard facilities for the project were no more than a shed with a rough concrete floor. The trades, technical and management staff are predominantly Australian, and all design drawings have been prepared in Australia. Email has been used extensively for the transfer of documents including drawings and manuals between Australia and Singapore.

The first of the boats was launched recently. They are 18 m long with a beam of 5 m. The propulsion is by two Hamilton 521 waterjets driven by two MTU 2000 diesels of 1325 kW each for a cruising speed of 40 knots.

The first Singapore Police Coast Guard Patrol Boat to be completed (below)

*Sydney 2000*, built by Oceanfast for operation on Sydney Harbour by Captain Cook Cruises (below)

# NEW SOUTH WALES NEWS

## New Construction

MV *Sydney 2000*, a 63m steel vessel for Captain Cook Cruises is due to arrive in Sydney at about the time of publication. The vessel will be used for restaurant harbour cruising, and was designed by Burness Corlett Australia in Sydney and was built by Oceanfast Marine in Fremantle. She can carry up to 600 passengers on three decks, is propelled by two right-angle drives and has a bow thruster for manoeuvrability.

A 21.5m GRP catamaran designed by Jutson Yacht Design in Sydney is currently under construction at Marine Magic in Queensland.

Crowther Multihulls has one 11m and one 17m aluminium catamaran under construction. The 17m vessel is being built by Alder Marine Fabricators in Maclean, NSW.

A 15m GRP sports fishing boat is currently under construction at Australian Marine in Newcastle.

## The Classic and Wooden Boat Festival

The Australian National Maritime Museum held their Classic and Wooden Boat Festival on 10 and 11 October, with more than 150 boats of all shapes and sizes on display, and the Classic and Wooden Ferryboat Race. Other highlights included a colourful re-enactment of the departure of explorers Bass and Flinders from Sydney Cove in 1798 on their epic voyage, the National Deckline Throwing Contest, many guest speakers (including Ken Warby beside *Spirit of Australia*), a maritime marketplace, street theatre, and children's activities.

## Around and About

*Hercules*, the floating crane which has serviced Newcastle harbour for many years, was docked for survey at Forgacs recently and found to be beyond economical repair. Her familiar profile will be sadly missed on the Newcastle waterfront.

NSW is expecting an influx of large (up to 40 m) super-yachts/cruisers visiting Sydney for the Olympics. There are reportedly twenty of these vessels booked on a semi-submersible vessel coming from Miami to Auckland for the America's Cup in 1999, continuing to Sydney for the Olympics in 2000. These vessels generate a significant amount of revenue by their pres-

ence, and the Government is keen to encourage them to include Australia in their world cruise itineraries.

There is currently a big resurgence in the restoration of historical vessels on the Murray River, some of which have been dredged up from the river bed for the purpose. Paddle-wheel passenger vessels include *Gem,* 40m long and built in 1876, being restored at Swan Hill, and *Ruby,* 39m long and built in 1907, being restored at Wentworth. Paddle-wheel tugs for the wool barges include *Success,* 25m long and built in 1877, being restored at Mildura, and *Hero,* 28m long and built in 1874, being restored at Echuca. Wool barge *Cannally,* 28m long and built in 1907, is also being restored. Many of these vessels were of composite construction with three-inch red-gum planking below the waterline and steel plating above the waterline, on angle-iron frames. The steel plating avoided the problem of shrinkage (and consequent leakage) of planks in the heat of the sun. Despite the long periods of immersion of some vessels, much of the original red-gum planking is in excellent condition, the worst deterioration being the *erosion* of the bottom planking due to years of scraping over the bottom!

The Waterways Authority has received a record number of applications for initial survey in the last few months.

*Phil Helmore*

## NORTHERN TERRITORY NEWS

The Marine and Maritime business remains buoyant in the Territory with a wealth of activity both onshore and offshore.

Darwin Ship Repair and Engineering have been busy having completed the HMAS *Gawler* repairs and refit after her well-publicized airborne activity and now have HMAS *Woolongong* undergoing refit. Other recent significant dockings have included the supply vessel *Pacific Spear* which required the full range of ship repair services and facilities to complete survey.

The DSRE yard at Frances Bay is progressing well with the construction of MV *Roslynne*, which is scheduled for service in November. With the upcoming closure in the prawn fishery and the refit season for the pearling fleet the medium-term future at the yard is looking rosy with the main refit bay booked up to December and the other nine bays to be well populated into the new year.

The Territory shipping company Perkins has announced their intention to rebuild *Frances Bay* in advance of No. 4 Special Survey. Approximately 850 tonnes of steelwork are involved along with the installation of new Wartsila 6L20C main engines. Their coastal shipping and link to Singapore remain star performers in the Northern Territory for remote communities and remote business ventures alike.

Oil and gas related projects in the Timor Sea and Arafura Sea are keeping local industry active with up to twelve anchor handling supply vessels operating out of Darwin along with a host of seismic and sea bed survey vessels.

The FPSO *Modec Venture* recently made her first offtake from the Elang - Kakatua field located in the Zone of Cooperation A (ZOCA). *CSA Venturer* is busy installing flow lines in the Corralina – Laminaria field in advance of next year's installation of the worlds largest FPSO. Survey work is well underway for the much heralded Bayu –Undan field for Phillips/BHP which should provide the Territory maritime/oil industry with many years of opportunities.

Other offshore activities include development of the Buffalo field and the continuing operation of the Challis Venture and Jabiru Venture, which are in the process of changing owners from BHP to Gulf.

Opportunities for the future look good in this industry especially if Territory businesses make meaningful alliances with service companies with both parties being committed to each other.

For those who like to "hoist their main engine" and steer well clear of the dirt and grime, they have been blessed by the visits of many a wandering millionaire during the fast-diminishing dry season. For over two months we had the yachts *Anakena* and *Antartica* berthed locally and even the most ardent anti-yachtie would not have failed to be impressed by the size, style and opulence of these "His and Hers" floating palaces owned by a Chilean magnate. Another notable visitor was the *Dorethea* owned by the American Ambassador to Singapore. This vessel also took the oportunity to haul out whilst in Darwin.

The Darwin – Ambon Yacht Race was once again well patronized being won in record time by local yacht *Zuma*.

