THE AUSTRALIAN NAVAL ARCHITECT

Volume 14 Number 3
August 2010

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THE AUSTRALIAN NAVAL ARCHITECT

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(Australian Division)

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Cover Photo:

HMAS *Warramunga* firing a Harpoon Block II missile during a SINKEX exercise as part of RIMPAC 2010 in July (RAN photograph)

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From the Division President

A very important aspect of our lives is the giving and receiving of feedback. Sometimes this feedback is associated with our professional performance at the workplace and involves our subordinates or our supervisors. The purpose of the feedback is to improve the outcomes so that both parties benefit in the future. The giving and receiving of feedback is also critical for the professional institutions, like the Royal Institution of Naval Architects, which promote the understanding of science.

Feedback in the Institution may come in many forms. Recently I revisited Paper No. 1 from the *Transactions of the Institution of Naval Architects*. The paper entitled *On the Present State of Mathematical Theory of Naval Architecture* was read by the Rev. Joseph Woolley on 1 March 1860. In this paper the author gave his personal views and opinions on the state of the art of mathematics in naval architecture. Essentially, the paper is a critical literature review in which those who are new to a subject can learn from somebody who had so much to offer. But it was Paper No. 2, which describes *An Account of Experiments Performed on board of some of Her Majesty's Ships in 1855, 1856 and 1857, for the Purpose of Ascertaining the Heights of their Centres of Gravity*, presented by Frederick Barnes, which got my interest. At the end of this paper there is a very short section documenting a brief conversation which was prompted by the paper. Mr J. Scott Russell was recorded as saying that this paper "is one of the most valuable papers we naval architects have had submitted to us for many years". This type of recorded feedback was very influential to me in my early career. As a student of naval architecture I found myself reading many papers on a wide variety of subjects related to the discipline. More often than not the first part of the paper I read was the discussion at the end of the paper where various members asked questions and a discussion followed. Over the years I found that some of the discussers were on my favorites list. The late David K. Brown from the UK MoD was one of these. He would often read a paper and offer very well thought out questions, but always praised the authors where praise was due, and you knew whether the paper was worth further study by his comments. The discussions were recorded at technical meetings and reproduced for all to read.

Today there is a bewildering array of papers and technical notes which are published in a variety of formats. However, the process of feedback and discussion seems to be in decline and we are left to wonder whether a paper is a significant contribution to naval architecture or not. There are several mechanisms by which we can give feedback to the many published technical papers which we read. The most formal method is to download (from the RINA website) the papers submitted for the *International Journal of Maritime Engineering* (http://www.rina.org.uk/ijme_discussion.html) or the *International Journal of Small Craft Technology* (http://www.rina.org.uk/ijsct_discussion.html) and then send in a formal discussion for inclusion in the journal. A less formal method is to initiate a discussion on the forum pages of the RINA website. Unfortunately, the use of the Australian Division discussion forum, as well as others on the HQ site, is less than impressive. Very little discussion about today's technical papers can be found.

Every so often, a few words printed in *The Australian Naval Architect* causes a reaction. Those who write letters for publication in *The ANA* should be praised. They often raise further questions and certainly add value to the papers or articles presented within the journal. In the last issue of *The ANA,* the article in *From the Archives* raised the subject of warships being designed to commercial standards, and I was pleased to see that this created some lively discussion on the benefits and concerns associated with such a concept [*See Note – Ed*.].

In my opinion, this important function of our Institution is falling by the wayside. The recording of questions, comments and discussion about the contents of the journals and papers needs to be resurrected. I would encourage all to participate in this form of feedback as it is often the discussion which leads to new and exciting ideas within our profession.

Stuart Cannon

Note: The correspondence resulting from this article was not intended for publication but it has prompted further research and another article is possible in a coming edition of The ANA.

Editorial

In the world of the dedicated submariner, there are only two kinds of ships — submarines and targets. Some believe that submarines are the only kind of warship needed for Australia's defence but, realistically, there are many tasks which cannot be undertaken by submarines and a balanced force of surface ships and submarines will always be needed if all reasonable contingencies are to be addressed. However, there can be no doubt that the submarine is a formidable weapon, a fact which was recognised from the days of the earliest submarines and demonstrated to great effect during two world wars.

The primary defence against submarines is surely to prevent an attack from taking place, weapon avoidance or decoy. Early attempts at secondary defence included protective nets for anchored warships and extensive subdivision with anti-torpedo bulges in capital ships. To some extent the latter measures were successful and enabled some ships to survive torpedo attack. Some examples were extraordinary — bows and sterns were lost to torpedoes, yet the ship was brought safely home.

The development of the modern non-contact torpedo has made secondary defence much more difficult. The effect of a modern torpedo exploding beneath a ship has been demonstrated many times. The dramatic images of the decommissioned Australian destroyer escort *Torrens* being sunk by a Mk 48 torpedo are well known. More recently, the effect of such weapons was again demonstrated when the South Korean 1200 t corvette ROKS *Cheonan* was sunk on 26 March 2010.

It proved possible to recover the two halves of the wreck of *Cheonan,* providing a unique opportunity to examine the sinking and its cause in great detail. A very large Joint Civilian-Military Investigation Group was established to study the incident with four support teams from the United States, Australia, the United Kingdom and Sweden. The South Korean Defence Ministry has produced a most interesting presentation on the recovery of the ship and

the subsequent investigation which is available at http://www.freerepublic.com/focus/f-news/2517246/posts. The investigation group concluded that ROKS *Cheonan* was split apart and sunk due to a shockwave and bubble effect produced by an underwater torpedo explosion approximately three metres to port of the ship's centre line abreast the gas turbine room at a depth of about 6–9 m. The torpedo warhead would have had a net explosive weight of about 250 kg. It was also concluded that the torpedo was of North Korean origin.

It is this type of devastating effectiveness which makes the submarine such a powerful weapon — either as a tactical unit actually sinking ships or as a strategic weapon to threaten an enemy's sea-borne communications and surface ships. It only needs the possible presence of one submarine to demand an extensive and expensive defensive response, as was well demonstrated during the Falklands conflict in 1982.

For every threat there is, of course, a defence. The naval architect has an important role to play in designing warships with minimum radiated noise and magnetic signature. However, there is little that can be done to ensure that smaller ships can survive once a modern torpedo has reached its target and detonated. Of course, very large size and subdivision help. The most effective defence is to prevent the attack in the first place and this is a job for the combat-system engineers and a well-trained and eternally-vigilant crew.

John Jeremy

HMAS *Newcastle* firing an Evolved Sea Sparrow Missile as part of a surface-to-air missile exercise on the Pacific Missile Range Facility during the Rim of the Pacific (RIMPAC) 2010 Exercises, Hawaii, during July
(RAN photograph)

NEWS FROM THE SECTIONS

Tasmania

Titanic II: Exploring a Mandatory Polar Shipping Code

The May technical meeting of the Tasmanian Section of RINA was held on 26 May when Dr Julia Jabour gave a presentation entitled Titanic II*: Exploring a Mandatory Polar Shipping Code*. Julia currently works for the Institute for Marine and Antarctic Studies as a lecturer, researcher and the honours coordinator.

Julia's talk was extremely well attended and sparked questions and discussions from all areas of the maritime industry, including ship operations, engineering and environmental considerations. Julia's background is actually in politics, philosophy, sociology and law, so what was this topic which sparked so much interest?

In November 2007, in the icy waters off the Antarctic Peninsula, MS *Explorer* hit a large iceberg, capsized and sank. The crew's preparation, the proximity of other cruise ships and a good deal of luck prevented this catastrophic event from turning to tragedy. Julia detailed the entire incident which resulted in no fatalities. Although the exact cause of the accident was difficult to fully ascertain (the ship's data recorder box was never recovered) the incident has given fresh impetus to the push for regulations in Antarctic waters.

MS *Explorer* was 38 years old when she sank. Built in Finland, she was one of the first ships to take paid passengers to Antarctic waters and she had a 1A1 Ice-A rating from DNV. There are over 50 similar vessels operating in these waters pursuing a growing business in eco-tourism. Preliminary studies on the fleet have revealed that it is very old by global standards and has little regulation beyond the initial classification.

Julia detailed all of the research she has conducted so far, and some of the areas she would like to cover in the future, particularly gathering information to profile the fleet in the Southern Ocean. Without knowing what ships are there and what their details are, it is not possible to adequately assess the risks posed by an out-of-date fleet. Any interested naval architects should contact Julia directly by email at julia.jabour@utas.edu.au — she is certainly very keen to continue her research in collaboration with all interested parties.

Life on Board an Ice Breaker

On 21 July, Dr Carmen Primo gave a much-less technical presentation on her recent voyage on a Spanish ice-breaker. Carmen works as a research fellow at the National Centre for Marine Conservation and Resource Sustainability, looking at marine bio-invasions but, during the summer of 2009–2010, she went back to being a research assistant for the chance to go to Antarctica for a one-month research voyage.

Carmen gave a very informative and light-hearted description of life on board an ice breaker. The pictures she presented were as spectacular as you might imagine. Carmen also detailed the difficulties of conducting scientific experiments in such inhospitable locations, although her team were able to get loads of useful data.

Jonathan Binns

South Australia and Northern Territory

Annual General Meeting

At the SA and NT Section Annual General Meeting was held on 12 May at ASC Shipbuilding the new committee was appointed as follows:

Chair	Graham Watson
Deputy Chair	Malcolm Morris
Hon. Secretary/Treasurer	Danielle Hodge
Members:	Sam Baghurst
	Neil Cormack
	Peter Dandy
	Nik Parker
	Adam Podlezanski
	Jan Verdaasdonk

The Interpretation of the Evidence and Visualisation of the Sinking of HMAS *Sydney II*

On 2 June, at a combined RINA/IMarEST technical meeting at ASC Submarines, Mr Leo de Yong of DSTO gave a presentation on the work undertaken by the joint DSTO/RINA team appointed to provide expert advice to the Commission of Inquiry into the sinking of HMAS *Sydney*. Leo's presentation discussed the evidence of weapons damage to *Sydney*, presented the interpretation of the evidence, explained how and why *Sydney* sank, why there were no survivors and presented a visualisation of the engagement. The meeting was attended by approximately 65 people, all of whom thoroughly enjoyed the presentation. The RINA Section and IMarEST branch committees are grateful to DSTO and Leo for their support of this meeting.

Danielle Hodge

Leo de Yong during his presentation on 2 June
(Photo courtesy Danielle Hodge)

The attentive audience at the HMAS *Sydney* presentation
(Photo courtesy Danielle Hodge)

New South Wales

Committee Meetings

The NSW Section Committee met on 15 June and, other than routine matters, discussed:

- NAMSR: There is now a newsletter on AMSA's website Maritime Safety Regulation dated June 2010 (available at www.amsa.gov.au/Maritime_Reform/Maritime Reform Newsletter — June 2010.pdf). The newsletter makes clear that the Commonwealth Government has committed funding to progress the reform, and details actions planned and in progress.
- SMIX Bash: Final sponsorships for 2009 received, and the result is a very small surplus after some very tight budgeting, but a pleasing result in the face of the GFC. Planning for 2010 is under way, with the *James Craig* venue booked, discussions with the caterers commencing, and ticket prices to be decided in the near future.
- PI Insurance: It is a requirement of RINA that members who undertake consulting work have PI cover. There is a limited number of insurers available in Australia, and further details are being sought with a view to providing a brief article for *The ANA*.

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

- NAMSR: There has been a discussion paper circulated, and comments closed on 30 July.
- SMIX Bash 2010: The organising committee has met, and arrangements are proceeding; sponsorships are coming in and will determine ticket pricing for this year.
- TM Weblink: The possibility of recording technical presentations and placing on the web for the benefit of members far and wide was canvassed, but depends on funding.
- Committee Membership: Stuart Friezer has resigned from the committee as he is moving to Denmark to live, and Anne Simpson has accepted an invitation to join the committee. Craig Boulton has accepted a position on the Australian Division Council as Treasurer.

The next meeting of the NSW Section Committee is scheduled for 14 September.

Developments in Naval Regulation

Mike Mechanicos, Senior Manager Naval Services with Germanischer Lloyd, gave a presentation on *Developments in Naval Regulation: INSA and the Naval Ship Code* to a joint meeting with the IMarEST attended by twenty-two on 2 June in the Harricks Auditorium at the Engineers Australia, Chatswood.

Introduction

In recent years, navies have come under increasing pressure to comply—and demonstrate their compliance—with internationally-accepted safety and environmental standards such as SOLAS and MARPOL. Indeed, compliance with MARPOL is mandatory for the navies of a number of countries. Navies also need to comply with some aspects of the statutory requirements, such as navigation of ships.

Under this pressure, some navies decided to comply with SOLAS to the extent practicable, without compromising national security. Such compliance presented a number of problems, so an international initiative to develop the naval equivalent of SOLAS was undertaken. A specialist team was formed within NATO to develop this naval version of SOLAS, which was aptly named the Naval Ship Code (NSC).

At the same time, as a result of navies turning to classification for assurance, the classification societies begun developing their own naval ship rules. The classification societies then got together and formed the Naval Ship Classification Association (NSCA).

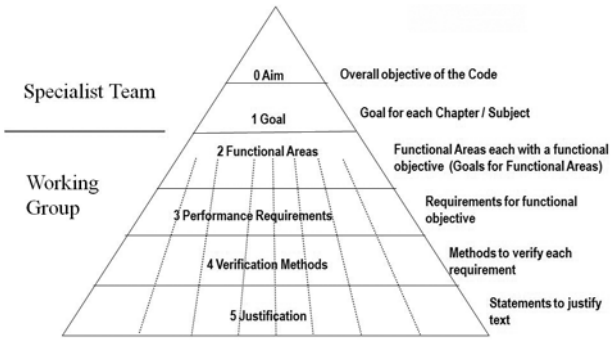
These initiatives led to the decision to establish an international naval regulatory system similar to the existing commercial model.

Here Mike showed two slides. The first represented the international commercial system, in which the flag states are represented at IMO to determine the rules, and then delegate their survey responsibility to the classification societies which, in turn, are represented at IACS, and IACS in turn is represented at IMO, completing the commercial loop. The second slide showed the proposed international naval system, in which the national naval authorities would be represented at NATO to determine the rules, and then delegate their survey responsibility to the classification societies which, in turn, are represented at IACS, and IACS in turn would be represented at NATO, completing the naval loop.

The Naval Ship Code

The overall aim of the Naval Ship Code is to provide a framework for a naval surface-ship safety-management system, based on and benchmarked against IMO conventions and resolutions, and which embraces the majority of ships operated by the world's navies. The code applies to all naval surface ships (except those nuclear powered) and belonging to or operated by the armed forces, the coastguard, or the agency of a state. Implementation would be left to the individual navy/agency.

The Naval Ship Code adopts a goal-based approach. This approach is risk based, and has already been adopted by IMO. The goals represent the top tiers of the framework, against which the ship is verified during design, during construction, and during operation.



The tiered structure of the Naval Ship Code
(Image courtesy Mike Mechanicos)

Mike then illustrating the tiered structure of the code, with the Specialist Team setting Tier 0, the Aim (i.e. the top level or overall objective of the code), and Tier 1, the Goal (i.e. the goal for each chapter or subject). The Working Group

were then responsible for the remaining tiers, including Tier 2, a number of Functional Areas within each goal (i.e. functional areas, each with a functional objective); Tier 3, Performance Requirements (i.e. requirements for each functional objective); Tier 4, Verification Methods (i.e. methods to verify each requirement); and Tier 5, Justification (i.e. the bottom tier or statements to justify the text).

Functional areas are the factors which contribute to achieving the Tier 1 Goal. They are identified by employing risk-assessments methods. Functional areas can be arrangements, systems, equipment, or procedures.

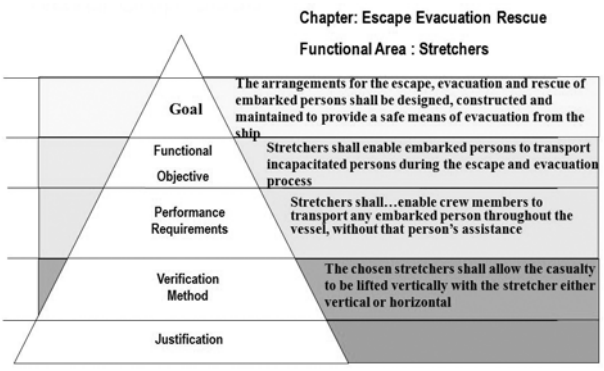
Performance requirements are independent of the technical or operational solution, and have a qualitative character. They ensure that the functional objective is achieved.

Verification methods can be prescriptive (as in a deemed-to-satisfy solution), analysis, demonstration, or safety assessment.

Justification statements are developed for future management of the Naval Ship Code. They are captured in the companion (annex) document, the *Guide to the Naval Ship Code*.

For some chapters, it may be considered sufficient to establish requirements for the upper tiers only. In such cases, establishing Tier 4 and 5 would be the responsibility of a recognised organisation, such as a classification society. The naval administration retaining responsibility for accepting the lower tiers support the higher-level tiers.

Mike then showed how the tiered structure of the NSC works by choosing the example of the Chapter on Escape Evacuation Rescue, with a Functional Area of Stretchers.



Application of the tiered structure of the Naval Ship Code
(Image courtesy Mike Mechanicos)

This approach offers a number of advantages:

- The Naval Ship Code can become prescriptive if appropriate for the subject.
- It permits innovation to be adopted in the solutions provided.
- Non-compliances can be managed in a more-controlled manner by referring to the intent.

The NSC is still being developed and refined. It was published as a Naval Engineering Publication (ANEP) in June 2008. Eventually the NSC will be moved out of NATO to become truly international. In the future, it will include all IMO conventions and codes which apply to navies.

Chapters

The chapters of the NSC are:

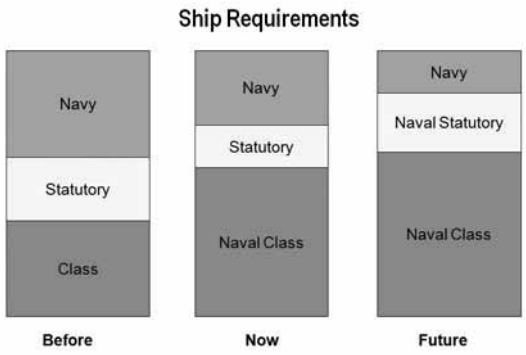
Chapter I	General Provisions		
Chapter II	Structure		
Chapter III	Buoyancy, Stability and Controllability		
Chapter IV	Machinery Installations →	Engineering Systems	
Chapter V	Electrical Installations	↗	*Not used*
Chapter VI	Fire Safety		*Fine tuning*
Chapter VII	Escape, Evacuation and Rescue		*Fine tuning*
Chapter VIII	Radio Communications		*Under development*
Chapter IX	Navigation and Seamanship		*Under development*
Chapter X	Dangerous Cargoes		*Under development*

International Naval Safety Association

To further develop the Naval Ship Code as an international standard, the International Naval Safety Association (INSA) was formed in April 2008 in London. It comprises both navies and classification societies. INSA will also maintain the Code. It is intended in the future to become the naval equivalent of the IMO. Classification societies will be certifying against the NSC.

The proposed international naval system (referred to previously) would then be modified with INSA replacing NATO, and the national naval authorities would be represented at INSA to determine the rules, and then delegate their survey responsibility to the classification societies which, in turn, are represented at IACS, and IACS in turn would be represented at INSA, completing the loop.

Mike then showed a slide illustrating the projected changes in the relationship between navy, statutory requirements and classification society requirements.



Changing relationships between navy, statutory and classification requirements
(Image courtesy Mike Mechanicos)

Conclusion

Navies around the world have been under increasing pressure to comply with the requirements of the IMO conventions as far as practicable. Such compliance, however, proved to be problematic due to the different design philosophies between commercial and naval ships.

In an effort to overcome these problems, a number of navies have come together and begun developing the naval equivalent of SOLAS, the Naval Ship Code (NSC) and the framework to support it, the International Naval Safety Association (INSA) which is the naval equivalent of IMO, along with the concepts of naval flag authorities and recognised organisations.

Queries

Question time elicited some further interesting points.

Some countries are not keen on INSA replacing NATO; the USA in particular. One of the concerns is that standards

which have been developed may then be used by countries which are not on the friendliest of terms with the countries which spent the time and resources in developing them.

There are differing ideas on how to implement the NSC. Builders, classification societies, and navies all want a harmonised standard, and there is the will to progress. However, different people have differing ideas on how progression should best be done!

Some navies don't have the resources to develop their own standards, and their standards may differ from those of another country; e.g. the Spanish-designed F100-class air-warfare destroyers for the Royal Australian Navy.

INSA has no head office at present. If INSA remains within NATO, then it may be that INSA will use NATO offices. Otherwise, the headquarters may be in London, or elsewhere in Europe.

The NSC is goal based; i.e. you start with the goal, and work towards achieving that goal by way of the functional areas, the performance requirements, the verification methods and, finally, the justification.

The Royal Navy has adopted some chapters of the NSC and not others. However, this practice is frowned on; the code should be adopted in its entirety. However, the Royal Navy has a strong safety-case regime, and is able to plug holes which occur due to the selective adoption.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by Jude Fernandes.

IMO's Goal-based Standards

Rob Gehling, Principal of Rob Gehling and Associates, consultants to AMSA, gave a presentation on *Development of Goal-based Standards by IMO* to a joint meeting with the IMarEST attended by fourteen on 7 July in the Harricks Auditorium at the Engineers Australia, Chatswood.

Introduction

Rob began his presentation by asking "What *are* goal-based standards?" He said that he would not answer that directly, but elucidate in the course of the presentation.

In May 2008, IMO adopted amendments to the SOLAS Convention which, for the first time, would give IMO some control over the content of classification society rules. The package included guidelines for verification and for the information to be carried aboard ship, and will enter into force for new-build oil tankers and bulk carriers from 2016.

Present Regulatory Requirements for Structure

Classification societies set and implement their own structural rules, based largely on the needs of insurers for a declaration of "fitness for purpose". International Conventions (such as SOLAS and Load Line) are predicated on an assumption that ships are constructed of adequate strength; e.g. SOLAS II-1/3-5 requires new ships to be designed, constructed and maintained in accordance with the requirements of a classification society recognised by the flag-state administration (Australia recognises nine IACS member societies). There is no restriction on safety competition between societies.

In the Beginning

Document MSC 76/5/10 was submitted to IMO by Greece in September 2002, and proposed:

"The ships designed and built should be strong enough to be able to meet, at all times throughout their expected commercial life, all the conditions and requirements of SOLAS and all other relevant conventions which should be suitably correlated with the rules of classification societies. ……. Classification societies and, in particular IACS, should develop and implement unified standards (as opposed to requirements) in areas where they do not already exist, also specifying the method of calculation and the methodology used."

This proposal signalled the beginning of IMO taking over what had hitherto been undertaken by the classification societies.

Greece subsequently got together with the Bahamas and, in October 2002, they jointly proposed (in C 89/12/1) to the IMO Council that their Strategic Plan should include:

"To remove the possibility of competition between classification societies in the quality of the construction of ships, IMO should develop initial standards which will permit innovation in design but ensure that ships are constructed in such a manner that, if properly maintained, they can remain safe for their economic life."

This was referred by Council to the 77th session of the Maritime Safety Committee in May/June 2003. MSC 77 observed that numerous countries of which Australia was one, are comfortable with current arrangements. However, the complementary roles of IMO and IACS were noted. The majority supported the proposal by the Bahamas and Greece, i.e. that IMO should commence a programme to devise basic goal-based standards for the design and construction of new ships, but continuing to draw on the experience, knowledge and expertise of IACS and others. The MSC agreed that a new item on "Goal-based new ship construction standards" should be included in the agenda for MSC 78 to take place in May 2004.