Developments along the waterfront in Darwin include two more marinas, which will complement the already popular Cullen Bay development.

*Ian Stevens.*

# EDUCATION NEWS

## Curtin University

**Short Courses**

Two marine short courses are being run at Curtin University this semester: Applied Hydrodynamics and Marine Structures and Materials. These courses have attracted a broad range of students including ship science degree undergraduates, physics degree undergraduates and engineers from the local shipbuilding industry. These courses are jointly run by AMECRC and the Department of Applied Physics at Curtin University.

A workshop on *Ship Evacuation: New IMO Regulations - Implications, Duty of Care and the Way Forward* was held at Curtin University by AMECRC in September. The workshop outlined the state-of-the-art research into evacuation being conducted by AMECRC and demonstrated the EVACUSHIP-2D software.

In conjunction with the University of Western Australia Centre for Oil and Gas Engineering, AMECRC is presenting a 2-day workshop in October on *FPSO Design and Structural Integrity*. A number of speakers from Australia and Europe are due to provide a detailed view of above-well design of FPSO systems, i.e. the hull, moorings and risers. During the workshop emphasis is to be placed on the regulatory requirements and international codes available for design.

**Undergraduate News**

As well as the undergraduate projects reported in the last edition of ANA there are two other marine-based projects underway at Curtin University. Matthew Legg is investigating acoustic propagation in shallow water. The search for petroleum deposits involves using reflected sound energy from a noise source, usually an underwater airgun, towed behind a vessel. Since the migration route of whales off the North Western Australian coast passes through an area of significant seismic investigation an extensive investigation by the Centre for Marine Science and Technology is being conducted into the effect of seismic airgun noise on sea animals. The other undergraduate project, being carried out by Damien Killeen, is investigating techniques for tracking whale locations using their emitted sounds. The results from this study will help track whales and assess the changes in their tracks due to the airgun activity.

**Postgraduate News**

Rick Shock is nearing completion of his master's project on lift-dumping foils, which has been an AMECRC task. His work has involved investigating the control of the amount of lift generated by a foil (for example used as a ride control surface) by controlling aeration of the water flow over the foil surface rather than adjusting the foil angle of attack. Rick has used a computational fluid dynamics code to model the change in lift due to aeration over the foils. He recently visited the United States of America to present a paper on his work at the 22nd Annual Symposium on Naval Hydrodynamics.

*Giles Thomas*

## University of New South Wales

## Undergraduate News

**Visit to AMC and Incat**

The Australian Maritime College again acted as a generous host to our third-year students. The visit, on September 14 and 15, contributed to their studies in ship hydrodynamics. The practical experience they gained by using the towing tank for resistance and ship motion tests, together with the inspection of the shiphandling simulator, the cavitation tunnel, and the circulating-water tunnel was a most valuable and useful addition to their theoretical studies.

The first work in the towing tank consisted of calm-water resistance experiments on a small planing boat and comparing the test results with the well-established Savitsky formulas. The second work was the determination of the motion characteristics of the ITTC S175 container ship in regular waves and, in particular, the linearity of the response was quantified.

A/Prof. Lawry Doctors, who led the group, presented a seminar on his theoretical work related to ship resistance and wave-wake predictions for river vessels to AMC staff and students. Much of this work had been done on a co-operative basis between UNSW, AMC, and AMECRC.

The students took advantage of their proximity to Hobart to visit Incat Australia's construction facility at Moonah. This visit was arranged by Mr. Robert Clifford, Chairman and Managing Director of Incat Australia. As well as meeting the technical staff at Incat, the UNSW students were pleased to go on board

the latest large wave-piercing catamaran which was undergoing final fit-out at the yard.

The UNSW group is grateful to Dr Martin Renilson and to Mr. Richard Young for organising the AMC tour; they both invested a considerable amount of time in this project. In addition, Dr Paul Brandner, Mr. Bruce Goodchild, Mr. Steve Eayres, and Mr. Ben King assisted with the AMC tour. Thanks also to the RINA (Australian Division), who generously funded the cost of the students' accommodation at the AMC and the Launceston bus fares. And finally, many thanks to Mr. Robert Clifford and all at Incat Australia for their hospitality and their efforts to make the visit interesting and enjoyable.

**Visit to ADI Minehunter Project**

On Tuesday 15 September the fourth year students travelled to Newcastle to visit the ADI Minehunter Project. They were given a guided tour of the five vessels in various stages of construction. First-of-class HMAS *Huon* is undergoing sea-trials, *Hawkesbury* has been launched and is fitting out alongside, *Norman* is on the hard with engines fitted and is being readied for launch, *Gascoyne* is in the shed having propulsion units and decks fitted, while *Diamantina* is being laid up in the moulds.

**Ship Visits**

Visits to three container ships in port have been arranged recently for the fourth-year students. These included *Queensland Star*, built in 1973 in Germany and owned by the Blue Star Line, which was berthed at Patrick's, Port Botany.

**Inclining *Lady Hopetoun***

The Sydney Heritage Fleet again made their steam yacht *Lady Hopetoun* available for our fourth year students to conduct an inclining experiment. Friday 28 August dawned fine and sunny, the south-easter raised no more than 5 knots, and conditions at Rozelle Bay were text-book perfect for an inclining. Having taken all the measurements and readings, the students then had to work up the results to the lightship as a group project. The vessel had a new boiler fitted two years ago, and the regular inclining results have shown that the displacement and centre of gravity have remained essentially unchanged.

**Classification**

On Wednesday 9 September Mr. John Donovan from the Sydney Approval and Marine Service Centre at Det Norske Veritas gave an extra-curricular presentation *Introduction to Classification* to our fourth year students. The presentation covered the history of shipping and classification, the parties to modern-day shipping, the objectives of classification, and the process of classification.

## Post-Graduate and other news

**Study in Japan**

Dugald Peacock was awarded a scholarship funded by NSK-RHP Australia for study/research at Osaka University and to visit Osaka Prefecture University from March to June this year. The scholarship was intended to establish links between Australian Universities and their Japanese counterparts. Dugald spent the majority of this period at Osaka University researching literature on viscous roll damping. A considerable amount of literature was reviewed, and this literature is currently being catalogued. While in Japan, Dugald presented a paper at the 3rd Osaka Colloquium on Advanced CFD Applications in Ship Flow and Hullform Design (web-site `www.marine.osaka-u.ac.jp/oc3`) hosted jointly by both universities.

*Phil Helmore*

## Australian Maritime College

The second semester has started with effect from 20 July. Some of the memorable activities that have taken place and will be taking place are as follows:

Prof. Lars Larsson, professor at Chalmers University of Technology, Sweden, and Managing Director of FLOWTECH International AB has visited AMC. He delivered lectures on 'Michell's Theory- The Starting Point of Computational Hydrodynamics' and 'Failures, Fantasies and Feats in the Theoretical/Numerical Prediction of Ship Performance' on 17 July 1998 as part of the AMC/AMECRC seminar series program which was well attended by students and academic staff of AMC and UTAS.

Visitors to the College included the Vice President, Simulation for STN Atlas in Germany, Mr Hermann Hattermann and AMSA International Representative, Mr Ian Williams. Ian gave a lecture to naval architect students while he was here.

As part of the AMC/AMECRC Seminar Series, Lindsay Cunningham presented an interesting talk on Design of High Speed Sailing Craft to an well-attended gathering in the AMC auditorium on 12 August 1998. He has been the chief designer and driving force behind Australia's success in the International Catamaran Challenge Trophy (The 'Little' America's Cup), which Australia won in 1970 and again in 1985. Aus-

tralia led the world in this 'Hi-tech' field and held the cup from 1985 to 1996 with the 'Edge' series of catamarans designed by Lindsay. Lindsay has also been successful as a helmsman and has won a world C Class Championship as well as a number of national and state titles in various catamaran classes. He designed the sailing machine *Yellow Pages Endeavour*, which holds the world sailing speed record.

On 14 September 1998 A/Prof Lawry Doctors also presented an exceptional paper *Intelligent Regression of Resistance Data for Hydrodynamics in Ship Design*.

*Transformation of Wave Energy to Electrical Energy* was presented by Sigurd Schmidt on 17 September 1998, a visiting student from the University of Rostock, Germany, while undertaking his final year thesis work at AMC.

Ocean Vehicle Design Presentations from BEng (Naval Architecture) students took place on Saturday 1 August. Attending from industry were Gordon McDonald from the Department of Defence, Canberra, Sean Booth from New Zealand and Andrew Jeffs from Baird Publications. All BEng students of AMC undertake two projects in the final year of their study. One project pertains to ocean vehicle design while the other relates to a research project.

The topics covered under these presentations along with corresponding research projects due to be presented in October 98 were as follows:

| Family Name | Fore Names | Ocean Vehicle Design | Research Project |
|---|---|---|---|
| ABBOTT | Samuel | 27m Customs Patrol Boat | Shallow Water Effects on High Speed Craft |
| AHMED | Habibul Haque | 64m Offshore Supply Vessel | Loads And Responses on a Bulk Carrier |
| BIRD | Nicholas Dean | 55 Patrol Boat for the RAN | Computational Fluid Dynamics (Navier Stokes Equations in 2-D) |
| CHANG | Luke Nicolas T. M. | 45m Luxury Mothership | Wave Resistance of High Speed Slender Monohulls |
| COOPER | Andrew Boyd | 30m Passenger vessel | Deck diving of high speed catamarans in following seas. |
| HARMAN | Matthew James | 70m Casino/gaming Boat | Dynamic wave loads on Catamarans |
| KRETSCHMER | Stephen Grant | 180m Semi Submersible Heavy Lift Ship | Structural Analysis of a Semi Submersible Heavy Lift Barge |
| LONGMUIR | Brett Andrew | 30m Low Wash River Cat | An Investigation into Wave Wake Generated by High Speed Vessels in Shallow Water |
| LOWRY | Cameron Paul | 28m Coast Guard Patrol Boat | An Investigation into Wave Wake Generated by High Speed Vessels |
| NEUMANN | David Craig | Stern Landing Craft | |
| STEVENS | Samuel Peter | 21m Catamaran Lobster Fishing Vessel | Continuing Investigation Into the Damage Stability of Catamarans |
| THOMPSETT | Vaughan Ian | 61.5m Heavy Landing Craft | Investigation into Turbulence in the AMC's Circulating Water Channel |

*Prasanta Sahoo*

# RINA AUSTRALIAN DIVISION CHANGES

In January 1997, all members of the Australian Division were invited to indicate if the Australian Division Council should be restructured in a way to enable it to better represent the views of members and serve the maritime industry and the membership generally. The majority of members were in favour of such a restructuring and the Australian Division Council, after an exhaustive study, proposed that new By-Laws for the operation of the Australian Division and the Australian Division Council be approved by the Council of the Institution in London. The By-Laws were approved by the Council for implementation in Australia on 22 July 1998.

The Australian Division Council has resolved that it will, in addition to furthering the objects of the Institution and formulating matters of overall policy, be responsible for the organising of conferences of national interest, liaison with statutory bodies and peak councils of kindred organisations, the dissemination of information of national interest and the enhancement of the professional status of the Institution and its members. The Australian Division Council will also encourage the establishment of Sections of the Australian Division in those geographical areas where there is a perceived need for local representation.

Sections of the Australian Division will, in addition to contributing to the business of the Australian Division Council by representation on that Council, continue to have responsibility for the furtherance of the objects of the Institution, liaison with local bodies, organising conferences and activities of local interest, the provision of means whereby members are able to meet socially and professionally and offer assistance to local members. Sections will be responsible to the Australian Division Council for their own finances.

The Division President and the members of the Australian Division Council will be elected by national vote. Their term is for two years, however initially they have been appointed by the outgoing Australian Division Council for three years. This is to ensure that not all members of the Australian Division Council will retire at the same time, the Division Vice-President and members appointed by Section Committees are appointed for two years only thus allowing for some overlap of membership and continuity.