The Principles of Goal-based Standards

By December 2004, the MSC had decided on the principles for goal-based standards, which they enunciated in MSC 80:

"The standards should be broad, over-arching all of the safety, environmental and/or security standards which ships are required to meet during their lifecycle; they should state the required level to be achieved by the requirements applied by class societies and other recognized organizations, administrations and IMO; they should be clear, demonstrable, verifiable, long standing, implementable and achievable, irrespective of ship design and technology; and specific enough in order not to be open to differing interpretations."

There were, in fact, two competing approaches put to IMO, a prescriptive approach, and a safety-level approach.

A submission was made by Germany (MSC 80/6/4) at an early stage, and similar views were expressed by Norway and Denmark. "Goals clearly formulating the level of safety, security and environmental protection to be ensured by the regulatory framework might form the basis for future development of rules and regulations. In the course of improving IMO instruments, such goals will ensure that new regulations will meet the desired level of safety, security and environmental protection. For rules and standards developed by class and other (industry) bodies, such goals would ensure

that these rules and standards are in line with the aims of IMO, and that IMO maintains control through its request for proving compliance. Any regulatory framework containing such goal-based elements is considered to be called a goal-based regulatory framework.

The MSC agreed to work on the two approaches, the prescriptive approach and the safety-level approach, in parallel, namely, to continue with highest priority on the development of GBS for oil tankers and bulk carriers on a prescriptive basis, and also to work in parallel on GBS for other ships based on the safety-level approach. The safety-level approach proposed for adoption by IMO is based on that applied to the safety of petroleum and other offshore fixed structures

Framework

This approach resulted in a pyramid structure for the framework.

In the GBS components, Tier I contained the goals, Tier II the functional requirements and Tier III the verification of conformity.

Outside the GBS, Tier IV contained the rules and regulations for ship design and construction, and Tier V the industry practices and standards.

Tier I—Goals

The goals are spelled out in SOLAS Reg. II-1/3-10 (see below).

Tier II—Functional Requirements

Functional requirements include design life, environmental conditions, structural strength, fatigue life, residual strength, protection against corrosion, structural redundancy, watertight/weathertight integrity, human-element considerations, design transparency, construction quality procedures, survey during construction, survey and maintenance, structural accessibility, and recycling.

Principles

Goal-based standards are not classification society rules, they are "rules for making rules", and apply only indirectly to individual ships. They provide a means for much-more rigorous examination of classification society rules (as required by IMO Res. A739(18)) than can be carried out by most administrations. Scope exists for application of the GBS approach to any area of ship safety regulation.

Pilot Project

In a pilot project, Tiers I and II were developed in conjunction with a pilot verification using IACS Common Structural Rules for tankers and bulk carriers. The pilot project was carried out at the same time as anti-competitive action by the European Union in relation to classification societies. Following the pilot project, IACS indicated that each society would be seeking individual verification for its Rules for tankers and bulk carriers respectively.

However, the pilot project turned up some conundrums:

- How to regulate classification society rules, when SOLAS application is to ships on international voyages? The answer lies in requiring ships to be designed and constructed to class rules which have been verified as conforming to the GBS.
- Who derives the benefits, and who should bear the costs (administrative and verification) and how will those costs be funded? This requires IMO audit teams of technical experts to verify that technical basis of relevant rules of all classification societies. It involves some self-assessment by the submitting society and administrative support in IMO Secretariat. Direct verification costs should be charged to the submitting class society.

Regulatory Plan

The IMO plan for implementation included the following at MSC 87 in May 2010:

- Adopt SOLAS Regulation II-1/3-10 to give effect to GBS for tankers and bulk carriers.
- Adopt the goal-based standards to be implemented by SOLAS II-1/3-10.
- Adopt guidelines for verification of GBS-conforming class rules and determine how costs are to be funded.
- Adopt guidelines for the Ship Construction File.

There is an important link between individual ship and class rules, especially in relation to port-state control—guidelines are provided for supplementation of shipborne information.

The text of Regulation II-1/3-10 adopted in May 2010 sets out the implementation schedule for tankers and bulk carriers, commencing in 2016 In the intervening period, classification societies are to develop GBS-conforming harmonised structural rules and IMO is to verify conformance. Shipyards will then design to those rules.

The GBS regime for other ship types and generic GBS guidelines will follow.

Text of SOLAS Reg. II-1/3-10

1. This regulation shall apply to oil tankers of 150 m in length and above, constructed with single deck, top-side tanks and hopper side tanks in cargo spaces, excluding ore carriers and combination carriers:

   1.1 for which the building contract is placed on or after 1 July 2016;

   1.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017;

   1.3 the delivery of which is on or after 1 July 2020.

2. Ships shall be designed and constructed for a specified design life to be safe and environmentally friendly, when properly operated and maintained under the specified operating and environmental conditions, in intact and specified damage conditions, throughout their life.

   2.1 "Safe and environmentally friendly" means that the ship shall have adequate strength, integrity and stability to minimise the risk of loss of the ship or pollution to the marine environment due to structural failure, including collapse, resulting in flooding or loss of watertight integrity.

   2.2 "Environmentally friendly" also includes the ship being constructed of materials for environmentally-acceptable recycling.

2.3 "Safety" also includes the ship's structure, fittings and arrangements providing for safe access, escape, inspection and proper maintenance, and facilitating safe operation.

2.4 "Specified operating and environmental conditions" are defined by the intended operating area for the ship throughout its life, and cover the conditions, including intermediate conditions, arising from cargo and ballast operations in port, waterways and at sea.

2.5 "Specified design life" is the nominal period that the ship is assumed to be exposed to operational and/or environmental conditions and/or the corrosive environment, and is used for selecting appropriate ship-design parameters. However, the ship's actual service life may be longer or shorter, depending on the actual operating conditions and maintenance of the ship throughout its life cycle.

3. The requirements of Paragraphs 2 to 2.5 shall be achieved through satisfying applicable structural requirements of an organisation which is recognized by the administration in accordance with the provisions of Regulation XI/1, or national standards of the administration, conforming to the functional requirements of the goal-based ship construction standards for oil tankers and bulk carriers.

4. A Ship Construction File, with specific information on how the functional requirements of the goal-based ship construction standards for oil tankers and bulk carriers have been applied in the ship design and construction, shall be provided upon delivery of a new ship, and kept on board the ship and/or ashore, and updated as appropriate throughout the ship's s service. The contents of the Ship Construction File shall, at least, conform to the guidelines developed by the Organisation.

Proposed Regime for Other Ships

The regime proposed for other ships is risk-based and similar to the safety case for approval of offshore structures. There is a possible problem with securing international acceptance of standards and their implementation. This is because ships in service visit different jurisdictions on a daily basis, whereas movement of offshore structures to another jurisdiction is generally not practical or necessary, and there are different approaches taken by various administrations.

Verification

The audit team appointed to verify GBS compliance of each set of class rules would comprise between three and five technical experts; as an audit, the task for each verification follows a sampling process rather than "thorough check". Guidelines include criteria to be met for each functional requirement. Twenty-two verifications may be required for harmonised structural rule-compliant oil tanker and bulk carrier rules of IACS societies alone, but guidelines provide "flexibility" to avoid duplication in verifying common rules. Given that about 60 organisations purport to be classification societies, the number of verifications required to be conducted in limited time may be large. The text provides for maintenance of verification in respect of rule amendments by audit of 10% of annual amendments.

GBS as a Principle for Regulations

Generic GBS guidelines were proposed by Japan, but were placed on the back burner pending the outcome of the oil tanker and bulk carrier phase. The goal-based format is currently being used for development of the Polar Code and International Gas-fuelled Ships Code. However, neither of these standards will involve IMO verification of third-party rules.

Conclusion

IMO has developed a regime of goal-based standards for classification society rules for the structure of oil tankers and bulk carriers of 150 m or more in length, for implementation on ships constructed from 1 January 2016. This will be implemented by SOLAS amendments which were adopted in May 2010. There is an immense verification task to be carried out in short intervening period.

Questions

Question time was lengthy and elicited some further interesting points.

When asked why go to a goal-based regime, Rob replied that Australia, for one, is happy with the current arrangements with recognised classification societies involving audits by AMSA. However, there are other countries recognising smaller non-ICAS societies, and they are not widely accepted. The decision was made to go ahead with GBS at the request of Greece and the Bahamas, who protest that they do not have the resources to closely monitor recognised societies.

Who does the verification of the Tier II functional requirements? Any classification society wanting verification must go through and show, by self assessment, that they conform to the goal-based standards. This self assessment then becomes the starting point for the IMO-appointed audit team.

The nine classification societies recognised by AMSA are (in alphabetical order) American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Germanischer Lloyd, Lloyd's Register, China Classification Society, Korean Register of Shipping, Registro Italiano Navale and Nippon Kaiji Kyokai (Class NK). The other members of IACS are Indian Register of Shipping and Russian Maritime Register of Shipping. Following the settlement of the anti-trust case in the European Union, there may now be scope for the Polish, Hellenic and Croation registers to join IACS.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by David Gosling, who said that goal-based standards looked like presenting the classification societies with a lot of work in verification over the next few years. The vote was carried with acclamation.

Control of Shipboard Noise

Chris Norwood, Research Leader for the Signature Management thrust in the Maritime Platforms Division of the Defence Science and Technology Organisation, gave a presentation on *Control of Shipboard Noise: A Stepwise Design Process* to a joint meeting with the IMarEST attended by nineteen on 4 August in Room 101 in the School of Mechanical and Manufacturing Engineering at the University of new South Wales.

Introduction

Chris began his presentation by saying that shipboard noise control is an important design aspect for a number of reasons: there are OHS regulations on noise levels for personnel in general; cabin noise levels are important for passenger comfort (and satisfaction!) in liners and luxury ships; and underwater radiated noise levels are critical for warships.

However, noise-reduction measures have a cost. This cost can be minimised by considering requirements at the initial design phase, as it is more efficient to include noise-control measures in initial construction. Retrofitting modifications and noise-reduction measures is two- to three-times more expensive, and is usually less effective.

Noise requirements need to be clearly defined at the requirements stage. For OHS requirements, numerous national authorities have published statutory requirements or recommendations, and IMO has also published requirements. For cruise liners and luxury vessels, levels are set for passenger comfort and satisfaction. Warship radiated noise level specifications are derived from operational requirements and threats.

For warships there is a "signature design cycle", involving an analysis of operational scenarios, a threat analysis, resulting in signature requirements, development of noise-reduction strategies to meet the requirements, implementation, and the final capability. The capability is then matched against the operational scenarios, and the cycle continues.

Signature disguise and misinformation is as much a part of the warship scene as direct control of noise.

Phase 0

Before getting started on the design process, it is as well to know whether you have to worry, or how hard you will have to work. For a particular class or type of ship, what are the noise levels which can be expected?

A large database of noise levels has been compiled from ship measurements, and can be accessed via some of the classification societies. Information gathered includes ship characteristics/variables and noise levels in various spaces. The database may be applied to estimate the noise levels for a new design using statistical evaluation/comparison, or by use of statistical predictors derived from regression analysis.

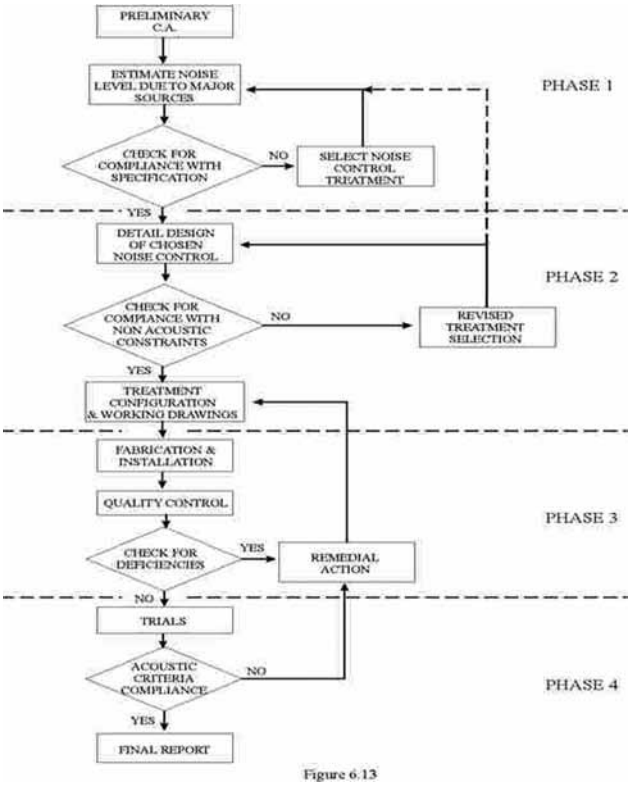
Here Chris showed a slide of broad divisions into ship types, including large/medium/small tankers, container vessels, offshore support vessels, oceanographic vessels, etc. This was followed by a slide showing average noise levels in various compartments, based on longitudinal distance from the propeller, and number of decks above the engine room, in the accommodation/bridge areas above machinery aft (tankers and container vessels) and with accommodation/bridge areas forward (offshore support vessels).

The Stepwise Design Process

Here Chris showed a slide illustrating the overall design process.

Phase 1—Estimation and Assessment

Noise predictions are made using baseline ship design information and compared with required performance. The predictions are used to set a noise budget and noise-control procedures. If noise estimates exceed requirements, then the noise budget is adjusted, and the modified design re-



The stepwise design process
(Drawing courtesy DSTO)

evaluated. The process is repeated until performance criteria are satisfied.

The output is a set of noise-control procedures and a noise budget which fulfills the performance requirements.

Phase 2—Detailed Design

Noise-control treatment proposals are evaluated with regard to impact on other ship constraints. Actual noise source data (if available) is used in the prediction model. It is necessary to identify whether noise-control treatments are in conflict with any non-acoustic design aspects. If so, then noise control treatments must be revised where necessary.

The output is a set of noise controls which are optimal in terms of acoustic performance and other design considerations, and are specified in detail for the construction phase.

Phase 3—Fabrication and Installation

Noise control treatments are fabricated and installed, hopefully as specified. The effectiveness of noise-control treatments can be seriously compromised during construction. Construction work needs to be checked, the installation inspected, and the performance of noise-control treatments checked if possible to assess acoustic performance. Remedial action for non-compliant treatments must be devised.

The output is a ship which meets noise-control requirements ready for test.

Phase 4—Trials and Testing

The final phase is the testing of the vessel to ensure that she complies with performance requirements by measuring noise levels and other performance criteria.

The final report is then prepared, including final noise levels, noise-control treatment details, problems encountered, and solutions to problems.

The knowledge and experience gained can then be used to improve noise-control design on subsequent vessels.

Noise-prediction Procedures

The procedures are the same whether assessing cabin noise levels or underwater radiated noise levels, and are based on the classical source–path–receiver noise model. This may require several separate assessments of the same noise sources and/or transmission paths.

The outputs are quantities which can be compared with the ship specification for noise performance.

Source Levels

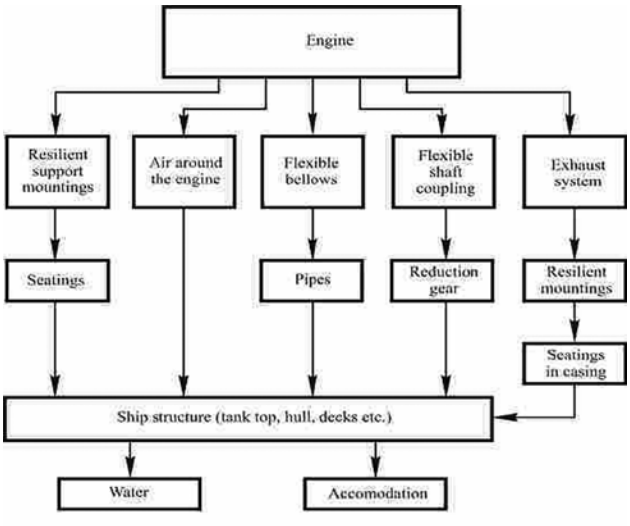
Source levels are typically specified by vibration levels on mountings of flanges, airborne sound-power levels, or fluid pressure fluctuations. There is usually more than one source level for each machine. For example, a diesel engine may be characterised by vibration levels on the mounting points as well as airborne sound power. Source levels should be given in the absence of the acoustic environment and transmission part to which it may be connected.

Acoustic sources are specified in terms of sound power, $L_W = 10\log_{10}(W/W_O)$ dB re W_O. Sound power source levels are independent of the surrounding acoustic environment. They should be measured using the ISO standard, the Australian Standard or the ASTM standard. Sound-pressure measurements due to a noise source in an enclosure depend on the source sound power and the acoustic properties of the enclosure.

Vibration source levels are usually specified in terms of "free" velocity, $L_V = 10\log_{10}(V/V_O)$ dB re V_O. "Free" vibration refers to vibration levels which would exist in the absence of any connection. Practically, "free" vibration levels are measured with the machine mounted on very soft, low frequency vibration mounts. Measurements should be in three perpendicular directions on at least half the mounting points.

The literature contains mathematical expressions of noise source levels, which are usually derived from a mix or practical experience, measured data and acoustical theory. A typical estimation procedure will include

- an equation for baseline level involving variables such as power and weight;
- baseline level adjustment to account for operational and design characteristics; and
- conversion of adjusted baseline level to octave band levels.



Noise paths from an engine
(Drawing courtesy DSTO)

Transmission Paths

These are expressed in terms of transfer functions relating input noise at the source to output noise at the receiver location. There is usually more than one transmission path for each source. Paths are typically divided into a series of sub-paths, each with a transfer function expressed in terms of transmission loss. Sub-path transfer functions are

multiplied together to give the overall transfer function for a particular path.

The transmission path through the ship structure can be divided into three groups: the ship structure to which the machinery foundation is attached; other ship structures along the transmission path; and intersections of ship structures.

The transmission loss will depend on damping and whether the hull is wetted or unwetted. The transmission loss may be modelled using FEA or SEA.

Receiver Space

We need to consider the radiation into the space and the acoustic properties of the space. There are expressions for radiated sound power into the space from the walls, floor and ceiling, but we also need radiation efficiency for the construction. Sound pressure level will depend on internal acoustic properties.

Airborne Transmission

Airborne noise energy is lost in transmission through or around structures along the noise path. Transmission paths may include partitions, barriers, reflecting surfaces, ducts, enclosures, etc. Transmission losses for elements may be taken from the literature, or calculated. Transmission loss is expressed in terms of the fraction of incident noise energy transmitted through the partition.

Examples

Here Chris gave some examples of work which had been done in measuring noise and abatement procedures.

One was to predict the underwater radiated noise levels for a bulk LNG storage vessel. This involved the following steps: identify the main machinery sources; calculate the generic source levels; identify the transmission paths; determine the transfer functions; and calculate radiated noise levels. Noise-reduction what-ifs were then investigated, along with the effectiveness of source-reduction options and comparison with radiated noise requirements.

Another was to measure airborne transmissions. This involved performing NAH measurements using an acoustic source in the MGR, and measuring the spatially-averaged sound-pressure level in the MGR; determining the transfer function between the far-field level and the spatially-averaged sound-pressure level; performing NAH measurements with the diesel engine running and measuring the spatially-averaged sound-pressure level in the MGR; predicting the far-field component due to airborne noise and comparing with the total from the NAH measurement.

Conclusion

Noise requirements can be an important aspect in ship design. Order-of-magnitude estimates of the likely noise levels can be gleaned from database information. The methodology presented provides a structured way to approach the design requirements. Calculation procedures are available for predicting noise levels.

Questions

Question time was lengthy, elicited some further interesting points.

Signature disguise on the warship scene is an ever-evolving feast. In the early days, a vessel could drop a noise-maker in the water and, if it made more noise than the ship, a torpedo would home on it and the ship could get away. The torpedo-makers wised up, and reasoned that if a noise was not moving it was not a target, and so headed the torpedo for the moving source. The ships wised up to that one, and made the noise-makers move as well. And so it goes, with the detection and identification of the real target becoming ever more complex.

The vote of thanks was proposed, and the "thank you" bottle of wine presented, by Ricahrd Sproge.

Phil Helmore

THE INTERNET

Journal of Naval Engineering

The *Journal of Naval Engineering*, published by BMT Defence Services (and not to be confused with the *Naval Engineers' Journal* published by the American Society of Naval Engineers) is available online at www.jneweb.com. This includes the predecessor *Papers on Engineering Subjects* from 1920–46, as well as the *Journal of Naval Engineering* from 1946–present.

Some articles which were originally given the security classification Restricted (in Navy Office hard-copy versions of the journal) have now been declassified. The documents are PDF scans but, with word-search capability and the search tool, is easy to use. This makes the website very useful—and it is all freely available! The only downside seems to be that the website requires the use of Internet Explorer; *all* browsers should be supported.

As a matter of current interest, in the latest volume there are papers on the design, and the hydrodynamic design, of the Queen Elizabeth-class aircraft carriers

Gary Duck
Martin Grimm

Historical Engineering Journals Available

On the same theme, the Australian Society for History of Engineering and Technology and the Sydney University Library have recently completed the digitising of Australia's two oldest engineering journals, the *Proceedings of the Engineering Association of NSW* (1896–1920) and the *Proceedings of the Sydney University Engineering Society* (1896–1917).

The digital archives, which are very easy to use, are at:

http://escholarship.library.usyd.edu.au/journals/index.php/EANSW/issue/archive

http://escholarship.library.usyd.edu.au/journals/index.php/SUES/issue/archive

The new archive will be launched at the University on 24 August. There is likely to be much of interest to Australian engineers in this archive and as a quick search rapidly proved with a paper by the well-known Walter Reeks, *Notes on the Design and Construction of Double-ended Screw Ferry Boats*, turning up in the *Proceedings of the Engineering Association of NSW*, Volume IX, 1894.

Well worth a visit.

John Jeremy

The Royal Institution of Naval Architects

INTERNATIONAL CONFERENCE ON INNOVATION IN HIGH SPEED MARINE VESSELS

2-3 March 2011, Fremantle, Australia.

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First Announcement & Call for Papers

Few sectors of the maritime industry have embraced innovation as readily and successfully as the high speed marine vessels sector, in seeking to extend operating envelopes, reduce downtime and increase reliability, safety and comfort, and reduce costs. Advanced design, the use of new materials and more efficient production methods and other means have and are all being explored to achieve these aims for commercial, military and recreational vessels.

Building on the success of the 2009 conference, the 2011 International Conference on Innovation in High Speed Marine Vessels will again provide an opportunity for all those involved with this sector of the maritime industry to present and discuss recent and future developments in all these aspects of commercial, military and recreational high speed vessels.

Technical papers are invited containing new and original ideas, innovative applications and practical achievements in various aspects of high speed marine vessels, including but not limited to the following topics:

- Design & Construction: including monohulls, multihulls, and special craft such as, SWATH and hydrofoils.
- Coatings, materials and manufacturing processes, including nanotechnology.
- Research & Development: Including model testing, hydrodynamics and structural response.
- Operations: including wake and wash implications, propulsion machinery, motion control, seakeeping and human factors.
- Safety, Regulation and Classification
- Equipment

http://www.rina.org.uk/highspeedmarinevessels2011

☐ I would like to offer a paper and attach a synopsis of no more than 250 words by 16th Sept 2010

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Please return to: Conference Department, RINA, 10 Upper Belgrave Street, London SW1X 8BQ
by fax on +44 (0)20 7259 5912 or by email: conference@rina.org.uk

COMING EVENTS

Tasmanian Section

A technical meeting of the Tasmanian Section of RINA was scheduled for 18 August with a presentation by Prof. Tarmo Soomere on *Changing Wave Climates*.

On 15 October Associate Professor Lenny Imas will present some of his research into sailing yacht computational studies.

NSW Section Technical Meetings

Technical meetings are generally combined with the Sydney Branch of the IMarEST and held on the first Wednesday of each month at Engineers Australia, 8 Thomas St, Chatswood, starting at 6:00 pm for 6:30 pm and finishing by 8:00 pm. The program of meetings remaining for 2010 is as follows:

1 Sep Alan Goddard, Gurit Australia
Composite Structural Engineering of the Panamax Ketch and Other Large Projects

6 Oct Andrew Scardino/Lyn Fletcher, Defence Science and Technology Organisation
Marine Biofouling: Current Challenges and Potential Solutions

2 Dec SMIX Bash

South Australia and Northern Territory

RINA/IMarEST Annual Dinner

The annual dinner jointly held by RINA and IMarEST will be held on 10 September at the Cruising Yacht Club at North Haven. The dinner will celebrate the 150th Anniversary of the RINA and 'The Year of the Seafarer'. The two guest speakers will be CMDR Brian Mateer RAN and Janet Giles (SA Unions). For information or to register please contact Danielle Hodge at danielle.hodge@defence.gov.au.