Provision is also made in the By-Laws for proxy voting. This ensures that all members, irrespective of where they live, are able to record their vote on the acceptance or otherwise of matters brought before the Annual General Meeting or a Special General Meeting of the Australian Division. In addition, there is provision also for meetings of the Australian Division Council to be held less frequently and for meetings to be conducted electronically. This should result in significant financial savings in airfares alone as it will no longer be necessary for members of the Australian Division Council to attend in person while matters of importance that might arise between meetings will be attended to by an Executive Committee of the Australian Division Council. A complete copy of the By-Laws will be sent to each member of the Australian Division in the near future.

*Keith Adams*

## THE ROYAL INSTITUTION OF NAVAL ARCHITECTS

### AUSTRALIAN DIVISION

### DIVISION COUNCIL MEMBERS 1998-99

**President:** Mr. B V Chapman
**Immediate Past President:** Mr. N T Riley
**Vice President:** Mr. J M Colquhoun

| **Members appointed by Sections:** | **Members appointed by Outgoing Council:** |
|---|---|
| Mr. J M Colquhoun | Mr. G L Doyle |
| Mr. P J Helmore | Mr. P C Hercus |
| Mr. R J Herd | Mr. J C Jeremy |
| Mr. G Leggatt | Mr. I C Laverock |
| Dr M R Renilson | (One to be appointed) |

**Non-voting Student Representative:** Mr. J Fenning
**Secretary:** Mr. K M Adams, **Treasurer:** Mr. S J Benjamin

# MV SEAROAD TAMAR
# MODIFICATIONS TO IMPROVE SHIP MOTIONS

**by**

**R P Dummett**

*Searoad Tamar* is a 9,642 DWT Roll-on/Roll-off vessel, currently owned by Holyman Coastal Express Pty Limited, and has been engaged in the trans Bass Strait trade since going into service in 1991, providing a regular scheduled service between Melbourne, Devonport and Hobart.

The vessel was designed and built by Carrington Slipways Pty Limited to the specifications of the first Owner, ANL. In order to ensure maximum flexibility of loading the ship was designed, for entirely RO-RO cargo, or, alternatively for block stowage of containers both on the main Vehicle Deck and on the Upper (weather) Deck, where they would have to be loaded by shore crane and could be stowed two tiers high.

This latter loading arrangement naturally resulted in the most dense stow, and determined the cargo deadweight capacity. It also, because of the high proportion of cargo weight carried on the Upper Deck, determined the 'worst case' stability requirements for the ship. When loaded in this manner the value of the fluid metacentric height ($G_FM_O$) was calculated to be of the order of 0.8 m, giving an estimated roll period of approximately 18 seconds.

On the basis of this assessment of vessel loading, and allowing what were considered to be adequate margins, an Intering controlled passive tank roll-stabilising and heel-control system was installed. The system included two stabiliser tanks ('A' and 'B'), designed to function optimally at values of $G_FM_O$ in the range 0.4 m to 1.50 m, corresponding approximately to natural roll periods of 25 seconds, ranging down to13 seconds. A roll period of 13 seconds was the lower limit to which the system could be tuned.

After being accepted into service it soon became apparent that the newly introduced 'cassette' method of loading containers onto the Vehicle Deck was so successful that this, in conjunction with road trailer cargo on the weather deck, would be the cargo loading system generally adopted. There was, in any case, no facility to block stow load containers on the Upper Deck, as originally envisaged.

Due to these factors, and also to cargo availability, cargoes on the Upper Deck were found in practice to be lighter and less densely stowed than in the design 'worst case'. The resultant $G_FM_O$ was often in excess of two metres, with natural roll periods in the range 8 - 12 seconds. Wave frequencies in some areas of the ships operation can be in this range, which is well outside that for which the Intering stabiliser system was designed. In these conditions the vessel was subject to synchronous rolling of high amplitude, resulting in an uncomfortable motion, and affecting operational and crew efficiencies.

It was considered necessary, in the interests of operational efficiency, to address the question of reducing acceleration levels in worst-case conditions. To this end a number of studies were commissioned by the owners to determine a range of possible modifications to the vessel to achieve these aims. In the meantime short-term solutions were put in place. Permanent ballast, in the form of twenty eight containers full of mineral sand, weighing over 500 tonnes, were arranged in a 'U' around the forward end of the Upper Deck, and the vessel was operated at all times with every ballast tank 'slack', contributing maximum free surface. These measures resulted in a reduction in the operating $G_FM_O$, but unfortunately not to the level where the stabiliser tanks could be used to reduce the roll amplitude.

The studies, carried out by a number of consultants, considered a wide range of potential solutions, ranging from large additions of mass at a high KG, through modifications to the Intering system, to retro-fitting active fin stabilisers. Most had either adverse effects on cargo carrying capability or unacceptably high cost. Eventually the preferred solution was one proposed by Burness Corlett Australia Pty Ltd (BCA), who recommended the fitting of one or two large passive stabiliser tanks on the Upper Deck.

This proposal was then tested in the Seakeeping Laboratory at MARIN, in the Netherlands, using a self propelled model, at 1:37 scale. The model was fitted with two roll damping (passive stabiliser) tanks of differing widths, one fitted forward, at the break of forecastle, and the other aft, immediately forward of the accommodation block. Tests were carried out in two alternative conditions of loading, using varying depths of water in combinations of one or two tanks, and with the model running in regular beam and quartering seas of 2 m and 4 m double-amplitude wave height, of varying frequencies.

The results of these tests showed that it was only necessary to fit the forward tank, and that when tuned (by varying the depth of water), this would provide significant improvements in roll motion. A reduction in the transfer function of 83% was achieved at the peak (i.e. resonant) frequency. This can be seen in Figure 1 (extracted from the MARIN model test report). Here it should be noted that the resonant frequency of 0.8 rad/s corresponds to a period of approximately 8 seconds.