Site Tour of Babcock Integrated Technology Australia's Osborne facility

On Wednesday 27 October the combined RINA/IMarEST technical meeting will be a site tour of Babcock's new Osborne facility. Babcock Integrated Technology Australia (Babcock) was established in 1989 to support the design and build of the weapons-handling and launch systems in the Collins-class submarine. A support partner to the Australian Government, Babcock has over 20-years experience in the Australian defence industry and is a market leader in naval systems design and supply, offering engineering support services, information and knowledge management, in-service support and specialist analysis. Babcock delivers state-of-the-art torpedo discharge systems and weapons-handling and launch systems for Australian platforms.

Second International Conference on IHSMV

The second International Conference on Innovation in High Speed Marine Vessels will be held in Fremantle on 2–3 March 2011. The conference is being organised by the RINA in association with Curtin University of Technology and supported by Austal Ships.

Few sectors of the maritime industry have embraced innovation as readily and successfully as the high-speed marine vessels sector, in seeking to extend operating envelopes, reduce downtime and increase reliability, safety and comfort, and reduce costs. Advanced design, the use of new materials and more-efficient production methods and other means have been and are being explored to achieve these aims for commercial, military and recreational vessels.

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Technical papers are invited containing new and original ideas, innovative applications and practical achievements in various aspects of high-speed marine vessels, including but not limited to the following topics:

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- Research and development: Including model testing, hydrodynamics and structural response.
- Operations: Including wake and wash implications, propulsion machinery, motion control, seakeeping and human factors.
- Safety, regulation and classification.
- Equipment.

The call for papers is out, and abstracts should be submitted to the conference secretariat at RINA by 16 September 2010 by fax to +44-20-7259 5912, email to conference@rina.org.uk, or lodged online at www.rina.org.uk/highspeedmarinevessels2011.

Further details may be obtained from, the conference website at www.rina.org.uk/highspeedmarinevessels2011.

Basic Dry Dock Training Course

Following on from the success of the courses held in Melbourne in 2008 and Brisbane in 2009, the Royal Institution of Naval Architects has announced its intention to hold the Basic Dry Dock training course again in Australia. However, no dates have yet been arranged.

This unique four day course covers the fundamentals and calculations of dry docking. The course begins with the basics and safety concerns, and progresses through all phases of dry docking: preparation, docking, lay period, undocking, and ends with a discussion of accidents and incidents.

Presented through classroom lectures, student participation in projects and practical application exercises, the course addresses the deck-plate level of practical operation needed by the dock operator and the universally-accepted mathematical calculations required to carry out operations in accordance with established sound engineering practices.

To view details of the last course held at Forgacs Cairncross dockyard, Brisbane, in 2009, visit www.rina.org.uk/basicdrydockaustralia2009.

To register your interest in this event or for more information, visit www.rina.org.uk/drydockaustralia.html or email awilliams@rina.org.uk

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CLASSIFICATION SOCIETY NEWS

LR's Sydney Design Support Office

Following a global review of Lloyd's Register's Design Support functions, the decision has recently been taken to restructure the Sydney Design Support Office in order to align with the corporate strategy of consolidating the plan review of design support activities into fewer centres. This will improve the consistency of the approval process whilst retaining a dedicated local capability to provide more effective local support to clients than is currently possible.

Under the new model, the focus of the Sydney Office will be exclusively on clients in Australia and New Zealand. The current support of global work carried out in Sydney will be re-assigned within LR's global network.

In place of the current structure, a dedicated Client Support Manager will be appointed. This role will allow greater flexibility to provide a wider level of support to local clients, whilst at the same time achieving greater control of design support work within the system.

Concurrent changes to the Global Design Support process will also enable LR to provide clients with clear and mutually-agreed service levels, whilst offering associated benefits through improved technical and commercial efficiencies. This will enable a more robust and consistent service across the full spectrum of design support disciplines.

In conjunction with these changes, plans have been put in place to enhance the capability of the South Asia Design Support centre in Singapore to enable a more comprehensive range of services within the region.

New project-management tools will also enable greater support to local clients in monitoring and influencing the progress of approvals through the system.

The transition to the new model is currently underway and LR anticipates the first phase being completed by the end of August, and the whole transition by the end of the year.

Work currently in progress in the department will not be affected by these changes.

Alan Williams

GL Forum on Innovative Maritime Software

Advancements in Maritime Software for Safe and Efficient Ship Operations was the subject of a Germanischer Lloyd Forum held recently in Singapore, receiving the interest of 30 registered participants. "Modern technologies play a central role in increasing competitiveness, improving efficiency and minimising risk in shipping operations", said Dr Torsten Buessow, global head of GL's maritime software business, in his welcome address.

What innovations and trends are visible for effective ship and maintenance management, was the content of the first presentation. Dr Buessow discussed developments towards software support for condition-based maintenance and hull-integrity management. He presented the GL HullManager as the latest development on the latter field, being able to support visual inspections and thickness measurement on an actual 3D model of the vessel.

How can we use hydrodynamics for safe and efficient ship operations? was the question answered in the second presentation by Dr Lars Gruenitz, GL's Business Development Manager South East Asia. Advancements in computation power and many years of GL experience in validating hydrodynamic behaviour of vessels has been put into software support for navigating officers. Examples are the GL SeaScout program for ship routing assistance and the ECO-Assistant program for fuel-efficient trim.

Each shipping company is producing large amounts of data by its operational, technical and commercial processes every day. How these can be used was addressed by Kevin Brunn, Sales Manager of GL Maritime Software. Again, technological advancements now enable corporations not only to make use of business intelligence solutions for reporting and analyzing data, but also to find key performance indicators and trends across their whole operations. The GL FleetAnalyzer program makes this technology available for the shipping industry.

GL Maritime Software

GL Maritime Software is GL's software provider and system integrator for the maritime industry. They improve shipping companies' processes and decisions in ship operations and fleet management onboard and onshore. They also develop market-leading software products and provide implementation and integration services, training and support. GL Maritime Software is part of the Germanischer Lloyd Group.

Mike Mechanicos

Publication of 2nd Edition of the Naval Ship Code

The International Naval Safety Association (INSA) has announced that Edition 2 of the Naval Ship Code, developed to provide a naval alternative to the commercial ship safety standard SOLAS, has now been published by NATO as ANEP-77. The publication date of 19 July 2010 marks five years of development work by navies and classification societies, and the first complete year of operation by the INSA.

The Code is an example of the way in which navies can work together to develop common safety standards. The standard is not mandatory and any nation, in or outside of NATO or INSA, is free to implement all or part of the code in their national regulations for naval ships.

INSA intends that the Naval Ship Code becomes established as the common goal-based standard for naval ship safety around the world. The Association was created from a NATO group specialist team in December 2008 to develop, maintain and promote adoption and application of the Naval Ship Code, and to capture feedback from the Code's application. INSA was formed with sixteen founding members: ten navies and six classification societies. Since that date, the membership has continued to grow.

At the annual general meeting of INSA in October of each year, study groups are formed to address areas of the Code which require substantial review and development. The Naval Ship Code is revised annually to incorporate the work

of the study groups and to maintain equivalence to SOLAS. Participation in INSA is open to all nations interested in contributing to the future development of the code.

The Naval Ship Code is freely available and can be downloaded from the NATO website e-library at www.nato.int under standardisation agreements. Further details on the work of INSA are available on the website www.navalshipcode.org.

For further information please contact the secretariat: secretariat@navalshipcode.org.

GENERAL NEWS

HMAS *Dechaineux* Returns to Service

On 23 May, Greg Combet, Minister for Defence Materiel and Science, welcomed the successful return to service of the Collins-class submarine, HMAS *Dechaineux*.

"The successful return to service of *Dechaineux* shows that efforts to improve material availability of the Navy's submarine force are paying off," said Mr Combet.

HMAS *Dechaineux* has recently completed her first Full Cycle Docking at the Adelaide yard of her builder, ASC.

Full Cycle Docking is the major recertification and upgrade docking for the submarines. *Dechaineux* is the fourth submarine to complete this upgrade and arrived in its home port of Fleet Base West, Western Australia, after an intensive sea trials period to prove her systems.

"The Government has been working to improve the level of submarine availability. To help provide an increased focus and scrutiny of the submarine sustainment program the Government formed the Australian Submarine Program Office (ASPO) earlier this year.

"The return of HMAS *Dechaineux* is an important step in the improvements Navy, DMO and ASC are making to submarine availability through the ASPO.

"I also acknowledge the US Navy's strong support in the development of capability upgrades for both our submarine forces.

"During her full cycle docking, *Dechaineux* was fitted with the BYG-1 combat system and Mark 48 Mod7 heavyweight torpedo, the third of the class to receive these upgrades.

"This combat system and torpedo have been developed through a highly-successful joint program with the United States Navy. The combat- and weapon-system upgrades, together with an augmented Special Forces deployment capability fitted to *Dechaineux* in the docking, make her Navy's most capable submarine." Mr Combet said.

HMAS *Dechaineux* joins HMAS *Waller* and HMAS *Collins*, both currently operating from Fleet Base West.

"Submarines are a potent maritime force and they will continue to play a major role in protecting Australia's maritime interests well into the future," said Mr Combet.

Australian Submarine Maintenance Capability

On 17 June, Greg Combet, Minister for Defence Materiel and Science, congratulated ASC on their continued commitment to building the local submarine industry in Western Australia.

"With the recent successful docking of the first submarine at the Australian Marine Complex (AMC) in Henderson, Western Australia, ASC have marked a key milestone for the $35 million purpose-built submarine-support facility," said Mr Combet.

"The establishment and growth of industry bases in key Defence areas continues to improve the capacity for industry partners to respond efficiently and effectively to Defence requirements.

"With this increase in capability, ASC is now able to carry out maintenance on as many as three submarines at any one time.

"The resulting responsiveness of the entire system demonstrates the benefits of Government's commitment to building local industry capability, for the defence of Australia, the protection of our sovereign interests and the security and stability of our region," Mr Combet said.

ASC West currently employs around 185 people.

HMAS *Dechaineux* arriving at Fleet Base West after her Full Cycle Docking
(RAN Photograph)

Austal's water taxis for Trinidad and Tobago on trials
(Photo courtesy Austal)

Austal's Water Taxis Complete Sea Trials

The Republic of Trinidad and Tobago's four 41 m Austal-designed and built high-speed passenger ferries achieved outstanding performance on recent sea trials.

Designed to carry 405 passengers at speeds of more than 37 kn, the aluminium vessels are intended to help reduce road congestion in Trinidad and Tobago by establishing a water-taxi service between San Fernando and Port of Spain in southwest Trinidad.

All four ferries achieved a trial speed above the contract requirement during recent sea trials.

Passenger seating onboard each vessel is split over two levels, with the main passenger deck featuring four passenger-entry points, a central kiosk and dedicated baggage compartment and bike racks. The vessels are powered by four MTU 16V2000 M72 engines driving KaMeWa waterjets and are fitted with Austal's Ride Control System to ensure passenger comfort.

When fully operational, the water-taxi service is expected to facilitate the transport over 7500 passengers in a normal working day and will be integrated with other transport systems.

With a combined capacity of 1620 passengers, the four Austal high-speed catamarans will reduce travel times between North and South Trinidad by almost one quarter.

The vessels are being constructed at Austal's Australian facilities and will be transported to Trinidad and Tobago via heavy-lift ships in coming months.

Principal particulars

Length OA	41.2 m
Length WL	38.2 m
Beam mld	10.9 m
Hull depth mld	4.3m
Hull draft	up to 2 m with ride control fitted
Passengers	405
Crew	8
Fuel	7500 L
Engines	4 × MTU 16V2000 M72
Gearboxes	4 × Reintjes VLJ730 HL/HR
Waterjets	4 × Kamewa 56A3
Service Speed	approx. 37 kn
Classification	Det Norske Veritas ✠1A1 HSLC Passenger R2 EO Passenger A

An engine room of one of the Austal water taxis
(Photo courtesy Austal)

Another Contract for Nulka

About 130 Australian Defence industry jobs will preserved under a new ship-decoy contract awarded to BAE Systems, the Minister for Defence Materiel and Science, Greg Combet, said in June.

The company has been awarded its 12th consecutive contract for the Nulka decoy, guaranteeing production and Defence industry jobs around the country until at least 2013.

BAE Systems-made Nulka decoys have been fitted to 12 ships of the Royal Australia Navy, protecting ships such as

the Adelaide-class guided-missile frigates and the Anzac-class frigates.

Australia's air-warfare destroyer will also be protected by the Nulka active missile-decoy system.

Mr Combet said that the new contract was good news for local Defence industry, for local jobs and for Australia's servicemen and women serving in the Royal Australian Navy.

"The Nulka decoy project is Australia's largest regular Defence export and one of our most successful electronic warfare projects," Mr Combet said.

"The project has generated export earnings of more than $500 million and employs approximately 130 Australians across a number of states, including Victoria, NSW and South Australia.

"It has helped keep thousands of our servicemen and women safe, both here and abroad, and supported local Defence industry and jobs in Australia.

"It is also a clear demonstration that our local Defence industry can compete against the best in the world and win."

Nulka has now been in continuous production for 12 years. It is currently in operational use in 135 ships, and is planned to be fitted to more than 160 ships of the Royal Australian Navy, United States Navy and the Canadian Navy.

BAE Systems supports Nulka from facilities in Richmond, Victoria, Mulwala, NSW, and Edinburgh Parks, South Australia.

AWD Block Transport Contract Signed

Greg Combet, Minister for Defence Materiel and Science, recently announced that the Air-warfare Destroyer Alliance has signed a contract with Toll North Pty Ltd for the transport of 66 hull blocks by sea from Newcastle and Melbourne to Adelaide, where they will be consolidated into Australia's three Hobart-class air-warfare destroyers.

Mr Combet said that the signing of this $25 million contract represented a significant milestone in the multi-billion dollar project.

"Full block production is now underway at three shipyards across Australia: ASC in Adelaide, BAE Systems in Melbourne and Forgacs in Newcastle," Mr Combet said.

"The completed blocks will be transported on a barge towed from the Melbourne and Newcastle shipyards to Adelaide.

"By mid-2011, the blocks will begin to arrive at the Government of South Australia's Common User Facility for consolidation into the complete warship," Mr Combet said.

Each ship is made up of 31 blocks. The blocks will be transported in groups, with 15 trips from the BAE Systems shipyard in Melbourne and eight from the Forgacs shipyard in Newcastle.

"This work will employ 14 people, part of a 3000 strong workforce building these warships around Australia," Mr Combet said.

The project is on track to deliver the first AWD, HMAS *Hobart*, in December 2014. HMAS *Brisbane* is scheduled for delivery in March 2016 and HMAS *Sydney* in June 2017.

Acceptance Test on First LM2500 Gas Turbine for AWDs

GE Marine reported on 1 July that it has successfully completed acceptance testing on the first LM2500 aero-derivative marine gas turbine for the Royal Australian Navy's air-warfare destroyers. GE will supply ASC with six LM2500 gas turbines to power three RAN AWDs.

Each Hobart-class AWD will have two LM2500s configured into a COmbined Diesel And Gas turbine (CODAG) arrangement with two diesel engines. While on test in Evendale, Ohio, the initial AWD LM2500 demonstrated rated power and verified its ability to operate at other partial-power load levels. In addition, critical airborne and structure-borne noise levels were demonstrated for power levels representative of the ships' planned operating profile.

The AWD is the second advanced ship program for which the RAN recently selected the LM2500 gas turbine as the baseline propulsion system. One LM2500 generator-set will power each of the RAN's next-generation Landing Helicopter Dock amphibious ships to be named HMAS *Canberra* and HMAS *Adelaide*.

The RAN already operates 16 LM2500 gas turbines in two additional ship classes — the Adelaide- and Anzac-class frigates.

The LM2500 gas turbines for the AWD program will be manufactured at GE's Evendale facility. The base and enclosure assemblies for the LM2500s will be manufactured by Thales Australia Limited, through a business component in Bendigo, Victoria. Two LM2500 engines will be delivered annually to ASC's shipyard from 2010 to 2012.

Order for More Austal Ferries

It was announced in June that Guadeloupe-based ferry operator L'Express des Iles has selected Austal to design and construct two 47 m high-speed catamaran ferries. The order consists of one vehicle-passenger ferry and one passenger ferry, and is the company's third contract with Austal since 1997.

The vessels are intended to operate from Guadeloupe to the Caribbean islands of Marie Galante, Dominique, Martinique and St Lucia, where they will provide an important inter-island link for tourism and trade.

The vehicle ferry will have the capacity for 364 passengers and 10 cars. The passenger ferry will have the capacity for 437 passengers. Both vessels will have a maximum speed of more than 32 knots and are designed to also carry cargo.

L'Express des Iles Chairman, Roland Bellemare, said the company's experience with earlier Austal ferries had been the main factor when selecting the supplier for the new vessels.

"The build quality and performance of our previous Austal deliveries has been outstanding. This, along with the high level of customer support we have received over more than a decade, meant that Austal was the logical choice," Mr Bellemare said.

Austal Chief Operating Officer, Andrew Bellamy, said the contract added to the company's history of repeat customer business.

"Maintaining and supporting existing customer relationships is a core focus of Austal. We are very pleased that a leading commercial operator such as L'Express des Iles has again returned to Austal for new-build ferries."

"This latest contract also demonstrates Austal's commitment to providing its customers with affordable, quality products." L'Express des Iles currently operates Austal-built ferries *Gold Express* and *Silver Express*, which were delivered in 2005.

Compared to the four-engine arrangements of L'Express des Iles' previous deliveries, the new vessels will each be powered by two MTU 16V4000 M71 diesel engines driving KaMeWa 71S3NP waterjets. This combines with Austal's expertise in producing durable, lightweight and efficient structures to deliver economical operation with reduced environmental impact, while still providing commuters with short transit times, comfort and service reliability.

The new vessels will be built at Austal's Western Australian facility and are scheduled for delivery in mid-2011.

Austal has an established service presence in the Caribbean region with a dedicated vessel repair and maintenenace hub located in Trinidad and Tobago. Austal Service personnel are currently on location in Martinique performing maintenance work on *Silver Express* and *Gold Express*.

Principal Particulars

Length OA	47.00 m
Length WL	41.20 m
Beam (mld)	11.10 m
Depth (mld)	4.00 m
Hull draft	1.82 m
Capacity	
Vehicle-Passenger Ferry	
Passengers	364
Vehicles	10 cars
Cargo	17 crates
Passenger Ferry	
Passengers	437
Cargo	15 crates
Propulsion	
Main engines	2 × MTU 16V4000 M71 diesel engines
Waterjets	2 × Kamewa 71S3NP
Performance	
Speed	Over 32 kn
Classification	
Bureau Veritas	
French Flag	

Austal Launches Wind Express Series

In June, Austal unveiled its new range of high-speed transfer vessels specifically designed for the burgeoning offshore wind-farm industry.

The company's *Wind Express* series of vessels combines fuel efficiency with advanced seakeeping characteristics to deliver a premier transportation solution for offshore wind-farm operators.

By utilising Austal's world-renowned advanced hull design and engineering capabilities, each vessel is purpose-built to deliver a rugged, reliable multi-purpose work boat platform.

Among the many significant features of the *Wind Express* series is the option to install Austal's patented Ride Control System — a first for offshore wind farm vessels — to ensure a safer, more productive platform, even in rough seas.

Austal Chief Operating Officer, Andrew Bellamy, said that the vessels would introduce new levels of productivity and safety to the growing offshore wind farm industry.

"In this industry, reliability is paramount; not only in terms of machinery but also in the ability of the vessels to transfer personnel to and from wind turbines in comfort and safety," Mr Bellamy said.

"With our *Wind Express* series, we have introduced platforms which not only deliver reliability but also have the capacity to operate in rougher waters at higher speeds and greater efficiency. These are important characteristics as wind farms are constructed further offshore."

Characterised by their optimum passenger comfort and safety, each vessel in the *Wind Express* series can be further customised to suit specific sea conditions, routes, work space and payload requirements.

The series incorporates four vessel types — *Wind Express 17*, *Wind Express 19, Wind Express 28* and *Wind Express 28 – Tri-SWATH.*

Austal's Wind Express 28
(Image courtesy Austal)

Austal's Wind Express Tri-SWATH
(Image courtesy Austal)

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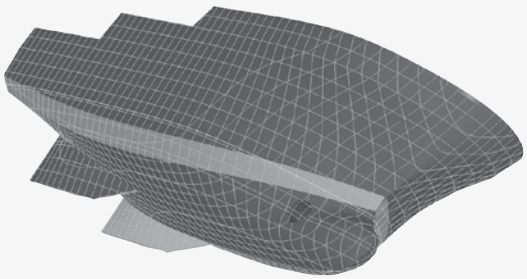
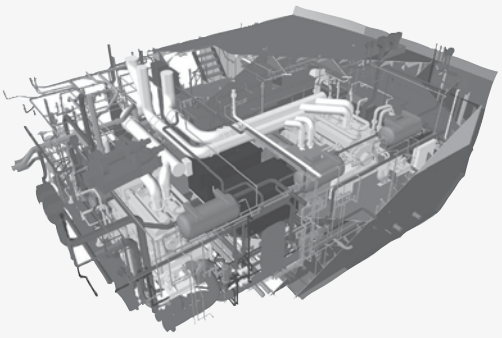
Maxsurf is an integrated suite of design, analysis and construction software suitable for all types of vessels. All modules feature a consistent, graphical Windows interface, work from a common database, and provide data exchange with AutoCAD, ShipConstructor and Microsoft Office.



ShipConstructor offers shipbuilders a complete detailing and production solution for all zones and systems within a ship including structure, equipment layout, piping, and HVAC. The 3D product model is tightly coupled to production output which reduces re-work and most importantly, reduces man-hours in the yard.



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These vessels feature a selection of hull forms ranging from a refined catamaran design for added stability and efficiency, to the Austal-developed tri-SWATH hull form delivering unparalleled seakeeping and onboard comfort in up to sea state 6.

Like all Austal vessels, the *Wind Express* series offers the peace-of-mind that comes from dealing with an ISO 9001:2008 quality certified shipbuilder with an established network of vessel support and maintenance centres worldwide.

As the largest aluminium shipbuilder in the world, Austal also has the unrivalled production capacity to facilitate fast, cost-effective delivery of multi-vessel fleets.

Austal has delivered more than 220 vessels to over 36 different countries over two decades.

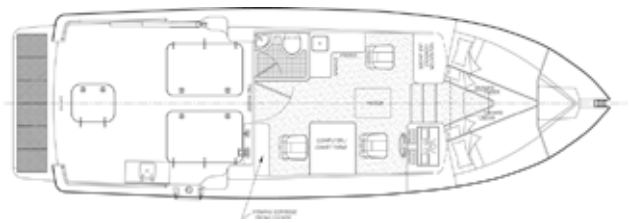
Bombora from Steber International

Steber International recently launched a 12.2 m coastal research support vessel for the NSW Department of Environment, Climate Change and Water. The vessel will be used for marine research, working in coastal waters and up to 100 nautical miles offshore. The vessel's main purpose will be to track changes in water quality, map marine activity, understand impacts of coastal river outflows, and track dispersal of pollutants.

The 12.2 m vessel offers high performance, with custom fitout to the customer's specifications. The hull and superstructure are constructed from lightweight composite material, and all deck surfaces are slip resistant. The cockpit area has a non-skid carborundum finish and accommodates an hydraulic A-frame gantry and a side-scanning sonar.