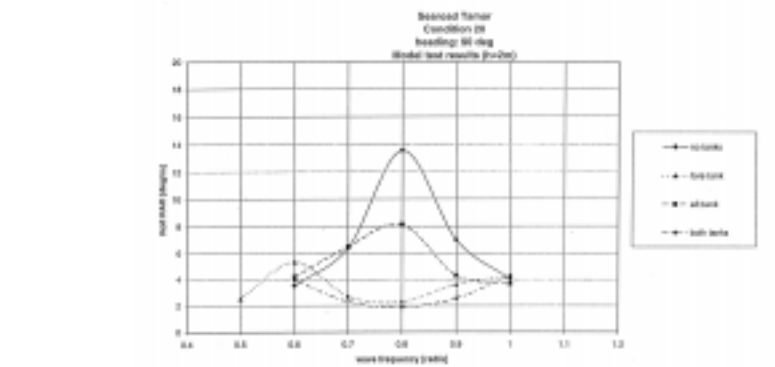
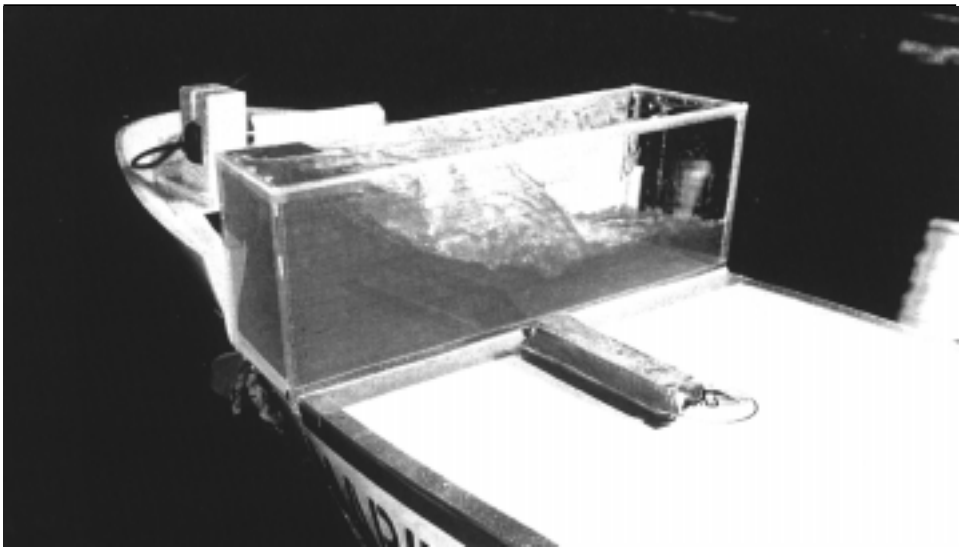


Figure 1


The MARIN model - unstabilised rolling in regular beam seas (above)

The MARIN model in the same condition, stabilised, in regular beam seas (below)



A close-up view of the RDT on the model - note the 'breaking wave' in the tank

The Roll Damping Tank (RDT) was designed by BCA and constructed by Tenix Shipbuilding (WA), being pre-fabricated and fitted during a scheduled docking in Fremantle early in 1998. It is an impressive structure, having a width equal to the full beam of the ship (23 m), a height of 7 m and a length of 5 m. The average operating depth of water in the tank is 2 m - 2.5 m, which translates to around 250 tonnes. The 'sloshing' loads exerted on the tank ends are considerable, with the energy associated with this weight of water in what is literally a breaking wave having to be dissipated every five seconds or so. The end baffles within the tank are curved to cushion the impact, and are constructed of 16 mm plate, strongly supported on 610 centres, with a matrix of 125 diameter holes.

A system was designed for rapid filling and emptying of the tank from a permanent reservoir, being the No. 2 Deep tank, which is immediately below the RDT. A high capacity pump (375 $m^3$ per hour at 40 m head) is installed in the bowthruster compartment, the piping being arranged so that it can pump either up to or down from the RDT, with an alternative gravity dump. The pump discharges through a flow meter, a signal from which is fed to the electronic control panel on the bridge.

When a given depth of water is selected on the control keypad, and the "Pump Up" command is activated, the pump will start, the remotely-controlled valves will be set in accordance with a pre-programmed sequence, and the pump will run until the flow meter signal indicates that the selected quantity of water has been discharged to the tank, whereupon the pump stops and all valves close. The required water level in the tank is initially determined by the Master on the basis of the 'as loaded' $G_FM_O$, with the option of confirming this by measurement of the roll period at any stage during the voyage, and fine-tuning the tank level at sea.

After six months in service the crew advise that the ship's motion has been transformed, and that the word "roll" has virtually been eliminated from their vocabulary. They are also enjoying full nights of uninterrupted sleep for the first time. Apart from the obvious beneficial effects in reducing stress on the crew, the ship and its cargo, an unexpected 'fringe benefit' has become apparent. Prior to the fitting of the RDT the excessive motion had obviously been inducing course instability, causing the auto-pilot to work overtime, with resultant added drag. The reduction in roll since fitting the RDT has resulted in a significant improvement in performance. This is manifested as either an increase in speed of about one knot, or alternatively as a reduction in fuel consumption of about 8%.

These benefits are now being exploited to best advantage on the different legs of the vessel's scheduled service. On the Bass Strait crossing to Devonport, where the schedule is not difficult to maintain, power and fuel consumption can be reduced. When operating on the direct run to Hobart, where bad weather could result in a late arrival, the extra knot of speed ensure that *Searoad Tamar* always arrives on time.

The view forward from the bridge, after fitting the Roll Damping Tank (above)

*Searoad Tamar* on the shiplift after the Roll Damping Tank had been fitted (below)

# SOME MARINE CASUALTIES EXERCISES IN FORENSIC NAVAL ARCHITECTURE (PART 1)

by
Robert J Herd

## 1 Introduction

Following a talk given to a joint meeting of the RINA and IMarE in Melbourne recently on some Australian marine casualty inquiries with which I have been associated, I was requested to develop the talk for publication. Some of these events may be new to younger members occurring as they did twenty-five and more years ago.

As it is not possible to canvass all the issues involved, reference should be made to the appropriate court reports, which will be listed for more complete information.

I use the term "forensic" as defined by the Macquarie Dictionary:

1. Pertaining to, connected with, or used in courts of law or public discussion and debate.
2. Adapted or suited to argumentation: argumentative.

The articles will conclude with some views on my experiences and lessons which may be learned therefrom.

Because dimensions in all the inquiries considered were in imperial units these have been retained throughout. The nautical mile and the knot are not of course, S.I. Units, but have been adopted for use in marine and aerial navigation.