A flush-fitting access hatch on the centreline provides access to the rudder compartment. Two large flush engine-room hatches are located forward on either side of the centreline. All hatches are installed with easy-lift gas strut systems.

Profile of *Bombora*
(Drawing courtesy Steber International)



Plan of *Bombora*
(Drawing courtesy Steber International)

The engine room contains twin 6LY3-UTP Yanmar 283 kW engines, auxiliary power plant Mase generator, and is fully lined with structural fire protection and a fire-suppression system.

The saloon area houses three pneumatic seats, a table for computers and electronic equipment, a galley with sink, microwave and fridge, and a sea-water sampling underway flow-through system. A full Furuno marine package and a 20 000 BTU reverse-cycle air conditioner completes the fitout.

An AC power electric/hydraulic winch mounted on the saloon roof operates through the A-frame gantry with a lifting capacity of 250 kg.

The vessel has a top speed of 28 kn and has exceptional cornering and sea-keeping abilities.

Principal particulars of the new vessel are

Length OA		12.20 m
Length measured		11.40 m
Length WL		9.83 m
Beam		3.84 m
Draft		1.00 m
Displacement		11.5 t
Fuel		1350 L
Fresh water		200 L
Main engines		2×Yanmar 6LY3-UTP each 283 kW at 3300 rpm
Gearboxes		2×Kamzaki KMH61A
Reduction ratio		2.43:1
Propellers		2×VeemStar Interceptor 4 blade 584×724 mm
Speed	max.	28 kn
	cruising	22 kn
Genset		7 kVA Mase
Survey		USL Code Class 2C

Colin Steber

Bombora at speed on trials
(Photo courtesy Steber International)

Cabin on *Bombora*
(Photo courtesy Steber International)

Aft deck and A-frame on *Bombora*
(Photo courtesy Steber International)

42.75 m Jackup Barge from ASO Marine Consultants

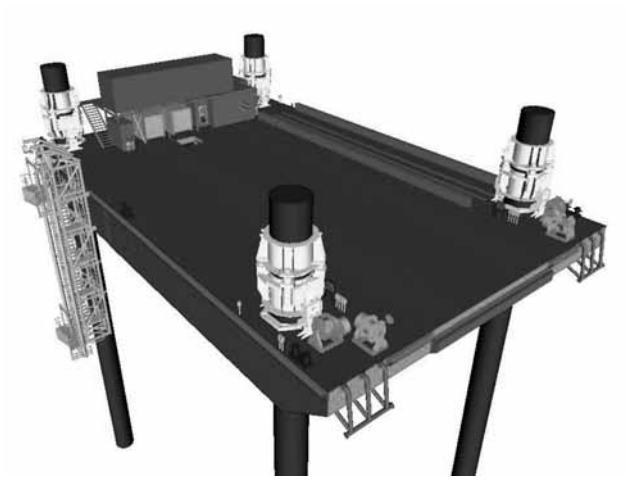
Walz Marine Services have taken delivery of a 42.75 m jackup barge, *SEP Desley Anne*, designed by ASO Marine Consultants. The vessel was built to American Bureau of Shipping classification by JSE in Batam, Indonesia, and has been specifically designed to have a Manitowoc 18000 crawler crane (with 600 t lift capacity) running down the centre to the bow of the barge. The deck has the capacity to allow a Kobelco CKE 2500 (250 t crawler crane) to run all over the working deck. The barge is fitted with rails along the port side for a 45 t piling rig to operate along almost its full length.

The jacking system is an IHC Handling Systems pneumatic jacking system which grips the legs using air-filled grippers. Each jack has a capacity of 765 t, a pulling capacity of 255 t and a maximum preload of 1069 t. The jacks have a stroke of 900 mm and an average jacking speed of 15 m/h.

The barge is equipped with two 270 kW generators for running the jacking system compressors and hydraulic power. An additional 270 kW generator is installed as a spare and a 50 kVA generator is installed for house systems when the barge is fully jacked into position.

To manoeuvre the barge into position, a 5 t high-holding-power anchor is fitted to each corner, with pulling power coming from four 10 t wire drum winches mounted on the bow.

The barge was designed to meet the SNAME guidelines for



NavisWorks model of *SEP Desley Anne*
(Image courtesy ASO Marine Consulting)

SEP Desley Anne alongside
(Photo courtesy ASO Marine Consulting)

Site Specific Assessment of Jack-Up Units. This included using finite-element analysis to check the structural response for survival in a 50-year-return storm in the Mackay area of north Queensland. The analysis consisted of natural-period response and time-domain assessment in a variety of water depth/wave height/wave period combinations which may occur in the operational area. A detailed fatigue assessment was also completed for the life of the unit.

ASO Marine modelled the complete barge using ShipConstructor software and supplied the shipyard with NC parts, assembly drawings and a full 3D model of the barge. The shipyard could view the model using NavisWorks software, interrogate part identification, and visually inspect how the finished product would look.

Principal particulars of *SEP Desley Anne* are

Length OA	42.75 m
Length Hull	39.60 m
Breadth moulded	25.00 m
Depth moulded (hull)	3.90 m
Maximum draft	2.40 m
Leg length	45 m
Maximum depth of water	26 m
Design deadweight working	1428 t
Design deadweight transit	1187 t
Design deadweight jacking	828 t

Craig Boulton

NavisWorks model of swim end on *SEP Desley Anne*
(Image courtesy ASO Marine Consulting)

Swim end on *SEP Desley Anne* under construction
(Photo courtesy ASO Marine Consulting)

SEP Desley Anne working on site
(Photo courtesy ASO Marine Consulting)

Kilimanjaro II from Incat Crowther

A second 37 m catamaran passenger ferry, *Kilimanjaro II*, has been built to an Incat Crowther design for Coastal Fast Ferries in Tanzania. Built by Richardson Devine Marine in Tasmania, the vessel is a repeat order from the operator, validating both the design and build quality delivered in the sistership *Kilimanjaro*.

Like her predecessor, *Kilimanjaro II* has been specifically designed and engineered for operation in Africa. The vessel

Kilimanjaro II on trials
(Photo courtesy Incat Crowther)

Main-deck cabin on *Kilimanjaro II*
(Photo courtesy Incat Crowther)

Upper deck on *Kilimanjaro II*
(Photo courtesy Incat Crowther)

utilises previous design experience in designing vessels for operators in remote areas with limited infrastructure. The systems and structures have been simplified to create a vessel which is efficient to maintain and operate. *Kilimanjaro* has already proven that this philosophy leads to better reliability and increased profitability for the operator, results that clearly prompted the repeat order.

The high-capacity vessel will typically carry 400 passengers, and is engineered and certified to carry 500 passengers in peak scenarios. Attention has been paid to the loading and circulation of the large number of passengers. Simple hinged ramps are fitted to the vessel on both sides for passenger loading, whilst another pair of ramps is fitted aft for luggage loading. The aft deck has been arranged with four toilet spaces, luggage room and a staircase.

The main cabin contains seating for 200 passengers with

Bridge control console on *Kilimanjaro II*
(Photo courtesy Incat Crowther)

further seating for 128 in the vessel's mid-deck cabin. In addition, there are exterior seats on the foredeck, aft mid-deck and upper deck.

With the wheelhouse located on the upper deck, the mid-deck has a full-length first-class cabin, offering 360 degree visibility.

The vessel features durable construction, including heavy hull plating and heavy-duty fendering.

Powered by twin Cummins KTA38M2s, each producing 969 kW, the vessel has a maximum speed of 28 kn.

Coastal Fast Ferries will operate *Kilimanjaro II* alongside her sister ship between Tanzania's largest city, Dar Es Salaam, and Zanzibar.

Principal particulars of *Kilimanjaro II* are

Length OA		36.80 m
Length WL		34.00 m
Beam OA		9.50 m
Depth		3.40 m
Fuel oil		12 000 L
Fresh water		1500 L
Sullage		3200 L
Passengers		500
Crew		6
Max. deadweight		56 t
Main engines		2×Cummins KTA 38 M1 each 969 kW@ 1800rpm
Gearboxes		2×ZF 305D
Propulsors		2×five-bladed propellers
Speed	maximum	28 kn
	cruising	24 kn
Generators		2×Cummins 170 kVA 50 Hz 1×Cummins 17 kVA 50 Hz
Construction		Marine-grade aluminium
Class/survey		USL Code Class 1C
Flag		Tanzania

17.5 m Wind-farm Service Vessels from Incat Crowther

A project in the UK is the construction of three wind-farm service vessels by Lyme Boats in Exeter. The vessels are 17.5 m long and bank on Incat Crowther's very-successful high-capacity workboat platform. They will have a cargo capacity of 14 t, including space for a 10 ft container on the aft deck.

The design features a wheelhouse with excellent visibility, courtesy of "Pilot-style" windows fitted in the forward wheelhouse roof. These windows will enhance visibility of crew heading up the turbine ladder, and to help the crew to safely observe the platform.

The main cabin features comfortable seating for 12 passengers with tables, lockers, a large galley and a lounge. At the aft end of the cabin is a wet locker room and bathroom.

The vessel's hulls feature spacious engine rooms and tank voids, as well as two twin cabins each side forward.

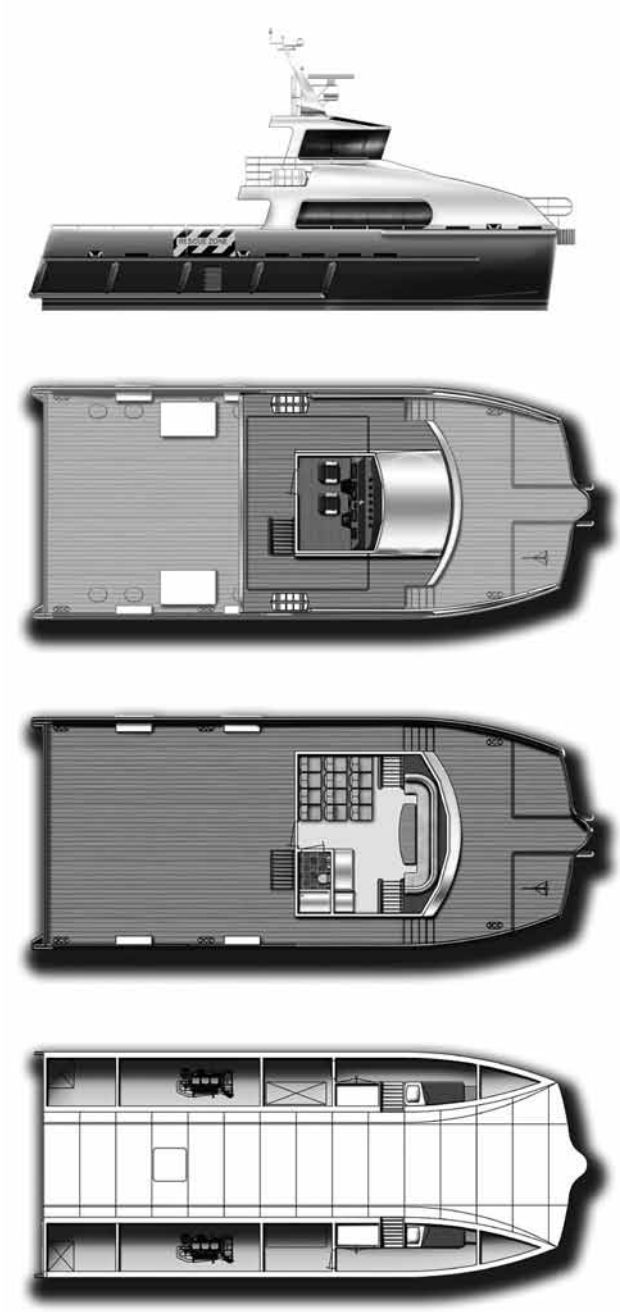
These vessels represent the creation of a new class of vessel, bringing the hallmarks of Incat Crowther catamarans to the wind-farm industry, and offering an unparalleled level of efficiency, seakeeping and load-carrying capacity.

Together, these two projects demonstrate Incat Crowther's ability to continually evolve and improve its products to remain at the forefront of marine design.

Starboard bow of 17.5 m catamaran windfarm service vessels
(Image courtesy Incat Crowther)

Principal particulars of the new wind-farm service vessels are

Length OA		17.50 m
Length WL		17.14 m
Beam OA		7.50 m
Depth		2.80 m
Draft	hull	1.00 m
	Loaded	1.45 m
Crew		4
Passengers		12
Deadweight (max.)		20 t
Fuel	main tanks	4000 L
Fuel	transfer tanks	1000 L
Fresh water		800 L
Sullage		250 L
Main Engines		2×Scania DI16 42M each 559 kW @2100rpm
Propulsors		2×fixed-pitch five-blade propellers
Speed	max.	30 kn
	cruising	25 kn
Generators		1×Onan 13.5 ekW
Construction		Marine-grade aluminium
Class		Lloyd's Register (structure and machinery)
Flag		UK MCA SCV Category 1/ Workboat



General arrangement of 17.5 m catamaran windfarm service vessels
(Drawing courtesy Incat Crowther)

Starboard quarter of 17.5 m catamaran windfarm service vessels
(Image courtesy Incat Crowther)

Cat Cocos III from Incat Crowther

Incat Crowther has signed a contract to design a 26 m catamaran ferry for Seychelles operator Inter Island Boats. To be built in Tasmania by Richardson Devine Marine, *Cat Cocos III* will be the third vessel Incat Crowther has designed for this operator. This demonstrates a long term commitment to its clients through the entire process of design, build and operation.

Following a comprehensive design consultation, the vessel length and capacity was settled at 26 m and carrying 216 passengers. The sleek vessel is styled to match the Cat Cocos fleet, whilst being more efficient to build and reducing operating costs.

The main passenger deck seats 163 passengers in mostly forward-facing seats, with tables located in booth arrangements at seats near to the bar at the aft end. There is a forward door with access to the foredeck which features bench seats for passengers.

There are three toilets aft, as well as a large luggage room with counter access to the side decks, immediately adjacent to a crew gate for speedy loading.

An external stair aft leads to the upper deck where there are 39 outdoor seats. In the upper deck cabin are 14 first class seats and a mini-bar.

The vessel is powered bytwo MTU 12V2000 M70 engines, each producing 787 kW @ 2100 rpm. Propulsion is via ZF gearboxes through to five-bladed propellers. Combined with Incat Crowther's efficient hulls, the modest output of these engines will propel the vessel to a top speed of 30 kn. The vessel's loaded service speed will be 28 kn.

Securing this project proves Incat Crowther's ability to satisfy its clients' requirements and continually evolve and improve its product offering.

Principal particulars of *Cat Cocos III* are

Length OA		26.2 m
Length WL		24.4 m
Beam OA		8.0 m
Draft (max)		1.7 m
Depth		2.7 m
Passengers		216
Fuel	main tanks	6000 L
	day tanks	2000 L
Fresh water		500 L
Sullage		500 L
Main Engines		2×MTU 12V2000 M70 each 787 kW @ 2100rpm
Propulsors		2×five-bladed propellers
Generators		1×Kohler 40EFO7D 50 kVA/40 kW 50 Hz
Speed	max.	30 kn
	service	28 kn
Construction		Marine-grade aluminium
Survey		Australian USL Code/NSCV Class 1C
Flag		Seychelles

Profile of *Cat Cocos III*
(Image courtesy Incat Crowther)

James Grant from Incat Crowther

Incat Crowther has designed an 18m catamaran passenger ferry for Victorian operator, Inter Island Ferries. MV *James Grant* has been built and launched recently by Aluminium Marine in Brisbane, and is the fourth vessel designed by Incat Crowther for this operator.

Port bow of *James Grant*
(Photo courtesy Aluminium Marine)

James Grant on Trials
(Photo courtesy Aluminium Marine)

This vessel is the first passenger ferry to feature Incat Crowther's latest hullform, implemented on recent successful workboats. Performance is excellent with a top speed of 27 kn at full load with a power of only 339 kW.
The vessel will carry 100 passengers, with boarding via side gates aft. Across the aft bulwark is a large luggage rack. The aft deck also features two WC compartments and stairs to the upper deck. The main passenger cabin features 64 seats. Windows in the forward bulkhead give passengers a view over the foredeck, whilst a large television screen is fitted on the centreline behind the half-height wheelhouse.

MV *James Grant* demonstrates Incat Crowther's ability to satisfy clients' requirements with continual evolution and improvement.

Principal particulars of the new vessels are

Length OA	18.0 m
Length WL	17.3 m
Beam OA	6.0 m
Draft (hull)	1.15 m
Depth	2.20 m
Passengers	100
Fuel	4000 L
Fresh water	400 L
Sullage	400 L
Main engines	2×John Deere 6125AFM75-M3 each 339 kW @ 2000 rpm
Propulsion	2five-bladed propellers
Speed max.	27 kn
service	25 kn
Construction	Marine-grade aluminium
Survey	USL Code/NSCV Class 2C

Stewart Marler

BCTQ Busy

It was a successful start to 2010 for Burness Corlett Three Quays Australia with the first fully operational Mini-Typhoon weapon system being installed on an FFG. The Mini-Typhoon, supplied by Rafael, is a naval, stabilised and remotely-operated machine gun. BCTQ design staff were faced with the challenge of designing a suitable foundation which would meet the shock-load requirements on an existing unsupported aluminium structure. Using detailed 3D modelling and finite-element analysis, BCTQ developed a structural arrangement which met all shock-load requirements, whilst remaining efficient and practical. The Mini-Typhoon installation was part of a detailed design package including relocation of two 50 calibre machine guns, design of ballistic panels for crew protection, electrical design for the remotely-operated weapon system and a new unmanned aerial vehicle. The detailed design package was delivered to prime contractor BAE in February 2010, and the entire system was successfully installed at Garden Island, Sydney, in April 2010 by installation contractors Thales and Madco.

Since the start of 2010 BCTQ has completed two inclining experiments inside the Captain Cook Dock at Garden Island, Sydney. The first was on the P&O vessel, *Southern Surveyor*. The aim of the experiment was to obtain data to update the BCTQ loading instrument Mariner 4.2. This has successfully been completed to the satisfaction of Lloyd's Register.

The second was conducted on the Carnival Cruises vessel, *Pacific Sun*. The program included a ship check to determine all weights on and off, and liquid-state conditions to determine current lightship parameters and through-life growth since her last inclining. The *Pacific Sun* inclining was conducted, and the associated reports prepared, to the satisfaction of the Maritime Coastguard Agency.

BCTQ recently won its first job through the Defence Materiel Organisation Support Services (DMOSS) Panel to provide the design of a classification-society-approved rudder stock, pintle, bearings and housing. The rudder design is for an Auxiliary Oiler and Replenishment ship and is to Bureau Veritas classification. The entire design package for installation has been developed in house, and includes detail ripout and installation drawings, casting and machining drawings, detailed design report, installation specification, and test and trials procedure.

BCTQ has recently completed two rigging warrants for the Amphibious and Afloat Support Program Office of the Royal Australian Navy. Completing a rigging warrant involves surveying all rigging items onboard and checking their compliance with standard requirements. All the information is then compiled into an approved and controlled document and updated regularly as items are replaced or tested. The first rigging warrant was for the tall ship *Young Endeavour*. BCTQA staff surveyed standing and running rigging onboard and recorded both the condition and size of components. The size of the components was used to calculate the ability of each rigging item to withstand loads previously specified by the designer.

The second rigging warrant was for an LPA. Although vastly different to *Young Endeavour*, predominantly lifting gear, a similar approach was used. All rigging onboard is now specified in a single easy-to-read document describing safe working loads and certification status.

BCTQ News Update, August 2010

Austal Service Worldwide

Austal has established itself as a major provider of worldwide vessel maintenance and management, securing more than 1000 service-related jobs in 16 different countries over the past year. Many of these contracts involve non-Austal vessels and range from refitting steel offshore-support vessels to planned vessel maintenance of high-speed aluminium patrol boats.

Earlier this year, the company announced a vessel-maintenance services contract with Oman's National Ferries Company for the maintenance of seven large high-speed craft, including two Oman Coast Guard rescue boats. Notably, five of these vessels were built at other shipyards.

Austal Service General Manager, Chris Pemberton, said that the company was no longer being viewed as just a ship builder.

"I think operators now recognise how our experience in designing and building more than 200 vessels over two decades translates to a more effective and efficient service offering," Mr Pemberton said.

"This experience allows us to understand the value of vessel operability across all sectors, from commercial ferry operations to patrol boat fleets to luxury private yachts."

"For commercial operators this means more revenue-earning voyages per annum, for naval operators it means more patrol days per year and for yacht owners it ensures that their vessels are available when they want them."

Mr Pemberton said Austal Service's product offering included contract maintenance, general refit and repair, spare parts, consultancy, ship-management support services, and crew familiarisation training.

Austal's efficient global supply chain enables Austal to source quality parts, particularly specialist parts, with quick delivery and at reasonable cost.

The past year has seen Austal undertake service-related work all over the world, including Indonesia, Norway, Venezuela, Malaysia, Maldives, Spain, Trinidad and Tobago, United Kingdom, Egypt, United Arab Emirates and USA.

Austal recently completed the annual docking of the 69 m high-speed catamaran vehicle ferries, *Jazan* and *Farasan*, owned by the Kingdom of Saudi Arabia. Performed by Austal personnel at Saudi Arabia's Jeddah Shipyard, the docking included vessel modifications and preventative maintenance.

Austal continues to build a permanent service presence in the Middle East, having established hubs in the Red Sea (Egypt) and in Oman, with a regional office in the UAE to open in coming months.

Demonstrating Austal's general refit and repair capabilities was the recently completed refit work on the 82 m, 3226 dwt steel diving-support vessel, *Nor Australis*, built by Nor Offshore in Singapore. The project involved sending a team of Austal engineers, naval architects and engineers to Karratha in Australia's North West. Their work successfully reduced noise and vibration onboard the vessel, resulting in improved working conditions for the crew.

Mr Pemberton noted that this reflected Austal's capability to effectively service a wide range of vessels. "Austal is known as a designer and builder of high-speed aluminium vessels but jobs such as this demonstrate how owners of other vessel types can benefit from our expertise. This is because our capabilities include naval architecture, mechanical, electrical

28 m Wave-piercing Catamaran Crewboat from Incat Crowther

Incat Crowther has been contracted to design an innovative 28 m wave-piercing catamaran crewboat to support offshore oil and gas operations. Developed in conjunction with Topaz Shipbuilding for a large petroleum firm, the vessel features a new and cleverly-developed layout. As the inventors of the wave-piercing catamaran, Incat Crowther proposed the platform in response to a challenging combination of operational requirements.

The first challenge was to balance a restriction on beam with the requirement to locate an oil-spill recovery container transversely on the aft deck. The solution was to have upright topsides aft, like a traditional catamaran. The operators also required a monohull-shaped bow which interfaced cleanly with the rig structure, whilst being well clear in all other areas to avoid risk of collisions and injuries. The wave-piercer's centre bow is an ideal solution to this requirement. To eliminate the risk of damage to the forepeaks, or having them hang up on the rig structure, the vessel's hull bows have been configured so that they do not extend beyond the outline of the foredeck.

The resultant platform offers excellent functionality, whilst retaining the wave piercer's offshore capabilities. The vessel features a large aft-deck with container mounts, Effer 155M deck crane and more than 50 m^2 of usable deck space.

Passenger access is via side gates at the forward end of the cargo deck. This transverse passenger thoroughfare is protected from the cargo space by large cargo barriers, allowing passengers and cargo to be loaded concurrently in a safe and efficient manner.