## 2 Loss of HMAS *Voyager*

At about 2056 hours EST on the night of the 10th February 1964, the aircraft carrier HMAS *Melbourne* struck the destroyer HMAS *Voyager* approximately amidships cutting the destroyer in two with the loss of 82 lives.

A Royal Commission was appointed to inquire into:

(a) the cause or causes of the collision;
(b) the facts or circumstances leading up to, contributing to or otherwise relating to the collision and the loss; and
(c) the facts and circumstances relating to the rescue and treatment of survivors.

The writer was seconded along with his colleague Captain Alan Pearson to advise Counsel assisting the Commission on technical matters within his field of expertise, i.e. matters relating to ship structure, stability, and performance.

Because there were a number of issues raised during the course of the Commission it is impossible to canvass them all in this short article. Readers are referred for further detail to the Report of the Royal Commission [1] and to the book by Tom Frame [2]. This latter work considers a wide range of background matters as well as discussing the day-to-day operation of the Royal Commission.

*Melbourne* was an aircraft carrier with an angled flight deck, having a deep load displacement of 19,930 tons, an overall length of 710 feet 6 ½ inches, extreme breadth of 112 feet 6 inches, and draughts of 25 feet 10 inches forward and 24 feet 4 inches aft.

*Voyager* was a Daring Class destroyer, having a deep load displacement of 3,550 tons, length overall 390 feet, beam of 42 feet 11 ¼ inches, draught of 12 feet 1 ½ inches forward and 13 feet 7 ½ inches aft.

The night of the collision was clear but moonless with visibility approximately 20 miles. There was a short low south-easterly swell with light and variable winds. The two ships were engaged in "touch and go" exercises where participating aircraft touch down on the carrier's flight deck and immediately take off. This is a preliminary to the carrier taking the aircraft on board.

The destroyer was to act as a plane guard to rescue personnel from any aircraft which accidentally land in the sea. In this case the plane guard station was No. 1 whereby the destroyer takes up a position 1000 to 1500 yards from the carrier on a bearing of 200 degrees relative to the flight course, on the port quarter of the carrier. The destroyer must maintain this position with appropriate adjustments for any small changes of course.

On the night of the collision *Melbourne* was having difficulty in finding a course on which the wind over the flight deck would be sufficient for performing the 'touch and go' exercises. From 1929 hours when the flying course was signaled till 2056 when the collision occurred the carrier sent a series of signals altering the expected flying course, as each course tried was found to provide insufficient wind.

Some of these signals had to be executed immediately and some executed on receipt of a later order. Each course change required the destroyer to make an appropriate response. At 1957 hours *Melbourne's* course was 175°. At 2030 hours, *Melbourne's* course was 190°. At 2042 hours *Melbourne* and *Voyager* turned together to starboard to a course of 020°. This brought *Voyager*, which had to maintain true bearing and distance from *Melbourne*, ahead of *Melbourne*. At 2047 hours both ships turned together to starboard to a course of 060°. At 2053 hours both ships were to turn to port to a course of 020°, *Voyager* still being ahead of Melbourne. At 2054, *Melbourne* signaled *Voyager* that the estimated course for flying operations was 020°.

There was some disagreement among the naval experts as to the implications of this signal for *Voyager*, whether she should have taken up plane guard station No. 1 again on the basis of this order. She was observed to start to turn to starboard, then turned to port and crossed *Melbourne's* bow with disastrous results. Just before impact the order 'full ahead both, hard-a-starboard' was given in vain.

The task given to the writer was to replot the courses and positions of the ships based on the signals sent, the rounding of signal times and the manoeuvring characteristics of the two ships.

In the case of the *Voyager* fully detailed turning information for various helm angles was available from the trial records. *Melbourne* had no such data, no turning or manoeuvring trials ever having been carried out. There was a miscellaneous collection of data from various sources. Using this data, estimates of transfer, advance, radius, speed loss and revolution loss in a turn were all calculated for both vessels and the plot of the ship's courses previously submitted to the Commission was redrawn. This new plot did not agree with that already submitted.

To clarify the matter *Melbourne*, by now repaired, carried out a series of turns under similar conditions to those on the night of the collision, reducing somewhat the writer's albeit conservative figures. A plot containing the results from the calculations and this full scale trial was then submitted to the Commission as being the best possible version of the manoeuvres. Other calculations were performed. Minorsky's analysis of energy absorption by ship structures during collisions, was used to compare the damage sustained by *Melbourne* with the known data as to speed, courses, displacements etc. Good agreement resulted. When *Voyager* heeled as a result of the hard-a-starboard order just prior to the collision, the likely angle of heel was checked against the evidence of its results.

A suggestion was made to Counsel assisting by a member of the public that interaction between the two ships had been significant. The writer of the letter referred to tests conducted at Sydney University following the collision between the ferry *Greycliffe* and the passenger ship *Tahiti*. Examination of the marks on the flight deck made by the mast as it fell were checked against the speeds and courses being achieved at the time of the collision. These marks indicated that the angle of impact was between 90° and 100° measured from the stern of *Melbourne*. In this event interaction as an influence was most unlikely.

Marks and punctures on the port side of *Melbourne* enabled the course of rotation of the bow of *Voyager* to be determined. Two of the longitudinals in *Voyager's* midship section had a unique spacing, which matched marks and punctures in the shell plate.

HMAS *Voyager* in Sydney Harbour on Australia Day 1964
(Photo by John Jeremy)

**3 Aluminium Runabout**

An aluminium runabout, popular in the early 60s, well built and of attractive appearance was the cause of loss of a number of lives, resulting in inquests and in one case, a Supreme Court action.

It is probably a truism that technical problems increase in inverse proportion to the size of a boat, largely because the weather, sea and human dimensions do not scale and consequently have greater influence on smaller craft. In this case, the boat, of hard chine construction with length just under 12 feet, was light, easily handled and could be put onto a car roof rack by one man.

The effect of one man moving around in the boat could readily bring one chine out of the water and as the edge of the waterplane traveled from the chine towards the keel, the ability of the boat to resist the capsizing influence of the one man reduced alarmingly.