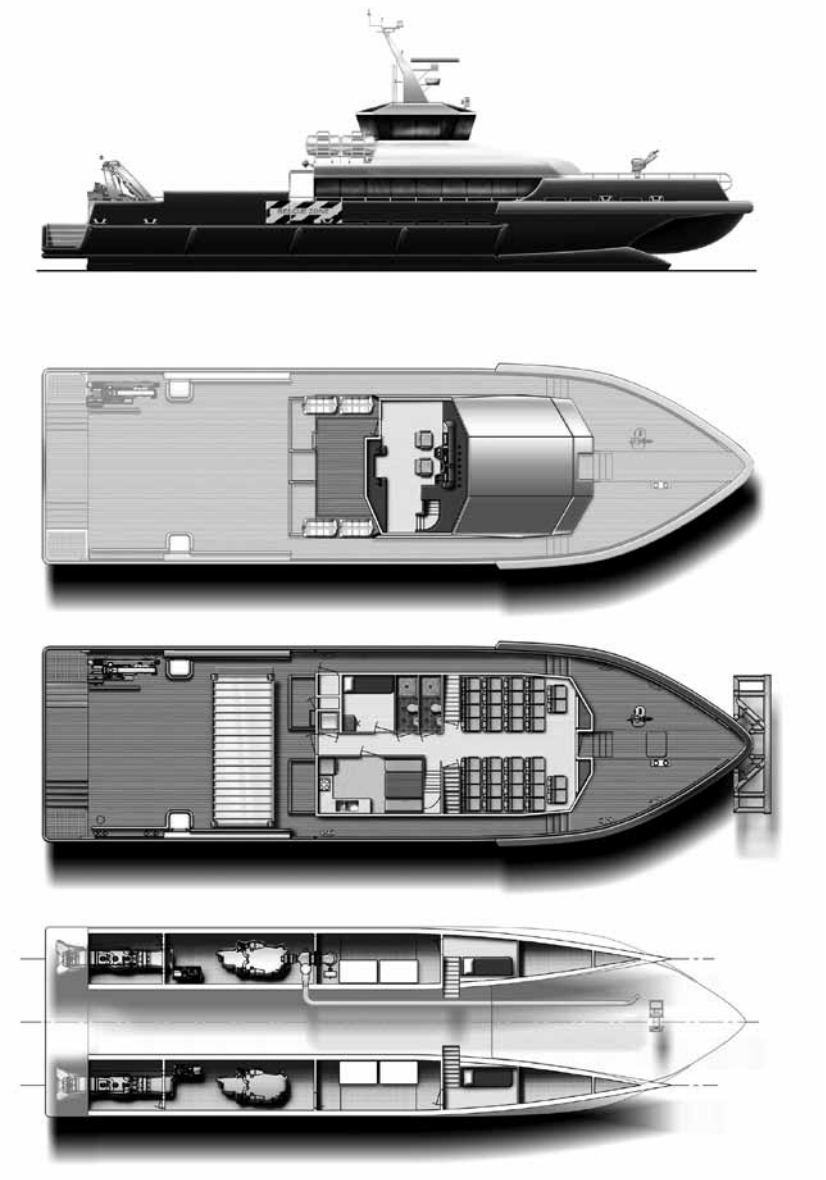
The vessel will be powered by a pair of Caterpillar C32 ACERT engines, each producing 1193 kW at 2100 rpm. These engines will drive Hamilton HM651 waterjets. The vessel's service speed will be 28 kn, with a maximum speed of 30 kn. The port main engine will turn a FFS 250×350HD FiFi pump that feeds a foredeck-mounted fire monitor.

Incat Crowther believes that its commitment to continual evolution and improvement in its products has allowed the company to develop this unique design to meet its client's specific requirements. A second vessel with a higher capacity is also under construction at Topaz Shipbuilding.

Stewart Marler

Principal Particulars

Length OA	27.6 m
Length WL	23.0 m
Beam OA	7.50 m
Draft (hull)	1.40 m
Depth	3.20 m
Passengers	36
Crew	5
Fuel oil	10 000 L
Fresh water	5000 L
Sullage	5000 L
Main Engines	2×Caterpillar C32 ACERT D Rating Each 1193kW @ 2100rpm
Propulsion	2×Hamilton HM651 waterjets
Generators	2×Caterpillar C2.2
Speed max.	30 kn
Speed service	28 kn
Construction	Marine-grade aluminium
Flag	UAE
Class/survey	DNV



General Arrangement of 28 m wave-piercing catamaran crewboat
(Image courtesy Incat Crowther)

HMAS *Farncomb* in the floating dock with the two pairs of rams anchoring the dock to the wharf, two SPMTs threaded under the cradle and the third one being inserted. The SPMT operator is in the foreground and part of the second submarine cradle in the lower right corner
(Photo courtesy Hugh Hyland)

First Submarine Docking in WA Floating Dock

On 9 June 2010, the first docking of a submarine took place using the new floating dock and transporters at the Australian Marine Complex, Common User Facility, (AMC CUF) in Western Australia.

The floating dock was designed by Clark and Stanfield in the UK. The dock pontoon and lower sidewalls were fabricated by Strategic Marine in their Vietnam yard, and then brought to Fremantle by heavy-lift ship. The remainder of the side walls and the fit-out were completed locally. The dock was officially opened on 12 February 2010. It has a design life of 50 years.

Apart from vessels, it can also dock or launch jack-up rigs and other major offshore components.

In preparation for docking and transporting submarines, a similar cradle set-up was tested in December using a barge of the same size, although lighter. Also several thousand pages of data were vetted.

The dock is the world's most advanced floating dock and is the only one which routinely moves in more than one direction at a time. It can be manoeuvred manually or by computer control. It has an overall length of 102.3 m and an overall beam of 53 m. It can lift vessels up to 12 000 t and up to 9.2 m draft. The clear width between fenders is 41.8 m. There is a future option to add a second floating dock unit, 132 m long.

Vessels up to 3500 t can be moved ashore using solid-tyred Self-propelled Modular Transporters (SPMTs). The SPMTs, built in Germany by Scheuerle at a cost of $18 million, have a payload capacity of up to 4652 t and the required number for each vessel are linked together and controlled by one operator walking alongside. They can be manoeuvred in virtually any direction very precisely, and will maintain a level bed and uniform pressure on the vessel even over undulating terrain due to each wheel operating independently.

The AMC CUF provides the common user facility to multiple customers at any one time, including the dock and its specialist operators, three cradles, wharves, large cranes, a large building, hardstands, and services. A submarine requires one cradle, utilising bilge blocks supplied by ASC which are fitted with load cells to monitor for any excessive local loadings. Two such sets of blocks are available, should a second submarine need docking at the same time. Anzac-class frigates would require two cradles. Vessels can remain on the dock utilising concrete blocks with timber caps, and flat-bottomed vessels can be initially docked this way and then moved ashore using the SPMTs where they can be placed on similar blocks.

The dock is named *Yargan*, a traditional Nyoongar name meaning 'tortoise'. The SPMTs are named *Kaalil*, meaning 'soldier ant'.

The operational steps are as follows:

- Using four cables, the dock is moved out about 100 m into the deep sink-pocket, where it is ballasted down.
- The vessel enters the dock and is lifted.
- The dock and vessel are moved back to the wharf.

- Rams are activated to bear down on strengthened points along the edge of the wharf, so as to anchor the dock.
- The SPMTs are driven under the cradle.
- The cradle with the vessel are lifted and driven ashore to a nominated position where they are set down and the SPMTs withdrawn.
- During unloading, computer-operated pumps ensure that the dock remains flat and horizontal.
- Submarines are driven into ASC's purpose-built facility, initially to their external hardstand to clean down, then transferred into the large shed using rail bogies.

Undocking follows the reverse procedure.

Hugh Hyland

Keel Laying Ceremony for *Spearhead*

Just over six months after the official opening of Austal's new Module Manufacturing Facility (MMF) in November 2009, Austal USA hosted a keel-laying ceremony at its shipyard in Mobile, Alabama on 22 July to signify the erection of the first modules on the US Department of Defense's next generation multi-use platform, the Joint High Speed Vessel (JHSV). This is part of a 10-ship program potentially worth over $US1.6 billion.

Spearhead (JHSV 1) will be a US Army vessel and its name represents a major feature of the Regimental Insignia of the Transportation Corps. The insignia is a gold-colour metal and enamel device consisting of a ship's steering wheel bearing a shield charged with a winged vehicle wheel on a rail, all gold, centred upon a brick-red spearhead, point up, all standing upon a curving gold scroll spanning the lower tips of the spearhead and inscribed 'Spearhead of Logistics' in blue letters.

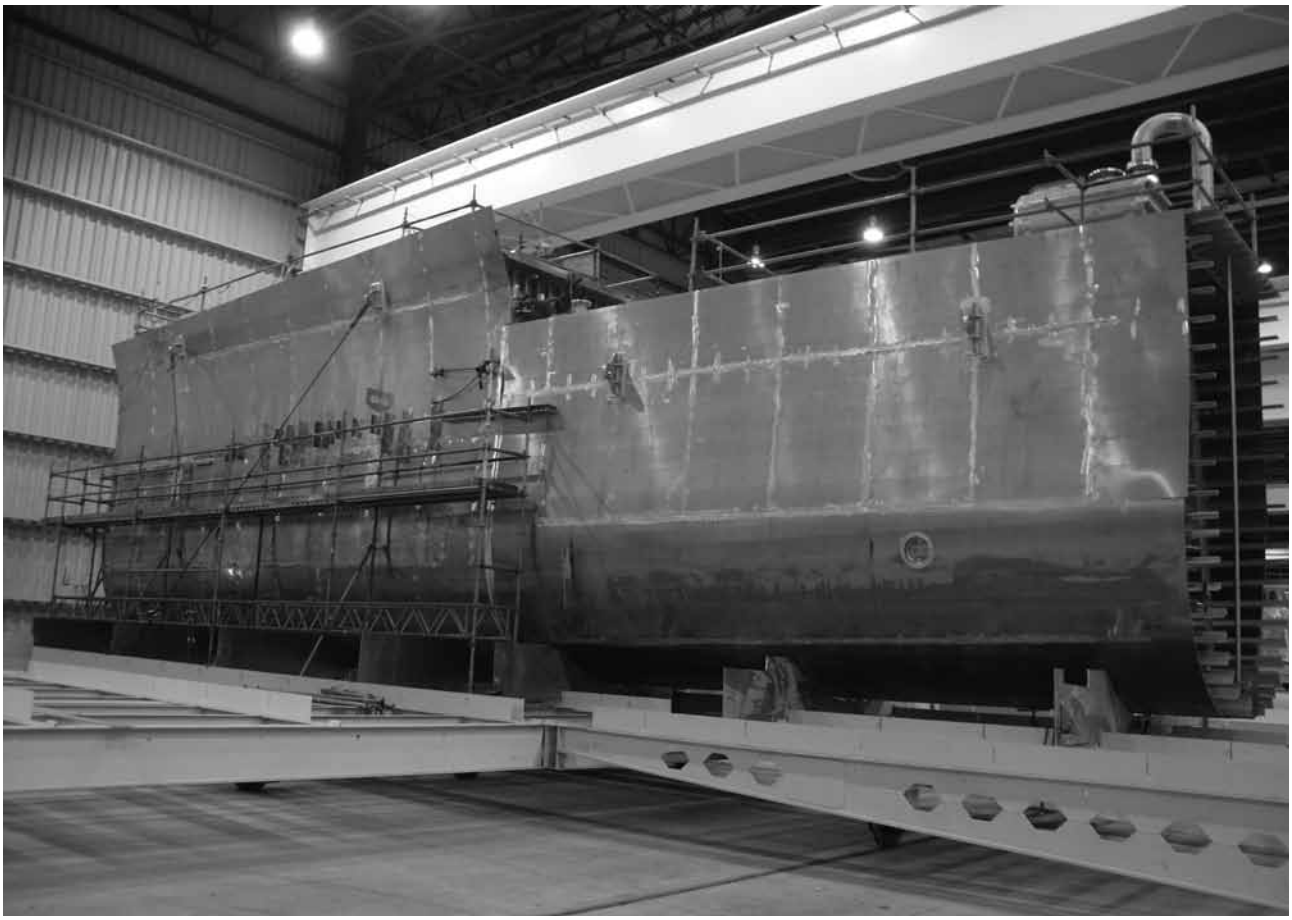
The ceremony signified the erection of the modular components which will form part of a 103 m aluminium catamaran capable of transporting troops and their equipment, supporting humanitarian relief efforts, operating in shallow waters, and reaching speeds in excess of 35 kn fully loaded. JHSV 1 is the first of a class of 10 vessels to be operated by both the US Army and Navy.

Austal USA is the prime contractor, responsible for designing and constructing the 103 m high-speed catamaran. General Dynamics Advanced Information Systems is the platform mission systems engineering agent responsible for the design, integration and testing of the ship's mission systems, including internal and external communications, electronic navigation, and aviation and armament systems.

The ceremony was attended by many high-ranking officials from the US Army and US Navy, the State of Alabama, and City and County of Mobile, who joined the Austal workforce to mark this historic occasion.

Spearhead" is the first ship built from modules fabricated entirely in Austal's new Module Manufacturing Facility.

Austal's initial JHSV contract included options for nine additional vessels to be awarded between FY09 and FY13 for a total value of up to $US1.6 billion. JHSV 2 is scheduled for start of construction in the northern autumn of 2010 and JHSV 3 in the northern spring of 2011. Austal also recently received an award from the US Navy which funds long lead-time material acquisition for JHSV 4 and 5.



The first module for *Spearhead* (JHSV 1)
(Photo courtesy Austal)

FROM THE CROW'S NEST

Automatic Identification System

The Automatic Identification System (AIS) is a short-range coastal tracking system used on ships and by Vessel Traffic Services for identifying and locating vessels by electronically exchanging data with other nearby ships and VTS stations. Information such as unique identification, position, course, and speed can be displayed on a screen or an ECDIS. AIS is intended to assist the vessel's watch-standing officers and allow maritime authorities to track and monitor vessel movements, and integrates a standardised VHF transceiver system such as a LORAN-C or Global Positioning System receiver, with other electronic navigation sensors, such as a gyrocompass or rate-of-turn indicator. The IMO's SOLAS convention requires AIS to be fitted aboard international voyaging ships with gross tonnage of 300 or more, and all passenger ships regardless of size. It is estimated that more than 40 000 ships currently carry AIS Class A equipment. For more details, see

http://en.wikipedia.org/wiki/Automatic_Identification_System.

The AIS has a number of implementations on the web, and a good one is located at www.marinetraffic.com/ais. Go to this site, and you can track vessels anywhere in the world in real time. Go to an area, a port, or a particular vessel. You can see vessel location and heading, with type shown by colour, and click on the vessel to get details and photos. You can see the ferries running around Sydney Harbour, vessels in the English Channel, the Baltic, the Great Lakes, or anywhere you like. Once you start, you can spend a lot of time!

Phil Helmore

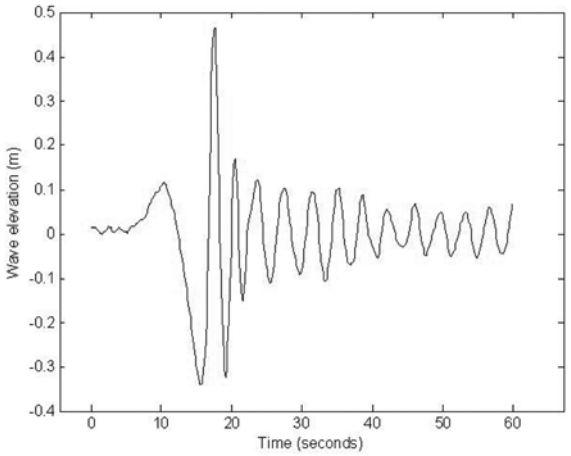
EDUCATION NEWS

Curtin University

Swan River Wave-wake Study completed

Recent research by CMST has confirmed that reducing boat speed limits in sections of the Swan River would dramatically reduce shoreline erosion and damage to wildlife habitats. The research was commissioned by the Swan River Trust in collaboration with the WA Department of Transport. The first stage of the investigation was a desktop study into boat wakes and wind waves conducted jointly with the Australian Maritime College. The second stage of the investigation involved full-scale experiments measuring boat wakes and wind waves at locations of interest along the Swan River. The trials confirmed that a reduction in boat speed limits in sections of the Swan River would dramatically reduce the potential for shoreline erosion, damage to wildlife habitats and disruption to other aquatic users. The full report is available at:

http://www.swanrivertrust.wa.gov.au/riverpark/recreation/Boating information/boatwash.aspx



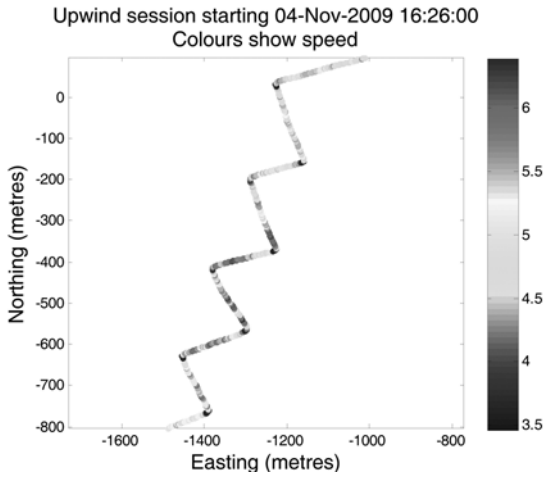
Wake-wave elevation for a 15 m power boat travelling at 9.8 knots (Image courtesy CMST)

Science, Sailing and Students

The Centre for Marine Science and Technology is continuing to run final-year science and engineering projects into sailing dinghy performance at Fremantle Sailing Club. This year we have three student projects under way.

Developing software for analysing GPS data (Ketesse Hansen, Applied Physics)

Ketesse is developing software to analyse GPS data from one-boat or two-boat trialling. Recordable GPS units are used to measure latitude and longitude as a function of time. The software then breaks the data into tacks and upwind legs. Speed, heading and velocity-made-good are displayed for each upwind leg. Tacking angle and time lost through each tack are also displayed. The results will help sailors to better understand tacking angles, wind shifts, VMG and the effect of different rig settings on performance.



GPS analysis of a 470- class dinghy during training off the Fremantle Sailing Club, showing the upwind performance (Image courtesy CMST)

Measuring mast stiffness on Lasers and RS:X (Jon Martellotta, Mech Eng)

Jon has developed a test rig to measure the varying stiffness of Laser and RS:X masts. This will give the sailors an idea of how their mast stiffness compares to other boats at Fremantle Sailing Club, in order to better understand their rig tuning in light and strong winds. Correlation is also being made with the weight and age of the mast. The mast properties will be used in ANSYS structural modelling software to look at the effect on sail shape.

Analysing dinghy hull shapes using boat design software (Matt Templeton, Mech Eng)

Matt has input the lines plan of a 470 dinghy into the Maxsurf suite, and is using the software to look at the effect of trim and heel on wetted area and resistance.

Short course for industry

CMST recently presented a five-day in house training course on advanced seakeeping measurement and prediction techniques at BMT Defence Services Melbourne. The course was run in collaboration with SSAC Consulting (Melbourne) and Renilson Marine Consulting (Launceston).

High-speed Vessel Conference

Curtin University will once again be supporting the RINA's Second International Conference on Innovations in High-speed Marine Vessels to be held at Fremantle on 2 and 3 March 2011.

Few sectors of the maritime industry have embraced innovation as readily and successfully as the high-speed marine vessels sector, in seeking to extend operating envelopes, reduce downtime and increase reliability, safety and comfort, and reduce costs. Advanced design, the use of new materials and more efficient production methods and other means have been and are being explored to achieve these aims for commercial, military and recreational vessels. Building on the success of the 2009 conference, the 2011 International Conference on Innovation in High-speed Marine Vessels will again provide an opportunity for all those involved with this sector of the maritime industry to present and discuss recent and future developments in all these aspects of commercial, military and recreational high speed vessels.

Kim Klaka

Australian Maritime College

ITTC Committees

In June Martin Renilson visited MARIN to chair the second meeting of the ITTC's Stability in Waves Committee. This is reviewing the latest activities in the state of the art in this field, as well as developing procedures for calculation of roll damping and conducting damage stability experiments. It is also organising a benchmark on the prediction of parametric rolling.

The committee will be making its report to the next ITTC which will be held in Rio de Janeiro next year.

Final Year Projects – Mini Conference

The final-year project list was published in the last edition of *The ANA* — it hasn't changed since then. The final-year project mini-conference has been set for 22 October 2010. All are invited to this interesting and varied event in Laun-

ceston — please contact Martin Renilson at m.renilson@amc.edu.au if you intend on coming or if you would like further information.

ALTC Teaching Citation and ALTC Grant for AMC

Dr Chris Chin received a prestigious ALTC citation for outstanding contributions to student learning in 2010. This particular award was for creating an innovative learning environment which inspires cross-faculty first-year mathematics students to continue their studies and foster independent learning skills. Previously Chris has been awarded a Teaching Merit Certificate and a Vice-Chancellor's Award for contributions to teaching.

Roberto Ojeda has joined a team from UNSW with success in obtaining an ALTC grant titled *An Adaptive eLearning Community of Practice for Mechanics Courses in Engineering*. This project will run over 20 months.

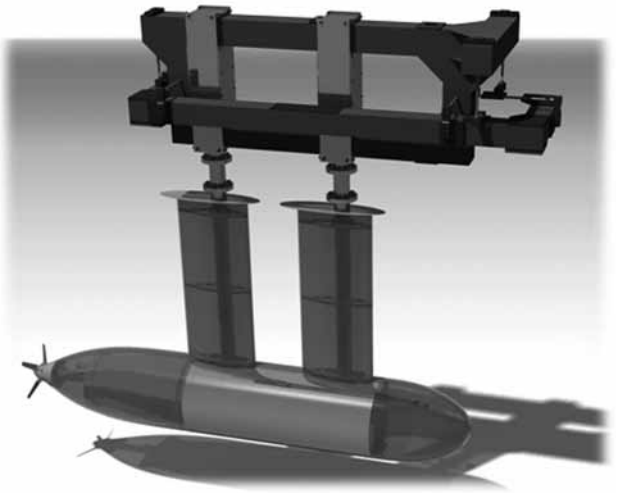
Dr Christopher Chin
(Photo courtesy AMC)

Assessing the Performance of a New Prototype of a Cyclic Pitch and Collective Pitch Propeller for an Autonomous Underwater Vehicle

Poowadol Niyomka has begun his graduate year in May 2010 on research of a prototype of a Cyclic Pitch and Collective Pitch Propeller (CPCCP). The prototype CPCCP was developed by T. Charles Humphrey in 2005 at Memorial University of Newfoundland, Canada. The CPCCP is an unconventional propeller which can generate thrust not only in the axial direction but also in the two lateral directions. A similar controlling mechanism of CPCCP can be commonly found in the blade-controlling mechanism of a helicopter.

This type of propeller is designed to provide a highly-manoeuvrable capability in comparison to a conventional propeller design. The the propulsion system is suitable for underwater vehicles which have to be controlled at low-speed because the propeller can generate lateral forces without forward velocity.

In Poowadol's research, the CPCCP will be mounted on a torpedo-shaped body. All forces and moments from the CPCCP will be measured by a 6 DOF force transducer and also a yacht-force balance developed by A/Prof. Paul Brandner and Dr Jonathan Binns. His first experiment, to assess the performance of the CPCCP, will be in November 2010. It will be tested at the newly-commissioned $2.3 million flume tank at the Australian Maritime College's Beauty Point campus. Before the first experiment commences, he has to complete a mathematical model of the control system and also a program to control the CPCCP. The results of the experiment will be employed in the further development of the control system and, from the hydrodynamics point of view, the data will be utilised to understand unsteady flow and to improve performance of this prototype.



A model of the CPCCP mounted on a torpedo shaped body and yacht dynamometer
(Image courtesy AMC)

Sailing Dinghy Research at AMC and University of Melbourne

The sailing simulation project being run by Dr Jonathan Binns over the last few years in collaboration with University of Melbourne has been completing a number of full-scale dinghy tests in Albert Park Lake.

The test Laser under sail
(Photo courtesy AMC)

For this project the test platform is a Laser dinghy which has been fitted out by MPhil student Graham Bennett from the University of Melbourne. The data acquisition consists of a state-of-the-art wireless distributed system. The scalability of this system has been demonstrated by the number of sensors fitted to this boat (3×3 component accelerometers, two digital encoders, wind velocity measurement, wind-direction measurement, gyroscope and two GPS). Dr Binns and AMC student Nic Clarke recently added a sail-vision system to the boat. Essentially this is the most instrumented Laser ever to hit the water.

Why are we doing this? All to validate the simulation models used by the Virtual Sailing simulator. Hopefully this will also spin-off into marketable research for sail-training devices. The work is also producing some fantastic data for further studies at undergraduate and postgraduate level.

Mark Symes

University of New South Wales

Undergraduate News

Thesis Topics

Among the interesting undergraduate thesis projects newly under way are the following:

Review of Propulsion Configurations for OPVs

The most-efficient propulsion configuration for an offshore combatant vessel depends on the vessel's mission and operational profile as much as the area of operation and sea/weather conditions encountered.

Tibor Corbett is conducting an investigation of the principal propulsion configurations and their useful modes of operation, including diesels and gas turbines in various combinations, and conventional propellers, controllable-pitch propellers and waterjets.

Investigation of PS Decoy

Built in 1877, the paddle steamer *Decoy* is one of the oldest vessels to ply the Murray-Darling river system of south-eastern Australia, and is one of very few hulks on the river system still capable of being restored to her former glory. After being lengthened and seeing several incarnations as a paddle tug and excursion steamer, she is today an un-used houseboat. While there is much interest within the river community to restore the vessel, much work is required with both the fore and aft sections requiring a total rebuild.

Tom Bromhead is conducting an investigation of the vessel, including measuring the existing hull and, hence, drawing a lines plan for the vessel and a general arrangement drawing, completing a stability analysis, resistance calculations to determine machinery and propulsion requirements, and structural requirement for existing and replacement sections to ensure sufficient strength for the restoration.

Fishing Vessel Stability

Maritime authorities around Australia are facing increasing problems with commercial fishing vessels which have been "grandfathered" into current survey by having previously been in survey, but not having any stability data. There have been many attempts over the years to come up with simplified methods of analysing a vessel's stability, but few are reliable. The roll-period test has its uses, but depends on factors which are less-well known than they should be. Annette Hill is conducting an investigation of simplified stability analysis, and has come up with two methods which show promise, based on measurements taken at an inclining experiment, but does not require that the displacement be known. She is checking the database of vessels in survey to see how vessels with stability data stack up against the two methods, and will conduct a regression analysis of those vessels.

Ballast Water Management

Ballast-water management is becoming mandatory for commercial vessels on international routes, due the harmful effects of transport of organisms from one eco-system to another via ships' ballast water.

Nazmul Hossain is conducting an investigations of the requirements for ballast-water management, as well as the various systems available for complying with those requirements. His job as a surveyor for a classification society gives him access to a multiplicity of vessels and many engineers to discuss the pros and cons of the various systems.

Determination of Discharge Coefficients for Progressive Flooding

Progressive flooding of ships and the consequent time to founder or capsize is of concern to naval vessels as well as historians and forensic naval architects. Some commercial software packages use discharge coefficients of around 0.58–0.60 for the passage of water through a hole, irrespective of size or shape of hole and whether submerged on both sides or not. The shape of the hole would be different for high-explosive or armour-piercing projectiles.

Claire Johnson is conducting an investigation of the coefficient of discharge for a range of sizes of hole, for a range of shapes, and for the hole being either submerged on one side only or submerged on both sides. These results can be used directly, but will also be checked against those from a computational fluid dynamics investigation to see if CFD can predict the coefficient of discharge with sufficient accuracy.

Post-graduate and Other News

Faculty of Engineering Annual Dinner

The Faculty of Engineering Annual Dinner brings together alumni, staff and other supporters of the Faculty to re-connect, celebrate and recognise the achievements of the Faculty of Engineering. This year, the Faculty of Engineering paid special tribute to the graduation classes of 1960, 1970, 1980, 1990 and 2000.

The Faculty of Engineering Annual Dinner for 2010 was held in the Leighton Hall, John Niland Scientia Building, UNSW Kensington Campus, on Friday 6 August, commencing with drinks at 6:30 pm and dinner at 7:00 pm.

Naval architecture graduates Martin Grimm and Todd Maybury (1990) and Phil Helmore (1970) attended. As well as the Dean of Engineering, Prof. Graham Davies, and Pro Vice-Chancellor (Academic), Prof. Richard Henry, a number of past and present staff from the School of Mechanical and Manufacturing Engineering also attended, including present Head of School A/Prof. Philip Mathew; previous Heads of School Em/Profs Brian Milton and Kerry Byrne, Prof. Hartmut Kaebernick and A/Prof. Robin Ford; Profs Bob Randall and Eric Hahn, A/Prof. Berman Kayis, Dr

Victoria Timchenko, Kelvin Hundt, Diane Augee, and Ana Naumoska.

The meal was excellent and it was good to catch up with naval architects, staff, other graduates, and form new friendships.

Phil Helmore, Todd Maybury and Martin Grimm
at the UNSW Engineering Annual Dinner
(Photo courtesy Helen Wortham)

School History

The 2010 Engineering Annual Dinner was also an opportunity to bring together graduates from the School of Mechanical and Manufacturing Engineering in celebration of the School's 60 year history with the launch of the book *The History of the UNSW School of Mechanical and Manufacturing Engineering 1949–2009*. The book was officially launched by Head of School, A/Prof. Philip Mathew, and BE and PhD graduate in mechanical engineering, Dr John Baxter.

Graduates and current and former staff contributed greatly to the development of the book by responding to surveys and providing photographs and other materials. In 2008, the authoring team of Blanche Hampton, Ben Allen and Robert Loeffel was commissioned to prepare this illustrated history of the school. The book traces the School's origins from Sydney Technical College to the internationally-recognised education and research institution it is today.

The History of the UNSW School of Mechanical and Manufacturing Engineering 1949–2009 will be available for purchase, and arrangements are currently being made. If you would like a copy, then email your expression of interest to mech@unsw.edu.au.

Faculty History

The 2009 Engineering Annual Dinner was the occasion of the launch of *The History of the Faculty of Engineering 1949–2009*.

In 1999, as a part of the Faculty's 50th anniversary, then Vice-Chancellor of UNSW and former Dean of the Faculty of Engineering, Em/Prof. Mark Wainwright AM, commissioned a history of the Faculty, which began with the oral history project, run in conjunction with UNSW Archives. As a result of the oral history project it was decided to prepare a written history of the Faculty. Graduates and current and former staff contributed greatly to the development of the book by responding to surveys and providing photographs and other materials. In 2007, the authoring team of Blanche Hampton, Ben Allen and Robert Loeffel was commissioned to prepare this faculty-wide illustrated history. An editorial committee with representatives from most schools in the faculty was convened to work actively with the authors. The book traces the Faculty's origins from Sydney Technical College to the internationally-recognised education and research institution it is today.

The History of the Faculty of Engineering 1949–2009 is available for purchase through the UNSW Press website, www.unswpress.com.au, or by calling UNSW Press direct on (02) 8778 9999.

Phil Helmore

HMAS *Newcastle* firing a Standard Missile (SM-2) as part of a surface-to-air missile exercise with HMAS *Warramunga* during RIMPAC 2010. The exercise was conducted on the Pacific Missile Range Facility to test the operation of integrated multi-ship defence against multiple targets with SM-2, Evolved Sea Sparrow Missile (ESSM), Nulka and Chaff.
Realistic targets (BQM-74E) representing a regional subsonic ASM were used.
(RAN photograph)

AUSTRALIAN OFFSHORE COMBATANT VESSELS

The future Offshore Combatant Vessel will be able to undertake offshore and littoral warfighting roles, border protection tasks, long-range counter-terrorism and counter-piracy operations, support to special forces, and missions in support of security and stability in the immediate neighbourhood. — Defending Australia in the Asia Pacific Century: Force 2030 [1]

To minimise cost and personnel overheads, the Government has directed that Defence develop proposals to rationalise the Royal Australian Navy's (RAN) patrol boat, mine countermeasures (MCM), hydrographic and oceanographic forces into a single modular class of around 20 offshore combatant vessels (OCV). This initiative could provide significant operational efficiencies and long-term cost savings, and should substantially improve seagoing capacity as well as flexibility and deployability for future operations. The OCVs will be larger than the current Armidale-class patrol boats, displacing up to 2000 t. As well as replacing current patrol, mine-warfare and hydrographic capacity, the OCVs will also substitute for major combatants in less-onerous warfighting tasks. The OCV concept will feature modular unmanned underwater MCM and hydrographic systems which will be containerised and portable, useable from ashore, in any OCV or craft of opportunity.

While the OCV modular concept is yet to be developed in detail, it is likely that ships configured for specialist roles (say mine warfare) will be re-roled to meet other specific operational needs. The introduction of the modular OCV will also allow the Navy to exploit advances in mechanical and electronic technology and upgrade platforms simply and quickly during the course of the life of the ship; negating the need for long refits or major capability-upgrade programs. The modular concept, hosting a range of capabilities in a common or near-common hull should also limit purchase and operating costs and realise cost savings demanded by the 2009 Defence White Paper.

Capability Development

The development of proposals for the OCV began with a detailed Joint Capability Needs Analysis in late 2009, which involved many authorities within and outside Defence. The outcomes of this analysis defined the scope of the OCV Project, better informed the capability needs, and identified the issues requiring further study in 2010. These studies will aid Defence in developing the top-level requirements which will drive proposals for the OCV. The Defence Science and Technology Organisation (DSTO) and other agencies are providing technical support to develop qualitative and quantitative assessments which will guide future decisions. It is envisaged that the proposals to go to Government initially will be broad options based on past and ongoing studies; really an affirmation to proceed or not with the rationalisation concept, and in what form.

Other countries are also working on the OCV concept. The United States Navy continues to develop the Littoral Combat Ship (LCS) program, a much larger ship which is also based on modular system concepts. The RAN will monitor the LCS program for any applicable lessons. The United Kingdom is also exploring options for combining patrol, MCM, and hydrographic roles into a common hull as part of its Future Surface Combatant program. Royal Navy studies will commence in 2010, and both the United Kingdom and Australia are seeking to share the results of their analyses.

Conceptual Issues

For some years, the RAN's long-range plan, *Plan Blue*, recognised the need for multi-mission platforms comprising adaptable, flexible mission systems and identified a need to lessen costs by reducing crew numbers, and increasing automation and system and hull commonality [2]. To a large extent, the key to rationalisation is 'commonality' — this may mean a single, common hull and permanently-fitted systems; however, it may also mean hull 'variants' with a range of common permanently-fitted equipment. A major challenge in replacing the current minor warship fleet with common or variant hulls and modular payloads is to embrace the concept without compromising on the level of capability needed for each role. That is, the mission payload is effectively the OCV's major weapons system and will need a significant investment. Any additional cost associated with mission systems is expected to be offset by savings from commonality in generic hull systems, training synergies and administration. To some degree the ship, as the carrier of this modular functionality, is the less-important part of the overall OCV system, as long as it provides the endurance, range and survivability required by the strategic guidance.

Two key capability attributes which stand out from the White Paper guidance for the future force are 'deployability' and 'flexibility'. The modular OCV certainly has the potential to provide flexibility, as well as improving ship affordability. The need to deploy means that the OCV must be able to accompany a task force or advance force.

This has generally not been possible for either hydrographic or MCM ships, largely because of a lack of speed and limited communications. Additionally, seakeeping, endurance, and self-protection measures are limitations of all classes of current minor war vessels. Nevertheless, the advantages of a future larger hull must be weighed against the possibilities that the associated cost may limit ship numbers and that current basing infrastructure may be inadequate.

Although the OCV is deliberately described as a 'combatant' it will almost certainly not be comparable in capability with any major surface combatant. Its design features will be aimed primarily to meet the patrol, mine-warfare and hydrographic force needs, and it will mount defensive weapons systems. It may also be built without the levels of survivability associated with major combatants, and so may need protection in higher-level combat. Despite these potential limitations, the OCV, if capable of operating autonomous systems, may be able to contribute significantly in higher-level conflict by

operating from stand-off ranges [3]. This premise will be tested through fleet experimentation and assessing the experience of other navies. Most likely, the future OCV will be tasked primarily in its specialist roles, but it will have the flexibility and capability to substitute for major surface combatants where their additional capability may be neither needed nor cost effective [4].

As well as being flexible and deployable, the OCV must be able to defend itself against low-to-medium level air, surface and sub-surface threats. It must also be able to sustain operations with high systems serviceability and be able to operate with national or combined task forces.

Deployed task group operations, particularly those in littoral areas, are becoming more important and more common, both for humanitarian and military tasks. Future task group deployments involving the new amphibious ships with their ability to carry large numbers of troops, may need the accompaniment of MCM and hydrographic-configured OCVs. They would be tasked with environmental assessment and mine identification and neutralisation and, in some cases, would need to precede the main body of the task group to an area of operations.

For mine warfare and hydrography especially, the OCV concept depends greatly on anticipated advances in automated technology for specialist sensors. These advances will bring both opportunities and burdens. On one hand, they should lead to superior understanding of the physical battlespace and the optimisation of sensors and weapons. On the other hand, more environmental data is likely to be collected, generating a need for more analysis, production and dissemination of information, and thus additional effort on the part of limited ships' companies. This is particularly relevant to the rapid environmental assessment (REA) capability needed in amphibious operations. It is also closely linked to the Task Group Mine Countermeasures (TGMCM) concept of operations, whereby similar deployable teams and their mine-disposal systems deploy with the Task Group.

Synergies are continuing to develop among hydrography, oceanography and MCM, especially because of growing commonality in equipment and information needs. This will generate closer cooperation between MCM and survey forces, which will be further enabled with the delivery of the OCV. In REA and TGMCM operations, there will be considerable opportunity to share facilities, equipment and personnel. In turn, this will necessitate much more integration of training and exercises in the future. These common doctrinal and operational links need to be understood in more depth to enable production of operating concepts which will reflect the likely capabilities and employment of the OCV. This is particularly pertinent as squadrons of OCVs may deploy for a specific operation, in which they will need to be multi-mission capable.

Enhanced Capabilities

The future OCVs may be seen by some as a means to expand existing Australian Defence Force (ADF) capabilities. In particular, they could be used for warfighting in the littorals for tasks involving amphibious manoeuvre, support to operations on land and in the air, and sealift. If space and facilities for embarked forces were provided, the OCV could be used as a flexible joint expeditionary asset. If the OCVs also had a flight deck and aviation facilities then they could operate helicopters or unmanned aerial vehicles (UAV) in support of littoral tasks as well as patrol activities. The potential to embark a helicopter or UAV on the OCVs, or at least to operate aircraft from its deck, would have significant potential to enhance the operational effectiveness of each OCV. Such aircraft would dramatically increase the ADF's current surveillance and response abilities and reduce the need to deploy large numbers of patrol boats. Both of these potential requirements, however, are only possible as design compromises and at considerable additional cost. Such capability enhancement options will be subject to further study, including cost-benefit analyses, before a decision on the way ahead can be made.

Concluding Thoughts

The OCV announced in the White Paper will introduce a concept new to the RAN, a common or variant hull capable of meeting the demands of the patrol, hydrographic and mine-warfare missions by using modular combat capability. It will rely on advanced technologies, some of which are still under development, and which will lead to new more-flexible operating concepts. The OCV is also planned to have a level of warfighting capability which will allow it to support or substitute for major combatants in some circumstances. The higher speed and improved seakeeping qualities expected from the OCV will enable it to accompany or precede task group major units to an area of operations and conduct environmental and mine-warfare operations in support of the task group.

1. Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030*, Canberra, 2009, p. 73.
2. Royal Australian Navy, *Plan Blue 2006*, Defence Publishing Service, Canberra, 2006, p. 16.
3. RO Work, *Naval Transformation and the Littoral Combat Ship*, Centre for Strategic and Budgetary Assessments, Washington DC, February 2004, p. ii, <www.csbaonline.org/4Publications/PubLibrary/R.20040218.LCS/R.20040218.LCS.pdf> (27 April 2010).
4. Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030*, p. 73.

Reproduced from Semaphore, *Issue 4, May 2010, published by the Sea Power Centre — Australia*

NMSC Transferring Functions to AMSA

The National Marine Safety Committee (NMSC), at its meeting in June, reviewed a wide range of programs and activities currently overseen or managed by NMSC. The committee is continuing to work with AMSA on the wind down of NMSC and the transfer of functions to AMSA who will subsequently be managing commercial vessel standards and related national data and support programs under the National Approach to Maritime Safety Reform.

Safety Lines, July 2010

ATC Approves Amendments to USL Code

The Australian Transport Council in May approved Amendment List 8 to the existing Uniform Shipping Laws (USL) Code, making way for the national application of legislation for four new commercial vessel safety standards in Australia.

Set to take effect on 1 October 2010, the amendment will mean that the design and construction requirements of the National Standard for Commercial Vessels (NSCV) C6B — Buoyancy and Stability after Flooding will replace the equivalent requirements in the USL Code from October. However, the other standards covered by the amendment, NSCV F2 — Leisurecraft (Hire and Drive), NSCV C1 — Accommodation, Arrangements and Personal Safety, and NSCV C2 — Watertight and Weathertight Integrity, are still being finalised and will come into effect six months after their gazettal.

The National Marine Safety Committee (NMSC) develops and publishes the new national commercial vessel standards and NMSC's CEO, Margie O'Tarpey, is pleased with the introduction of twelve standards into national legislation in the past three years. The latest set will take that number to sixteen. "This last raft of standards completes the review of the USL Code and is the culmination of years of contribution by industry and government experts to the NMSC process," Ms O'Tarpey said. "It is particularly rewarding to have the buoyancy and stability standard join the other two stability standards to complete the trio in this important aspect of vessel design," she said.

Terry Hewitt, Engineering Manager with the M.G. Kailis Group is a member of the buoyancy and stability standard's Reference Group. With over 38 years in the marine and fishing industry, he is well-placed to appreciate the final approval and application of NSCV C6B. "I've been involved with NMSC and the other stakeholders in the development of the Amendment 8, and we put in many hours to ensure a thorough decision-making process," Mr Hewitt said. "This is a major step forward for the marine industry for the better—and for the long term".

A copy of NSCV C6B can be downloaded from www.nmsc.gov.au or obtained by phoning the NMSC Secretariat on (02) 9247 2124. More detail on the other standards included in Amendment List 8 will be posted on the NMSC website as it comes to hand.

Rosemary Pryor

Bridge Navigational Watch Alarm Systems

Requirements for bridge navigational watch alarm systems (BNWAS) were adopted at the 86th session of the IMO's Maritime Safety Committee. BNWAS will become mandatory for certain new ships on delivery. Existing ships will be required to retrofit the equipment "at the first survey", in accordance with the application schedule below, based on ship type, size and keel laying date.

Although the "first survey" may not coincide with dry docking, owners should be aware that substantial work could be involved in retrofitting this equipment, which could take the ship out of service. Consideration should therefore be given to carrying out the necessary modifications in dry dock, before the mandatory implementation date. The agreement of the ship's flag administration would be required to postpone retrofitting beyond this date.

The early notification of the new requirement is intended to enable shipowners and managers to plan accordingly.

Application (to ships engaged on international voyages only)

Ship type	Size	New ships (keel laying)	Existing ships
Passenger ships	All	1 July 2011	Not after first survey* on or after 1 July 2012
Other ships	GT≥3000	1 July 2011	Not after first survey* on or after 1 July 2012
	500≤GT<3000	1 July 2011	Not after first survey* on or after 1 July 2013
	150≤GT<500	1 July 2011	Not after first survey* on or after 1 July 2014

* The first survey means the first annual survey, the first periodical survey or the first renewal survey, whichever is due first, after the date specified. For a passenger ship, this is the first renewal survey for "Passenger ship safety survey"; for a cargo ship (non-passenger ship), this is either the "Cargo ship safety equipment survey" or the "Cargo ship safety survey" (combined survey—if the ship chooses to combine all SOLAS certificates in one). For both passenger ships and cargo ships which are under construction, if the keel is laid before, but the ship is delivered after, the date specified in the relevant regulation, then the initial survey is the "first survey".

Lloyd's Register's *Classification News*, 23 June 2010

New PFDs for Australian Boaters

Personal flotation devices made to the new Australian Standard AS 4758 can now be sold and worn around the country. National Marine Safety Committee CEO, Margie O'Tarpey, explained that Australia's marine safety authorities have met the timeframe of 1 July 2010 set by the NMSC to accept personal flotation devices made to AS 4758.

The NMSC has produced a point-of-sale brochure for retailers, dealers and the general public, explaining the PFDs made to the new standard and what they mean. Copies can be attained from marine safety authorities or the NMSC.

Ms O'Tarpey said that it is important for retailers and the general boating public to understand how to identify the markings on the new PFDs. "The new standard identifies PFDs for different uses according to 'Levels' rather than 'Types', and the new Level 150 PFD has increased

performance characteristics compared to most Type 1 PFDs.

The new PFDs are marked:

- Level 150 — is a new level of PFD suitable for offshore use
- Level 100 — is similar to the Type 1 PFD and is the minimum requirement for offshore use
- Level 50 — is similar to the Type 2 PFD
- Level 50S (Special Purpose) — is similar to the Type 3 PFD

"Standards Australia developed AS 4758 to more closely align with international standards and to take into account advances in PFD design and manufacture."

The NMSC confirmed that this change will have a minimum impact on boaters, as retailers can still sell PFDs made to the old Australian standards, marked as PFD Type 1, 2 or 3.

"In the majority of cases, boaters won't need to replace their existing PFDs as long as they are in a good, serviceable condition. However, some marine agencies have applied limits to accepting older PFDs, based on when they were manufactured so, if unsure, boaters should check with their local marine safety authority."

PFDs are recognised as a key safety feature in recreational boating. An NMSC study* found that people who survived a boating incident were more than two times more likely to have been wearing a PFD compared to those who died, and concluded that if PFD usage increased to 50%, two or three lives could be saved nationally each year."

NMSC cautioned that even though new PFDs manufactured to AS 4758 are starting to appear on retailer's shelves, full market availability may not be reached until the 2010/2011 boating season.

* The National Assessment of Boating Fatalities in Australia 1992–98 Report.

Ursula Bishop

PFD Level 150
(Photo courtesy Performance Flotation Developments Australia)

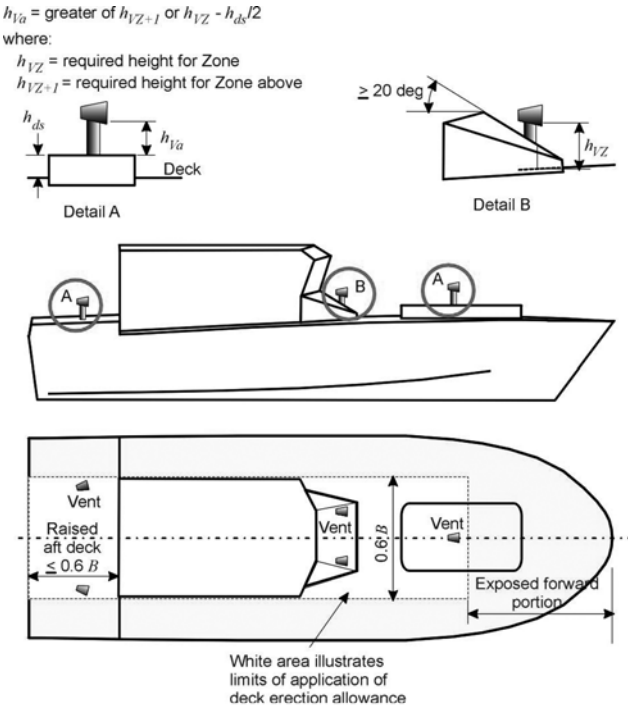
Draft Standard for Watertight and Weathertight Integrity

The National Marine Safety Committee (NMSC) recently released a draft standard for Watertight and Weathertight Integrity. The draft Regulatory Impact Statement (RIS) will also be available for comment soon.