This was readily demonstrated both in reconstructions of two fatal capsizes in Victoria, and in stability tests carried out in smooth water with just one person aboard. By sitting outboard on the midship thwart and leaning over the side as if to haul in a fish, the occupant found himself in the water under the boat.

In one accident, two men were fishing at night when one stood up to respond to a call of nature. The boat capsized. It was partly bailed out and the two men got in. Again the boat capsized, but they were unable to right it. One of the men was lost.

In the second accident, four or five men were proposing to fish near the shoreline. One of the men on the after thwart went forward to throw out the anchor. Before he resumed his place, the boat came up tight on the anchor line, broached in the waves and capsized. One of the crew was lost.

Evidence of the reconstructions of these two capsizes, which were filmed, and of the smooth water tests was given at an inquest. Counter argument was given that because of the large numbers of the boats that had been sold, there was prima facie evidence that the boat was popular and safe.

In his decision, the Coroner considered that the evidence against the boat was insufficient to condemn it [3].

The Supreme Court action related to loss the of three members of a surveying party who died following a capsize on Lake Pedder. The case was settled out of court, so no judgment in respect of the character of the boat resulted.

**4 *W.D. Atlas***

A twin-screw self-propelled well bucket dredge having a bifurcated hull approximately 55% of the vessel's length with a forecastle built to tie together the two foreparts of the bifurcated hull was built as *Mersey Engineer* by Ferguson Bros. of Port Glasgow in 1949. The dredge was 181 feet long, 41 feet broad, 13 feet deep and had an extreme draught of 11.33 feet.

It was powered by two triple-expansion engines with two Scotch boilers having a total indicated horsepower of 1190. Gross tonnage was 749 tons and net 287 tons. The dredge was delivered from Port Glasgow and operated as a harbour dredge for some years before being laid up in the Mersey, when it was acquired in 1964 by Westminster Dredging Company Limited to engage in worldwide dredging activities.

The vessel was chartered to Westminster Dredging Australia Pty Limited to carry out dredging in the Port of Whyalla. Voyage preparations included the conduct of an inclining experiment, resulting stability data being placed aboard for the voyage to Whyalla . She was manned by personnel from a company experienced in the conduct of delivery voyages, and the Master had considerable experience in the delivery of dredges.

Before departure it was agreed that the top tumbler, around which the bucket chain was led, should be left in position, it being shown to the satisfaction of the Master that the stability of the vessel in this condition was satisfactory.

The vessel sailed from the Mersey on 26 March 1965. During the voyage various problems arose. The dredge was very difficult to steer. In hard breezes the bow would turn into the wind and would not return. This often necessitated doing a complete turn to get back on course. The top tumbler assembly, which weighed some 37 tons, began to move transversely from 2 to 4 inches, resulting in the vessel shuddering with each movement. Attempts to chock the assembly were unsuccessful.

The vessel rolled to angles varying from 25° to 40°. Because the steering gear telemotor system broke down, the fuel oil from forward could not be pumped aft and the starboard engine could not be used due to meshing with the steering gear, and the dredge was towed into Lisbon. The top tumbler assembly was removed and stowed on deck aft. In order to try to improve steering performance, the rudder area was increased from the original 35.24 square feet to 84.59 square feet.

At that time classification requirements for rudder stock size and steering gear capacity were based on a numeral A x D where A was the area of the rudder abaft the fore edge of the mainpiece, and D the distance of the centre of area of the rudder abaft the pintles, and on the speed of the vessel. In this case the speed used was 8 knots. The original A x D of the rudder was 66.57 compared with A x D for the steering gear of 80. The rudder stock diameter was 4 ¼ inches. With the increased area the A x D became 140 or 75% in excess of that of the steering gear.

Steering gear troubles persisted with many breakdowns. The ship made numerous calls between Lisbon and Singapore. It was reported that due to the overload on the rudder the relief valves were screwed down and the hydraulic lines leaked at the joints. This necessitated the helmsman descending from the wheelhouse high in the vessel at the top of the two columns supporting the top tumbler to collect the leaked oil and return it to the reservoir. More than 15° of helm was needed to keep the vessel on course.

At Singapore it was found that the rudder stock was cracked and a new one was made and fitted. Three inches were cut from the trailing edge reducing the area to 63 square feet.

When the vessel arrived in Whyalla on 14 July 1965 it was found that the rudder was offset

to starboard. On examination it seemed that the new rudder stock was twisted 11°.

There was much discussion between the owners and the classification society during the vessel's stay in Whyalla. When she sailed in the afternoon of 10 May 1966,

- the rudder stock had been replaced by one of 4 5/8 inches diameter
- the main-piece diameter of 5 ¼ inches was unchanged
- the speed was limited to 6 knots
- the helm angle was limited to 25°
- the rudder area had been reduced to 55.3 square feet
- the top tumbler was in position at the top of the two columns, wedged to try to prevent movement transversely
- the vessel was on her marks, with a freeboard of 1 foot 9 inches, being loaded with equipment, spare gear, steel plates etc.

On leaving Whyalla, the stability characteristics were determined as -

Range approximately 35½°
Maximum righting lever 1.30 feet
Metacentric height about 5.91 feet.

The dynamic stability was less than when leaving both the Mersey and Lisbon. The stability with the top tumbler on deck was satisfactory for the voyage to Whyalla.

Significant improvements in dynamic stability could have been obtained by

- locating the top tumbler on deck aft, or
- removing the top tumbler assembly from the vessel (and increasing freeboard), or
- removing the top tumbler assembly and about 60 tons of equipment ashore (with further increase in freeboard)

The vessel's GM gave her a quick uncomfortable roll, noticeable particularly on the bridge high in the vessel.

The steering gave trouble from the time of departure from Whyalla, the speed did not exceed 4 knots and fuel consumption was high. A call was made to Portland on 14 May 1966 for fuel, water and steering gear repairs. The vessel left Portland on 15 May, after navigating the harbour entrance with difficulty. The steering problems continued. Large angles of helm were needed to achieve a course. The telemotor hydraulics remained defective and the main engines were used to assist the steering. As before the vessel on occasions turned full circle to get back on course. The deck was continuously awash after leaving the shelter of Spencer Gulf and the water-tightness of deck fittings, skylights etc., was defective, large quantities of water entering the hull.

Difficulty was experienced in keeping the steam generators operative. At 6 am on 19 May the vessel was making 3.5 knots, and at 6 am on 20 May the speed was 4 ½ knots with ETA Sydney of 1400 on 21 May. At 1225 the ETA was amended to 0600 on 21 May assuming the then speed of 6 knots was maintained. However by 3 pm the vessel was hove-to in near gale force winds. Steering with the wind abaft the beam was impossible and the ETA was

cancelled till further notice.

The vessel broached at about 1.30 pm in a Force 5 to Force 6 wind. Mooring ropes trailed over the stern assisted by the engines were ineffectual in getting the vessel back on course or head to wind.

The steering gear was ineffective. The vessel lay in the trough of the sea rolling heavily making ¼ knot or less over the ground.

Shortly before 8 pm the boiler fires were extinguished by fuel contamination. The engines were stopped and the remaining steam kept one generator running till 8.20 pm, following which the only lighting was by hurricane lamp and flash lights. At about 8.19 pm the Master advised that the vessel was completely out of action.

Over the next couple of hours there were various exchanges between the Master, the owners, Sydney Radio and HMAS *Vendetta* as to the position of the dredge and the need for assistance. The weather was worsening progressively. At 10.25pm *Atlas* broadcast a Mayday message indicating *inter alia* a bad list to port. At 10.43 pm the ship was abandoned. By 10.45 pm she had capsized.

The top tumbler moved transversely by up to 5 inches from departure till the port list developed, causing vibration throughout the vessel, but particularly on the bridge. The two columns which supported the tumbler passed through the deck and were seated on the bottom plating.

While water entered the vessel in various places through absent or ineffective packing, watertight deck fittings etc., it is likely that the impact forces produced by the tumbler, being eccentrically mounted on the face of the columns and therefore being torsional in nature, affected the watertightness of their upper deck penetrations and the bottom shell in way of their footings, thus admitting sea water into the fuel.

The vessel had been rolling heavily, an estimated 30° to 40° and was down by the head possibly due to water entering the hold forward. Due to the depth of sea water continuously on deck and the obstruction caused by the equipment and material on deck, no checks could be made forward. Shortly before capsize the vessel was listing 40° to 50° and the bulwark top was some 2 feet under water. Of the crew of 17 persons, only 4 survived the capsize[5].

*References*

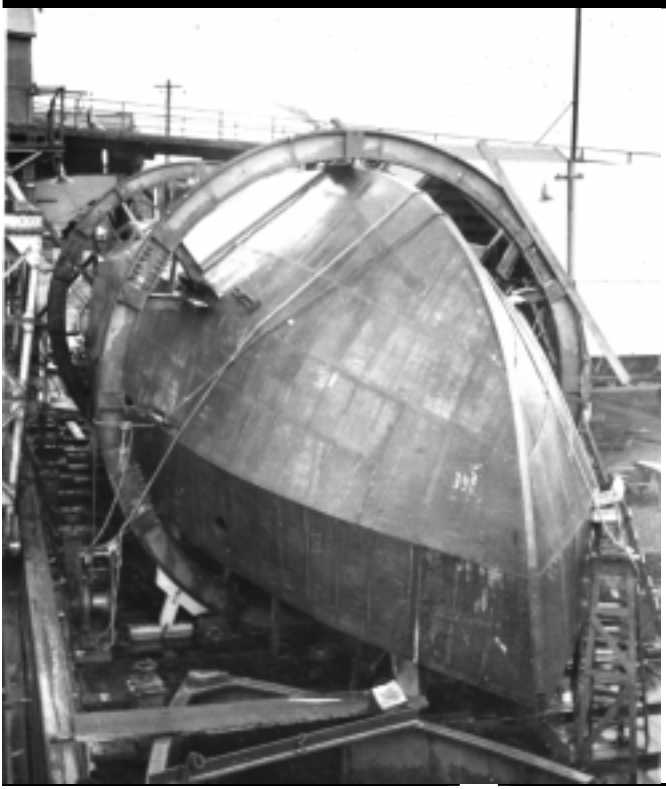
1. *Report of Royal Commission on Loss of HMAS Voyager*, Melbourne 13 August 1964.
2. Frame, Tom - *Where Fate Calls, The HMAS Voyager Tragedy*, Hodder & Stoughton, Sydney, 1992.
3. Gaudion Inquest, Coroner's Court Melbourne, October 1964.
4.Cripps vs. Hydro Electric Commission, Supreme Court, Hobart, September 1968.
5. CMI Report No 148 - Court of Marine Inquiry under Section 364 as to the circumstances of the sinking of the dredge *W D Atlas* off Jervis Bay, NSW, on 20 March 1966.

*(To be continued...)*

# MEMBERSHIP NEWS

In the last edition of The Australian Naval Architect a number of recipients of Royal Institution of Naval Architects 45 year Service Certificates were recognised. London has updated our records and we can now acknowledge the other recipients in Australia. They are Mr J M Alsop MRINA (joined 1949), Mr A R Colquhoun FRINA (joined 1950), Mr D J Dalziel MRINA (joined 1951), Mr B Dodds MRINA (joined 1946), Mr G Griffiths FRINA (joined 1952), Mr R J Herd FRINA (joined 1952), Mr I B Johns FRINA (joined 1948), Mr G Kenworth-Neale FRINA, Mr J H Mayson FRINA (joined 1952), Mr P McBride FRINA (joined 1951), Mr L H McDonald MRINA (joined 1946), Mr L McMillan MRINA (joined 1950), Mr K M Murray MRINA (joined 1951), Mr J S Palmer MRINA (joined 1947), Mr M D Pearson FRINA (joined 1948), Mr. L A Randall (joined 1952), Mr. J B Savage MRINA (joined 1948), Mr L Smith MRINA (joined 1948), Mr C E Sparrow FRINA (joined 1933) and Mr R T Wright FRINA (joined 1950).

# FROM THE ARCHIVES



This small welded ship was one of a number constructed in this manner some years ago. The hulls were built in roll-over jigs to maximise downhand welding.

Can you identify the project and the approximate date?

The answer will be in the next edition, but as a clue the photograph was taken in New South Wales.

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