The new National Standard for Commercial Vessels (NSCV) Section C2 — Watertight and Weathertight Integrity will replace the USL Code Subsections 5C and 5D and Section 7 Load Lines. Provisions in the draft standard include open boats; inlets and discharges; coaming and sill heights for hatches, doors, ventilators and air pipes; requirements for side scuttles and windows; minimum bow height; freeboard marks; and drainage of wells and cockpits.

The review also addresses a number of issues identified with the current standards, including the use of polycarbonate windows, glued window frames and the tension between door sill heights and trip hazards.

A typical catamaran and NSCV C2 Zones for Class 1B operation
(Image courtesy NMSC)



Allowance for local deck erections
(Image courtesy NMSC)

Principal Technical Adviser, Mori Flapan, said that the draft acknowledges and rewards vessels having excess freeboard by introducing the concept of Zones (as shown in the illustration). "Standards for fishing vessels are proposed to be aligned with those for Class 2 non-passenger vessels", he said, "and the draft Regulatory Impact Statement which will accompany the draft standard explains the nature of changes and highlights the benefits and costs."

NMSC's CEO, Margie O'Tarpey, welcomes comments from as many stakeholders as possible. "Your comments will be reviewed by a reference group comprising experienced industry and government representatives who will, in turn, make recommendations for alteration to the NMSC," she said. "This is your chance to influence the future direction of this important standard".

To obtain a copy of the NSCV Section C2 — Watertight and Weathertight Integrity, please contact the NMSC Secretariat on (02) 9247 2124 or visit www.nmsc.gov.au, and click on Have Your Say. The accompanying RIS will be posted on the web as soon as available. Comments close on 30 September 2010, so get your copy today and comment away!

Marine Surveyor Competencies

NMSC has released for public comment an Issues Paper on Marine Surveyor Competencies.

Director Programs, Anne Rauch, said that this is an important project with significant ramifications for those surveyors wishing to continue to work for government following the transfer of regulatory functions to the Australian Maritime Safety Authority (AMSA) under the new national maritime system.

The paper explores three main elements:

1. What are the competencies which marine surveyors require in order to adequately perform their job?
2. What training or courses are required in order to impart these competencies to trainee marine surveyors?
3. What would be a suitable system of assessment, monitoring and accreditation of marine surveyors so that AMSA could be assured that surveys were being conducted to a professional quality standard?

To provide comment on these issues, please access the Issues Paper and feedback form by clicking on Have Your Say on the home page of the NMSC website www.nmsc.gov.au. Comments close on 31 August, so get your copy today and comment away!

The marine surveyor competencies workshop held in April provided a basis for the Issues Paper
(Photo courtesy NMSC)

Equivalent Solutions Manual Published

The Administrative Protocol for Assessing Generic Equivalent Solutions under the NSCV has been published as a new Guidance Manual on the NMSC website.

The guidelines set out a protocol for assessing proposed generic equivalent solutions to ensure that the resulting decisions are acceptable to all maritime authorities within Australia.

The document's major goal is to make sure that a vessel which has been assessed as being compliant with the National Standard for Commercial Vessels (NSCV) in one maritime jurisdiction (state or territory) will be acceptable in any other maritime jurisdiction.

The guidelines are intended to be applied by authorities when assessing the compliance of equipment, vessels and their operations with the NSCV and should be read in conjunction with NSCV Part B — General Requirements.

A group has been established to assist in the national peer evaluation of decisions taken in relation to generic equivalent solutions by an authority. The Peer Advisory Network (PAN)

consists of a representative from each authority and the first PAN meeting successfully took place in Sydney in July.

For a copy of the protocol go to www.nmsc.gov.au and click on Standards and Publications/Guidance Materials.

Rosemary Pryor

Leisure Craft Standard Ready for ATC Approval

The National Marine Safety Committee (NMSC) has endorsed the final draft of the National Standard for Commercial Vessels (NSCV) Part F, Section 2 — Leisure Craft to go to the Australian Maritime Group (AMG) and the Australian Transport Council (ATC) for approval. The standard is included in the final raft of commercial vessel standards set to be implemented in law through Amendment List 8 to the USL Code nationally from 1 October.

The Leisure Craft standard replaces the USL Code's Section 18 (Hire and Drive Vessels) and responds to the wider variety of hire-and-drive activities now available.

NMSC's Standards Team Leader, John Henry, said "National data shows that most incidents involving these craft are the result of driver error. Fittingly, the emphasis in the new standard is on safety management and the provision of an adequate briefing, especially for inexperienced and unlicensed hirers".

Safety Lines, July 2010

INDUSTRY NEWS

ShipConstructor 2011 Released

On 21 July, ShipConstructor Software Inc. (SSI) announced the release of ShipConstructor 2011, the newest version of the company's AutoCAD-based CAD/CAM application for the shipbuilding and offshore industries.

The new release incorporates several enhancements which are based on input to SSI's Product Management team members who collected feedback and analysed needs from shipbuilders around the world.

"Our latest release supports several of the new features introduced in AutoCAD 2011 to improve the ease of editing," said Denis Morais, ShipConstructor's Product Development Manager. "ShipConstructor 2011 also increases speed and improves functionality."

For instance, in ShipConstructor 2011, the Product Hierarchy Module has been enhanced to now allow users to organise their project in various ways. Multiple hierarchies can now be used to generate production output as well as for analysis. This new feature also empowers shipbuilders to generate multiple build strategies for construction of vessels at different locations.

To ensure that the ShipConstructor SQL database is always optimised for maximum performance, ShipConstructor 2011 now provides a simple method for scheduling database maintenance operations including the cleanup of unused data, compacting of database files, and the re-building of database indexes. This powerful feature can be scheduled to run during down-time, providing the design team with the most well organised and efficient database possible when they return to work.

The Project Revisions dialogue has also been enhanced to make it easier to localise and examine project revision history which will aid users in analysing progress and in tracking potential sources of errors.

The ShipConstructor Project Split and Merge product for multi-site collaboration has also had a performance enhancement in the 2011 version of the software. Merge and refresh speed at distributed locations has been improved by as much as 10%.

Information regarding each part's Global Unique Identifier (GUID) is now more accessible, which makes it easier to integrate the ShipConstructor product model with other best-of-breed software such as ERP and FEA applications. Readily-accessible GUIDs can also make reporting and macro creation easier, thereby allowing shipyards to customise the software for their own unique requirements.

Additionally, based on customer feedback, ShipConstructor 2011 has expanded its profile endcut definition capabilities. An addition to the software's parametric features now allows users to create a variety of new types of endcuts being used in today's offshore and shipbuilding industries.

For more details on ShipConstructor 2011, visit http://www.shipconstructor.com/SC2011/

Wärtsilä Fuel Cell Unit in Car-carrier

Last May Wärtsilä's WFC20 fuel cell unit was installed onboard *Undine*, a car carrier owned by Swedish Wallenius Lines and managed by Wallenius Marine. This unique power unit is the first of its kind in the world and, during the test period, will provide auxiliary power to the vessel while producing close to zero emissions. This project is an important step towards more environmentally-sound shipping and cleaner seaborne transportation.

The fuel cell unit, which has a nominal output of 20 kW, is based on planar solid-oxide fuel-cell technology (SOFC), and fuelled with methanol. Methanol is particularly suited for fuelling the WFC20 since it can be easily reformed to a composition suitable for the unit. Methanol can be produced from natural gas, or from renewable raw materials such as gasified biomass. Methanol is a commonly used liquid in the oil and process industries, and is available in all major harbours.

Installation of the WFC20 fuel cell unit onboard *Undine* is the result of a joint project by the international METHAPU consortium. The participants in the consortium are Wärtsilä, Wallenius Marine, Lloyd's Register, Det Norske Veritas, and the University of Genoa, each of whom is globally active in the field of fuel-cell system integration, sustainable shipping, classification work or environmental assessment. The project has been funded with €1 million from the European Union, and is part of the European Community Framework Programme (FP6).

The principal aim of the METHAPU project has been to validate and demonstrate new technologies for global shipping which can reduce the environmental impact of

MV *Undine* of Wallenius Lines in Sydney
(Photo courtesy Wärtsilä)

vessels. In addition, a further major aim is to establish the necessary international regulations for the use of methanol onboard commercial vessels, and to allow the use of methanol as a marine fuel.

"The development of sustainable sea transportation is a long-term target and one to which Wallenius Marine is strongly committed. The METHAPU project supports this vision, not only through developing sustainable fuel-cell technology for commercial transportation applications, but also by providing the opportunity to utilise a new renewable marine fuel. Furthermore, Wärtsilä's deep expertise in SOFC fuel-cell technology provides us with a solid platform from which to gain useful experience for the future," said Per Croner, President, Wallenius Marine.

Undine, with the Wärtsilä FC20 unit installed, sailed from the German port of Bremerhaven in May. From there she headed for the USA, via Sweden and the UK. The validation process carried out at sea will provide excellent feedback and valuable information for the future development of this technology for marine environment applications.

Essential Part of Wärtsilä's Strategy

Fuel cells are considered to be one of the most exciting energy technologies for the future. In addition to methanol, Wärtsilä's fuel cells can efficiently utilise various gases as fuel and produce almost zero nitrogen oxides (NOx), sulphur oxides (SOx) and particulate emissions, all of which are harmful to the environment. It is expected, therefore, that fuel-cell technology will also offer significant benefits to the shipping industry, where international emission regulations are becoming increasingly stringent.

The development of fuel-cell technology is a part of Wärtsilä's long-term product development, aimed at supplementing the company's product portfolio. The development of environmentally-friendly and sustainable

Wärtsilä's fuel cell unit WFC20
(Photo courtesy Wärtsilä)

energy-production technologies is an essential part of Wärtsilä's strategy. In 2008, Wärtsilä delivered a unique fuel cell unit, producing electricity and heating to the Vaasa Housing Fair site in Finland. The WFC20 unit, used in this project, runs on methane-rich gas originating from a nearby landfill, and was developed and is operated by Wärtsilä.

Cost Savings with Wärtsilä Energopac Propulsion System

Wärtsilä's Energopac is an integrated propeller and rudder design which effectively reduces flow separation behind the propeller boss, thereby reducing frictional drag while preserving course-keeping capabilities.

In recent trials carried out in co-operation with the Spliethoff Group, a company which manages more than 55 multi-purpose cargo vessels, it was shown that the Wärtsilä Energopac solution delivers significant reductions in fuel costs. The trials involved eight 17 700 dwt vessels, six of which were fitted with standard rudders and two with

Energopac units. The trials have shown that the Energopac solution saves close to 4 per cent power in the design condition. This represents annual fuel cost savings of more than $US120 000 (at July 2010 fuel prices).

"After six-months operation, it has been shown that the reality confirms the theory," said Frank Louwers, director at Spliethoff. "This facilitated our decision to install the Energopac propulsion solution on the next series of another five vessels."

Custom designed for optimal savings

Launched in 2008, Wärtsilä's Energopac is an easy-to-install rudder/propeller combination which features a rudder bulb located behind the propeller hub. The bulb is mounted on a custom-designed full-spade flap rudder. As each Energopac installation is designed to fit a specific vessel, it can be fully optimised for energy efficiency without compromising manoeuvrability or comfort levels. Wärtsilä's in-house computational fluid dynamics resources are used in developing an optimal design for the total system.

High-performance propeller designs usually involve a compromise between increased efficiency and reduced vibration levels. Differences in rudder resistance are significant, especially when small corrective steering forces are used to keep a vessel on course. Energopac's sophisticated full-spade flap rudder delivers excellent rudder balance and manoeuvring performance, and also enables a smaller overall rudder-blade area with lower consequent rudder drag. In transit conditions, where only relatively small steering angles are required to keep the vessel on course, the rudder bulb remains within the shadow of the fairing cap wake.

Wärtsilä's Energopac integrated propeller and rudder design
(Image courtesy Wärtsilä)

"Energopac is an effective way of reducing the operational costs of any vessel which spends a significant proportion of time in non-stop sailing," said Marcel van Haaren, Manager, Sales Engineering, Wärtsilä Ship Power. "Boss losses in a vessel equipped with a conventional rudder/propeller arrangement are significant, but these can be greatly reduced by installing an Energopac system. An increasing number of ship owners are looking to invest in technology which improves energy efficiency and reduces fuel consumption and emissions, and Energopac is a very effective solution."

For ships with highly-loaded controllable-pitch propeller systems, such as ro-ro vessels, ferries, container/multi-purpose vessels and vessels with an ice-class notation, the potential savings with Energopac are large. Bornholmstrafikken's ro-ro vessel, MV *Hammerodde*, for example, reported that results are even better than the predictions obtained from model tests carried out prior to the installation of the Energopac solution.

In addition to the Energopac systems already delivered, another 20 Energopac systems have been ordered and will be delivered in 2010 and 2011. Reductions in fuel consumption depend on the vessel type, its operational profile, and on the reference propeller and rudder. The performance improvements determined through CFD calculations and/or model tests indicate power reduction values ranging from a minimum of 2 per cent to a maximum of 9 per cent.

Wärtsilä Power System for Wind Turbine Installation Vessel

In June, Wärtsilä, the marine industry's leading ship-power systems integrator, signed a contract with Lamprell plc of the United Arab Emirates (UAE) to supply a complete ship-power system for a new wind-turbine installation vessel (WTIV). Wärtsilä's solution has been selected for its low fuel consumption, environmentally-sound technology, and global service support. The vessel's owner is Fred. Olsen Windcarrier AS, and it is scheduled to be launched in the northern summer of 2012. This is the first in a series of two such vessels with an option for two more at a later date.

Christopher Heidenreich-Andersen, Technical Manager of Fred. Olsen Windcarrier AS, commented: "Wärtsilä will provide us with state-of-the-art diesel-electric machinery, which will give us excellent operational flexibility and reliability, as well as lower emissions and reduced fuel consumption. We look forward to introducing this technology to the offshore wind industry."

Lamprell's Project Manager, Darren MacDonald, said: "Wärtsilä meets all the requirements concerning the delivery strategy, and furthermore is aligned to our philosophy of not compromising on quality. We are confident in the company's technology and capability to deliver environmentally-efficient equipment on time, which fully supports our aim of setting new benchmarks for the quality and capability of vessels in this industry."

The vessel is to be built by Lamprell plc, a UAE-based company specialising in marine and offshore construction and the refurbishing of rigs and lift boats for the oil and gas industries. Fred. Olsen Windcarrier AS, the ship's owner, is a company established two years ago to meet the increasing demand for offshore WTIVs and other related marine-service vessels. The owner, the shipyard, the ship's designer and Wärtsilä have worked in close co-operation to develop the vessel's capability to efficiently carry out this work in the challenging conditions of the North Sea. As a provider of complete ship-power solutions, Wärtsilä is able to optimise both the technical performance of the onboard equipment

and the overall operating costs of the vessel.

Flexible Power Generation

The engine configuration is based on fuel-efficient Wärtsilä medium-speed engines. The scope of supply includes one 6-cylinder, two 9-cylinder and one 12-cylinder generating sets based on the Wärtsilä 32 engine, the bow thrusters, the power drive, and the automation systems.

The operational profile of a WTIV requires appropriate power to meet the various operation modes, and Wärtsilä's fully diesel-electric machinery allows for such flexible power; for instance, by engaging only the required number of generating sets. This optimises engine loading, rationalizes fuel consumption, and ensures the most economical operation under all conditions. At the same time, the level of emissions is automatically controlled.

Huge Potential Demand

According to estimates by the European Wind Energy Association, the energy production from offshore wind resources will increase sharply. To meet increasing energy demands and the need to reduce CO_2 emissions, as many as 20 000 offshore wind turbines are expected to be erected over the next ten years. From 2020 to 2030, a further 40 000 wind turbines are likely to be installed providing a cumulative power generating capacity of 150 000 MW. This growth will, in turn, increase the expected demand for WTIVs.

Efficient Solution

In commenting on the award of this contract, Arthur Boogaard, General Manager, Special Segment Sales, Wärtsilä in the Netherlands said: "The mechanical configuration of the ship has to take into consideration the vessel's operational properties, and all the power requirements of the considerable amount of equipment onboard. We also had to provide the most efficient solution in terms of fuel consumption and exhaust emissions. Our Ship Machinery Comparison and Optimisation programme (ShipMaC) enables us to calculate both the capital and operational costs of each part of the system, and to optimise the levels of annual expenditure. This, together with our Operations and Maintenance services, is a prime reason for Wärtsilä being such a valuable long-term partner to its customers."

The new wind turbine installation vessel owned by Fred. Olsen Windcarrier AS, will be powered by an integrated Wärtsilä ship power system.
(Image courtesy Wärtsilä)

The WTIV will be 131 m long with a beam of 39 m, and will be capable of speeds of up to 12 kn. It will be capable of carrying heavy loads, will be equipped with dynamic positioning technology, and have good manoeuvrability in port. It will be able to transport on deck up to 10 wind turbines, each with rotors of more than 100-m diameter. On arrival at location, the ship's four legs are lowered to the sea floor and the vessel elevates itself using a jack-up system to become a stable working platform. The wind turbines are installed using the vessel's 800-t crane.

Wärtsilä confirms Major Order from Chinese Tanker Operator

Wärtsilä will supply 80 main engines for bunkering tankers. In terms of the number of engines, this represents one of the largest-ever orders received by Wärtsilä Ship Power. Reliability and Wärtsilä's global service support network were cited as being the key factors in the award of this contract.

Wärtsilä, the marine industry's leading ship power systems integrator, is to supply the main engines for 40 new bunkering tankers being built for the Brightoil Petroleum Group (BPG), China. This order for a total of 80 Wärtsilä 20 engines has has a total value of more than €23 million and has been included in the order book already but can be made public as BPG has recently signed the contract for the 10 first bunkering tankers with a shipyard in Zhejiang, China. These vessels will be launched in June 2012.

BPG is a listed company in Hong Kong, licensed by the Ministry of Commerce of the People's Republic of China for specialised business in the petroleum industry. The company has ordered a total of 40 bunkering tankers, each to be powered by two 6-cylinder in-line Wärtsilä 20 medium-speed engines. Delivery of the first 10 engines is scheduled to take place between December 2010 and June 2011. Wärtsilä has also signed an 8-year spare-parts and technical-services agreement with BPG for all 80 engines.

"Wärtsilä has a fine reputation for both quality and reliability, and is able to support its customers and ship-power solutions with a truly global service network. We are, therefore, very pleased to co-operate with Wärtsilä in this major project," said Mr Tan Bo, Vice President of BPG.

The bunkering tankers will be of two sizes, 4100 dwt and 7000 dwt, and both designs have the same power configuration utilizing a twin-screw propulsion solution. Some of the vessels will operate in Chinese waters and will be CCS classified. The remainder will trade in international waters and be classified by Bureau Veritas. BPG will itself operate the vessels. The Wärtsilä 20 medium-speed engine offers a remarkable combination of state-of-the-art design and top-class performance in a compact, space-saving package. Launched in 1992, its almost pipe-free, operator-friendly and heavy-duty design initiated a new era in the development of medium-speed engines. Unmatched in its power range, the Wärtsilä 20 was originally designed to operate reliably with even the poorest-quality heavy fuel, making it the ultimate in reliable performance using light diesel oils. Overhaul intervals of up to 24 000 hours and maintenance-friendly design are just some of the features which have resulted in the Wärtsilä 20 achieving an installed base of more than 2000 engines.

"In addition to its reliable and proven heavy-fuel technology, the Wärtsilä 20's low operating costs and low NOx emissions were important elements in winning this unique order," said Wim Knoester, Deputy General Manager, Ship Power, Wärtsilä in China.

"Other factors include our worldwide 24/7 service network, Wärtsilä's excellent reputation as a supplier of propulsion solutions, and the fact that vessels equipped with Wärtsilä engines hold their value well. We are looking forward to a long and successful partnership with BPG."

Wärtsilä Technology for Chinese Heavy-lift Vessel

Wärtsilä has signed a contract to deliver a ship-power system for a 38 000 t semi-submersible heavy-lift vessel for Chinese customer Zhejiang Share-ever Business Co. Ltd. Wärtsilä's solution was selected for its proven reliability and because of the first-class global service support the company is able to provide.

Zhejiang Share-ever Business Co. Ltd is a privately-owned company with more than 20 large-size vessels, including 72 m offshore platform supply ships, ocean cargo carriers of between 27 000 and 50 000 t, and drag-suction dredgers. The company seeks to utilise the latest marine technologies and works closely with domestic vessel design institutes.

This vessel will operate in offshore waters around the world, and will be mainly used in loading and transporting large-size offshore equipment required by the offshore oil and gas industry. Such equipment includes large-size steel structures, various kinds of platforms, platform jackets, and main platform blocks, etc. used in prospecting and exploration. The vessel will also assist large commercial vessels and naval ships in re-floating and similar operations. The vessel will be delivered at the end of 2011.

Reliable Power Generation

The engine configuration is based on the proven Wärtsilä 32 medium-speed engines. The scope of supply includes three 9-cylinder in-line Wärtsilä 32 generating sets for a diesel-electric installation, and three tunnel thrusters.

Wärtsilä's fully diesel-electric machinery allows for reliable and flexible power. For example, in order to optimise engine loading, rationalise fuel consumption and ensure the most economical operation under all conditions, only the necessary number of generating sets will be engaged at any one time. Furthermore, in addition to providing fuel efficiency and cost savings, this flexibility ensures that the level of emissions is automatically controlled.

Growing Market

"This kind of vessel has generated great interest amongst investors in the marine industry, and the market for it appears to be growing rapidly. Wärtsilä has been very successful in taking its share of related business opportunities, and we now have an excellent list of references to show our customers," said Michael Zhou, Business Manager, Special Vessels, Wärtsilä in China.

The 38 000 t self-propelled semi-submersible vessel has an overall length of 195 m with a moulded beam of 41.5 m. The moulded depth is12 m, the designed draft is 8.6 m and its maximum diving depth is 23 m. Propelled by electric power, the vessel features automated management, an unattended cabin, dynamic positioning, and a service speed of 13.5 kn. It is designed by the Marine Design and Research Institute of China under CSSC for technical specifications, and by Jiangsu Modern Shipbuilding Technology Co. Ltd for production processes.

Wärtsilä, ABB and HUG to Develop Low-emissions Technology

In an extension of their existing cooperation in the development of two-stage turbocharged medium-speed diesel engines, Finnish power solutions provider Wärtsilä and Swiss turbocharging specialist ABB Turbo Systems, intend to cooperate with a third partner, after-treatment specialist HUG Engineering, based in Elsau, Switzerland. The object of the new joint project is to develop an innovative compact selective catalytic reduction (SCR) system especially tailored to operation with two-stage turbocharging.

Under the envisaged agreement, Wärtsilä, ABB Turbo Systems and HUG Engineering will target a further expansion of flexible engine operation with reduced NOx emissions and optimised fuel consumption, as well as targeting savings in first and life-cycle costs. To develop the new combined SCR and turbocharging solution and its integrated application on the engine, the partners will combine their expertise and resources in order to achieve early readiness for market.

In April 2010, Wärtsilä and ABB Turbo Systems announced co-operation in a joint development programme for a new and groundbreaking application of two-stage turbocharging on large diesel engines. The application of two-stage turbocharging technology on Wärtsilä diesel engines has been developed through close co-operation between the two companies.

In this programme, Wärtsilä is focussing on developing advanced engine technology which, with the turbocharger, is able to reach the highest possible performance and become a cost-effective commercial solution for its customers. ABB Turbo Systems is delivering the turbocharging technology with defined performance in terms of airflow, pressure ratios and efficiency.

MEMBERSHIP

Australian Division Council

The Council of the Australian Division met on Wednesday 16 June, chaired by the President, Dr Stuart Cannon. Matters discussed at the meeting included:

Membership of Council

As this was the first meeting of Council folowing the Annual General Meeting, the President welcomed new Council members nominated by the Sections, namely Antony Krokowski (Qld), Adrian Broadbent (NSW), Alan Muir (Tas) and Ken McAlpine (WA). Lance Marshall (Vic) and Graham Watson (SA/NT) had tendered their apologies.

The Council also welcomed the return of Craig Boulton as Treasurer, following the resignation of Allan Soars subsequent to the March meeting. The President thanked Mr Soars for his ten-years service as Treasurer.

Pacific 2010 and 2012 IMCs

The chairman of the organising committee, John Jeremy, reported the satisfactory finalisation of Pacific 2010 and initiation of arrangements for Pacific 2012.

Single National Jurisdiction for Maritime Safety

The Secretary reported that he had been informed that the current situation was summarised in an information paper *National Maritime Safety Reforms* available on the web-site http://www.amsa.gov.au/Maritime_Reform/. This paper makes reference to the related task of re-writing the Navigation Act, for which the discussion paper is available on the Infrastructure departmental website.

Structural Standards Specified in the NSCV

Members nominated by two state Sections indicated their concerns with regard to this matter. Council agreed to canvass the relevant submissions across the Sections and, if appropriate, bring the perceived problems to the attention of the National Marine Safety Committee.

Inter-state Participation in Technical Meetings

Council is investigating the technical and financial feasibility of facilitating video-conferencing with a view to possible trials in coming months.

Next Meeting

Council's next meeting is scheduled for Wednesday 15 September.

Changes of Address

Members are reminded of the importance of advising the Division Secretary of any change of address in addition to advising Headquarters in London. If desired, the Secretary can advise London of these changes on the member's behalf.

Rob Gehling
Secretary

Recognition for Allan Soars Contribution

The London Council of the Royal Institution of Naval Architects has recorded its appreciation of Allan Soars' service and dedication to the Institution as Treasurer of the Australian Division for ten years with the award of a Certificate of Appreciation.

RINA Council and Committee Members

To keep members up-to-date with who is doing the hard yards on their behalf in Australia, current council, section and committee members are as follows:

Australian Division

President	Stuart Cannon
Vice-president	Martin Renilson
Secretary	Robin Gehling
Treasurer	Craig Boulton
Members nominated by Sections	
	Adrian Broadbent (NSW)
	Antony Krokowsi (Qld)
	Ian Laverock (ACT)
	Ken McAlpine (WA)
	Lance Marshall (Vic)
	Alan Muir (Tas)
	Graham Watson (SA&NT)
Members appointed by Council	
	Tony Armstrong
	Jim Black
	Peter Crosby
	Tim Lyon
	John Jeremy
	Martin Renilson
	Graham Taylor
Executive Committee	
	President
	Secretary
	Treasurer
	John Jeremy (representing appointees)
	TBA (representing nominees)

ACT Section

Chair	John Colquhoun
Deputy Chair	Peter Hayes
Secretary	Kerry Johnson
Treasurer	Tim Lyon
Nominee to ADC	Ian Laverock
Members	Dan Curtis
	Martin Grimm
	John Lord
	Bruce McNeice
	Richard Milne
	Glen Seeley

NSW Section

Chair	Graham Taylor
Deputy Chair	Craig Hughes
Secretary	Craig Boulton
Treasurer	Adrian Broadbent
Nominee to ADC	Craig Boulton
Members	Phil Helmore
	Rozetta Payne
	Anne Simpson
	Matthew Stevens

Queensland Section

Chair	Doug Matchett
Deputy Chair	Mark Devereaux
Secretary	Peter Holmes
Treasurer	Tom Ryan
Nominee to ADC	Antony Krokowski
Members	Tommy Ericson
	Jon Pattie

South Australia and Northern Territory Section

Chair	Graham Watson
Deputy Chair	Malcolm Morrison
Secretary	Danielle Hodge
Treasurer	Danielle Hodge
Nominee to ADC	Graham Watson
Members	Sam Baghurst
	Neil Cormack
	Peter Dandy
	Nik Parker
	Adam Podlezanski
	Jan Verdaasdonk

Tasmanian Section

Chair	Jonathan Binns
Secretary	Mark Symes
Treasurer	Jonathan Duffy
Nominee to ADC	Alan Muir
Members	Stuart McDonnell
	Gergor Macfarlane
	Giles Thomas

Victorian Section

Chair	Goran Dublevic
Secretary	Edward Dawson
Treasurer	Terry Turner
Nominee to ADC	Lance Marshall
Members	Stuart Cannon
	Sean Johnson
	Samantha Tait
	Allan Taylor

Western Australian Section

Chair	Kristofer Rettke
Deputy Chair	Ken McAlpine
Secretary	Tobias Clarke
Treasurer	Ken McAlpine
Nominee to ADC	Ken McAlpine
Members	Tiju Augustine
	Bianca Burns
	Sean Cribb
	Shaun Ritson

The Australian Naval Architect

Editor-in-chief	John Jeremy
Technical Editor	Phil Helmore
Referee	Noel Riley

Safety Group

Chair	Graham Taylor
Members	Adrian Mnew
	Mike Seward

Walter Atkinson Award Committee

In recess

RINA London

Council Members	Stuart Cannon (*ex officio*)
	John Jeremy
Safety Committee	Robin Gehling
High-speed Vessels	Tony Armstrong

International Journal of Small Craft Technology

Editor	Martin Renilson

RINA/Engineers Australia Joint Board of Naval Architecture

Members	Stuart Cannon
	Robin Gehling

Marine Safety Victoria Marine Industry Advisory Group

Members	Martin Jaggs
	Adrian Mnew

National Marine Safety Committee Reference Group on Accommodation, Arrangements and Personal Safety

Member Graham Taylor

National Marine Safety Committee Technical Advisory Panel

Members	Tony Armstrong, WA
	Lindsay Emmett, ACT
	Rob Gehling, ACT
	Brian Hutchison, Qld
	Kim Klaka, WA
	Antony Krokowski, Qld
	David Lugg, WA
	Martin Renilson, Tas
	Michael Rickard-Bell, Vic
	Graham Taylor, NSW

National Professional Engineers Register Naval Architecture Competency Panel

In recess

Pacific 2012 Organising Committee

Chair	John Jeremy
Members	Keith Adams (representing RINA)
	Adrian Broadbent (representing RINA)
	Tauhid Rahman (representing IMarEST)

Standards Australia Committee AS1799 Small Pleasure Boats Review

Member	Tommy Ericson
	Steven McCoombe

Standards Australia Committee CS051 Yachting Harnesses and Lines

Member	Bruce McRae

Phil Helmore

HMAS *Sydney* Inquiry Team Commended

Members of the DSTO-led multi-disciplinary investigation team which supported the Commission of Inquiry into the loss of HMAS *Sydney II* have received personal commendations from the Chief of the Defence Force, Air Chief Marshal Angus Houston.

DSTO collaborated with the Australian Division of the Royal Institution of Naval Architects (RINA) to provide expert scientific and technical advice and opinion about the loss of HMAS *Sydney* and her entire crew in November 1941 after her encounter with the German raider HSK *Kormoran*.

ACM Houston congratulated the team, saying how impressed he was with the work they had undertaken. He remarked that the President of the Commission of Inquiry, the Honourable Terence Cole AO, RFD, QC was "over the moon" about the analysis provided by DSTO and RINA — no mean feat, given Justice Cole's record of being an exacting task master.

Eight of the ten DSTO scientists and two RINA experts who collaborated in the investigation appeared as expert witnesses before the Commission in January 2009.

John Jeremy and Tim Lyon with the Chief Defence Scientist (left) and ACM Houston (right) and the DSTO/RINA teams with ACM Houston (below)
(Photos courtesy DSTO)

Not Just Another Plastic Boat

A most unusual sailing vessel arrived in Sydney on 26 August. *Plastiki*, an 18.2 m catamaran built from approximately 12 500 reclaimed plastic bottles and srPET, a fully- and uniquely-recyclable material, set sail from San Francisco in March to sail 8000 n miles to Sydney to raise awareness about plastic waste in our oceans. *Plastiki* was designed by Sydney naval architect Andy Dovell.

After generally light winds for much of the 128-day voyage, strong winds from the SSE as she approached Sydney tested the boat's innovative construction in the toughest conditions encountered during the voyage.

"Gusts over 60 kn are a fair amount of wind for any boat, but *Plastiki* handled it well," skipper Jo Royle, the only female on board, said.

Other crew members on board *Plastiki* included the expedition leader and Adventure Ecology founder, David de Rothschild, co-skipper David Thomson, Matthew Grey, Max Jourdan and Vern Moen.

"It's been an amazing voyage seeing first-hand the impact of plastic on our oceans and visiting island communities adversely affected by the waste we all generate. We know that Australians are deeply concerned about minimising their plastic waste — their actions to embrace reusable shopping bags and even ban plastic water bottles in some communities underscore this, but there's much more we can all do," David de Rothschild said.

Made from about 12 500 reclaimed plastic PET bottles and featuring the latest in sustainable design technology, *Plastiki* is a wonder of engineering and innovation. "It's about recognising that waste is fundamentally a design flaw. If we apply cyclical 'cradle-to-cradle' philosophies rather than linear thinking we can illuminate waste at source," David de Rothschild said.

More information about this unusual craft can be found at www.theplastiki.com.

Plastiki on display at the Australian National Maritime Museum, Sydney
(Photo John Jeremy)

NAVAL ARCHITECTS ON THE MOVE

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

Joshua Bolin has moved on from SPT Offshore and has taken up a position as a naval architect with van Oossanen & Associates in Wageningen, the Netherlands, commuting from Amsterdam.

Nichola Buchanan, a recent graduate of the University of New South Wales, has moved on from Delta Electricity and has taken up a position with American Express in Sydney.

Joseph Cole has moved on from the position of Maritime Development Engineering Liaison Officer within Navy Engineering Division and has taken up the position of Australian Naval Liaison Officer (ANLO) based in Bristol, UK. This position provides an effective technical linkage between the UK Ministry of Defence/RN and the Australian Department of Defence/RAN.

Brenden Egan has moved on from Gurit Australia, and has taken up a position with EMP Composites in Sydney.

Mark Gairey, having retired many moons ago, has flashed up the boiler and worked up a new head of steam in taking up the position of Project Director Future Submarine in the Defence Materiel Organisation in Canberra.

Stuart Grant, a recent graduate of the University of New South Wales, has taken up a position as a naval architect with Alloy Yachts in Auckland, New Zealand.

Tim Hall has moved on within Lloyd's Register and has taken up the position of South Asia Design Support Manager in Singapore.

Danielle Hodge has moved on within the Defence Materiel Organisation, and has taken up a position as a naval architect in the Directorate of Submarine Engineering in Adelaide.

Andrew Joyce moved on from Bain and Co. some time ago and held the position of Manager Strategy with CSG Services for eighteen months, but has now moved on and taken up the position of Associate with Archer Capital in Sydney.

Todd Maybury moved on from One2three naval Architects many moons ago, and has taken up the position of Senior System Engineer with Amphibious and Afloat Support Integrated Materiel Support (AASIMS) at Garden Island in Sydney. AASIMS is a joint venture between Rolls-Royce and Kellogg Brown & Root, and has a contract with the Department of Defence covering the four Royal Australian Navy amphibious and afloat support ships HMAS *Kanimbla, Manoora, Success* and *Tobruk*.

Peter van Oossanen undertook the first three years of his naval architecture degree at UNSW many moons ago, then returned to the Netherlands and completed his degree and PhD at the Delft University of Technology. He then worked at MARIN for many years, and has been involved in many America's Cup campaigns, including that of the successful *Australia II*. He and son Perry now run van Oossanen & Associates in Wageningen, the Netherlands. Friends can find out more at www.oossanen.nl (check out the Publications>Press page in particular).

Malinda Wickremaarachchilage, a naval architecture student at the University of New South Wales, has taken up a part-time position with Sofraco Engineering Systems in Sydney while he completes the requirements for his degree.

Daniel Wong has moved on from Fulsail shipyard and, after recently completing a Master of Engineering Science degree in Manufacturing and Management at the University of New South Wales, has opened his own shipbuilding and brokerage company under the name of Megalodon Marine in Sibu, Sarawak, Malaysia.

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

Phil Helmore

THE AUSTRALIAN NAVAL ARCHITECT

Contributions from RINA members for *The Australian Naval Architect* are most welcome

Material can be sent by email or hard copy. Contributions sent by email can be in any common word-processor format, but please use a minimum of formatting — it all has to be removed or simplified before layout.

Photographs and figures should be sent as separate files (not embedded) with a minimum resolution of 150 dpi. A resolution of 300 dpi is preferred.

FROM THE ARCHIVES

A Small Ship with an Interesting History

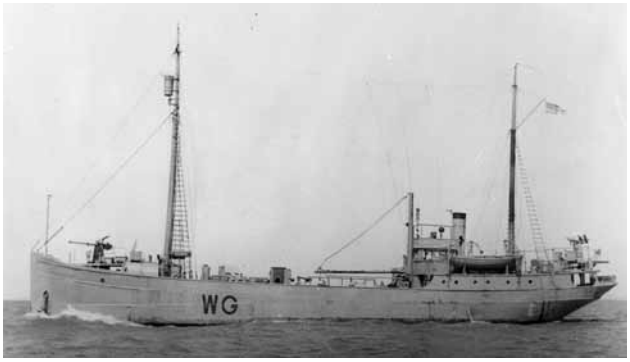
John Jeremy

Natone in the floating dock AFD 17 at Cockatoo Island in 1957
(Photo courtesy Don Dinnie)

The photograph reproduced above apparently shows simply a small wooden ship with an interesting hog in her keel which must have presented something of a challenge for the Dockmaster. The little ship was, however, far from ordinary and played a significant part in Australia's maritime history.

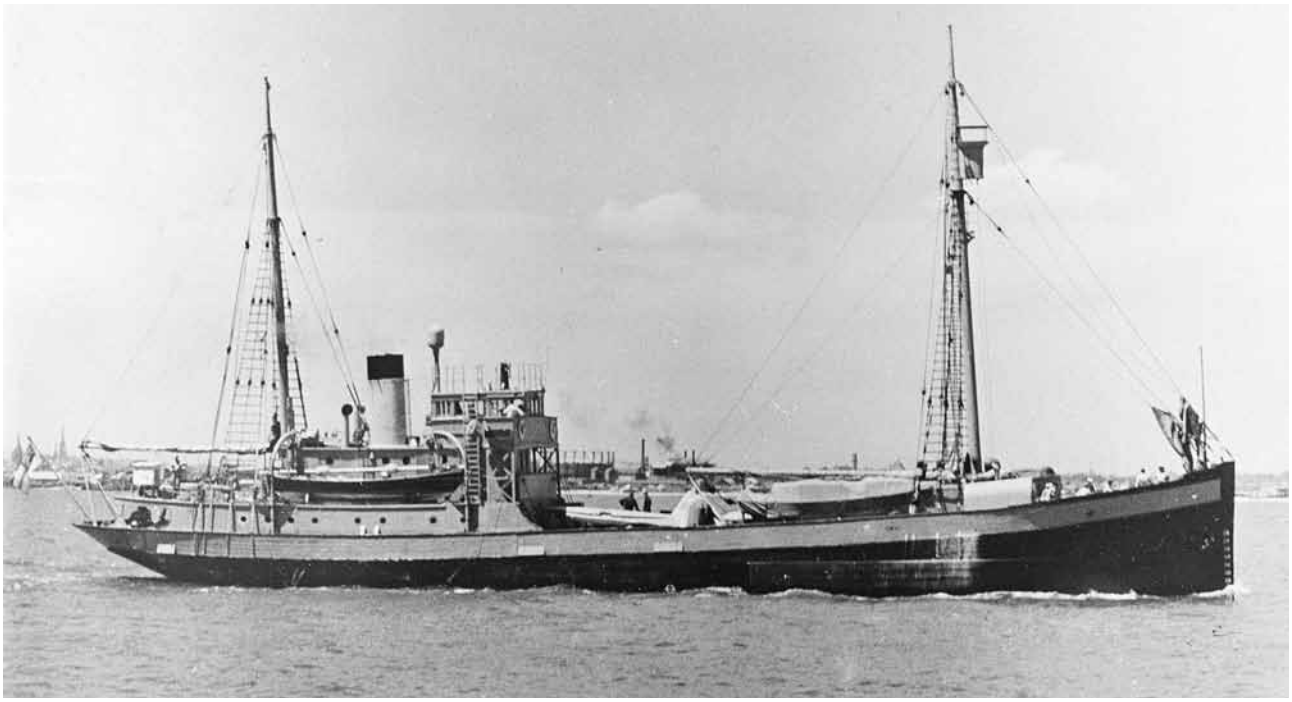
Natone was built in Norway in 1918–19 as *Fanefjord* for the herring fishing trade. Built of pine and oak, she was about 400 GT, 135 feet 7 inches (41 m) long, 29 feet 2 inches (8.84 m) in beam with a draft of 14 feet 4 inches (4.34 m). Her maximum speed was about 8 knots. In 1933 she was purchased by the American explorer Lincoln Ellsworth. He renamed her *Wyatt Earp*, sheathed her with oak and steel plates and used her for four Antarctic expeditions from 1933 to 1939 as a base ship for his aircraft.

The Commonwealth government bought *Wyatt Earp* in February 1949 for the Royal Australian Navy for use as a fleet auxiliary. She was renamed *Wongala* on 25 October 1939 and began her service as an auxiliary the following month. She completed only one voyage before being laid up in Sydney in January 1940. She was finally commissioned into the RAN on 15 July 1940. HMAS *Wongala* served as an examination vessel, guard ship and mother ship for the Naval Auxiliary Patrol in South Australian waters until she was paid off in Port Adelaide on 19 July 1944. In March 1945 *Wongala* was lent to the South Australian Branch of the Boy Scouts Association for Sea Cadet training and she continued in this role until February 1947 when her return was requested for survey for potential use in Antarctic exploration. She was found to be basically sound and, because of her previous reputation in the Antarctic, was renamed and commissioned HMAS *Wyatt Earp* in Adelaide on 17 November 1947.



HMAS *Wongala*
(RAN photograph)

HMAS *Wyatt Earp* set out on her first voyage south from Hobart on 26 December 1947, with the first ANARE expedition, led by the Chief Scientific Officer, Dr Phillip Law, on board complete with a Sikorsky Kingfisher single-engine seaplane. Because of damage in heavy seas and main engine problems she was recalled on 1 January 1948 to Melbourne for repairs at Williamstown. She sailed again for Commonwealth Bay in Adelie Land on 8 February 1948. Some time later she encountered severe conditions and, after



HMAS *Wyatt Earp*
(RAN photograph)

HMAS *Wyatt Earp* before departure for the Antarctic showing the aircraft stowed on deck
(RAN photograph)

HMAS *Wyatt Earp* in Antarctic waters
(Photo courtesy Naval Historical Society of Australia)

battling continuous gales, she had reached 65° 26' South by 18 February. Surviving pack ice and hurricane-force winds, she was forced to retreat but resumed her voyage south when conditions moderated. Heavy pack ice frustrated her attempts to reach Adelie Land and she turned back to Macquarie Island, having surveyed several islands and corrected their charted positions.

On 20 March 1948 *Wyatt Earp* met LST 3501 (later HMAS *Labuan*) at Macquarie Island, where a scientific station was being established. *Wyatt Earp* sailed for Melbourne on 24 March, arriving on 1 April 1948. It was decided that she would not be used for further Antarctic voyages and she was paid off on 30 June 1948. In November 1951 she was sold to the Arga Shipping Company (Victoria) who used her, under her old name of *Wongala*, for tramping between mainland and Tasmanian ports.

In 1956, *Wongala* was bought by the Ulverstone Shipping Company who renamed her *Natone* and she traded in Tasmanian waters for 18 months until moving to Queensland with occasional voyages to Victoria.

In January 1959, when on passage from Brisbane to Cairns, she encountered severe weather and sprang a leak which flooded the engine room. She managed to reach Rainbow Bay under sail but her moorings failed to hold and, on the night of 23–24 January 1959, she ran aground near Mudlow Rocks, about six miles north of Double Island Point lighthouse. Her crew of 18 reached the shore safely but the ship was a total loss.

Reference: www.navy.gov.au/HMAS_Wyatt_Earp, accessed on 20 July 2010.

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Picture courtesy of BAE Systems Marine Ltd.

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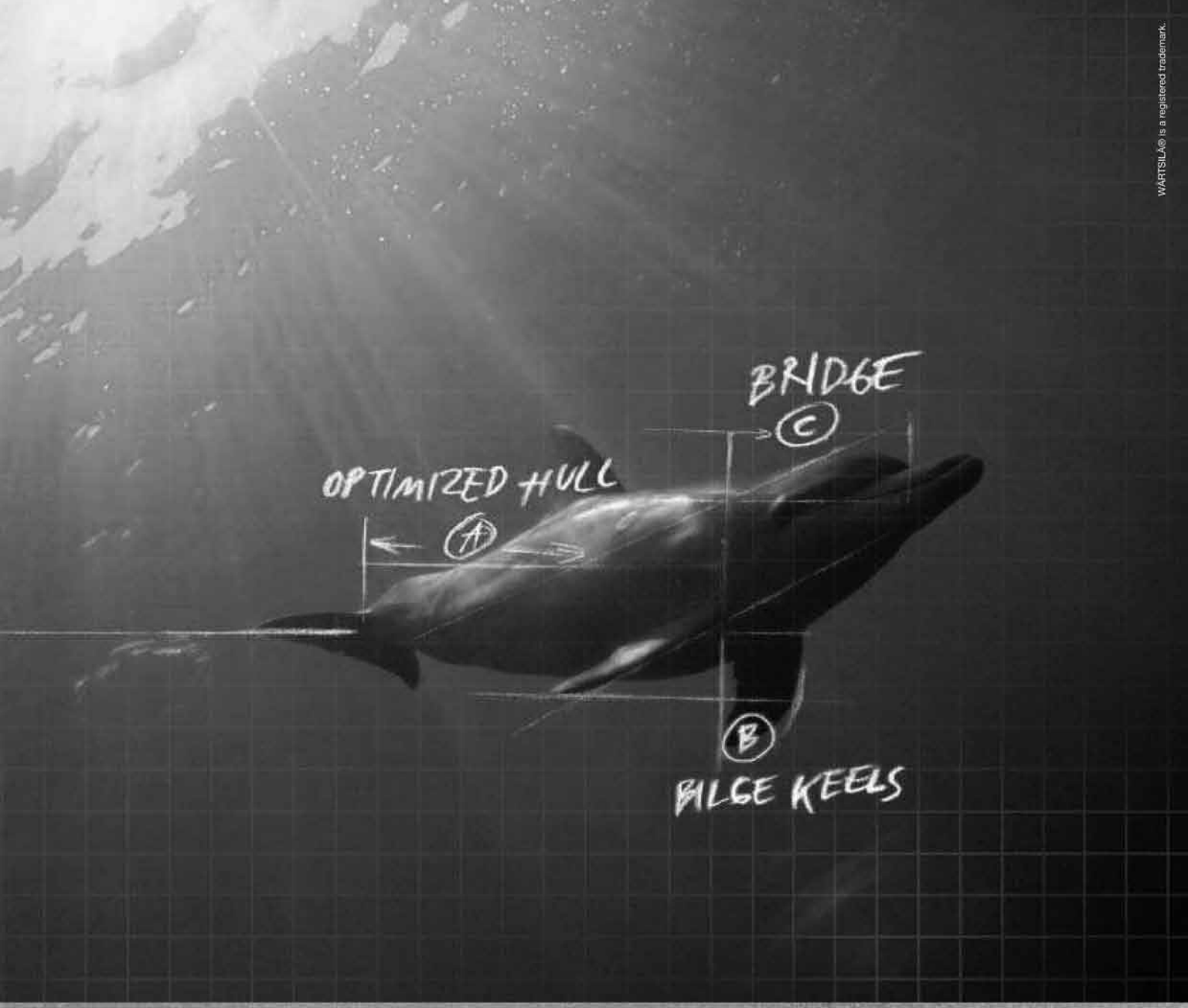

NOTICE HOW ALL THE PARTS FIT TOGETHER.

Wärtsilä now offers the marine industry total solutions that cover everything from design to lifecycle service. This makes our solutions uniquely efficient and environmentally sound. Read more about what we can do for you, wherever you are: wartsila.com.

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