



THE AUSTRALIAN NAVAL ARCHITECT



Volume 28 Number 1
February 2024



The Sydney Heritage Fleet's barque *James Craig* on Sydney Harbour on Australia Day 2024. This year the ship will celebrate her 150th birthday, having been built as *Clan Macleod* in Sunderland, England in 1874. In 1899 she was sold to New Zealand merchant J J Craig and named *James Craig* after one of his sons. She traded all round the world, and rounded Cape Horn 23 times. She finally lay abandoned in Recherche bay in Tasmania until rescued by a group of Sydney enthusiasts in the 1970s. A 30-year restoration followed before *James Craig* could sail again in June 2001
(Photo John Jeremy)

THE AUSTRALIAN NAVAL ARCHITECT

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Cover Photo:

A 12 m patrol boat recently designed and built by Norman R. Wright & Sons for the Queensland Police Service (Photo courtesy Norman R. Wright & Sons)

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The Editor
The Australian Naval Architect
c/o RINA
PO Box No. 462
Jamison Centre, ACT 2614
AUSTRALIA
email: jcjeremy@ozemail.com.au

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www.rina.org.uk/publications

From the Division President

I welcome you all to the first 2024 edition of *The Australian Naval Architect*. While looking forward to the new year and the opportunities which it will bring us, these notes are primarily looking back over the past twelve months and form the basis of my annual report to the Division's AGM in March. Once again I find myself preparing this report while we are at a time of flux in Australian naval shipbuilding, with the Defence Strategic Review released last April foreshadowing an upheaval in the current shipbuilding plans and now this month's release of the government's response to the subsequent Surface Fleet Review putting some detail to it, but still leaving us with the unknowns of just how and when the eleven general-purpose frigates will be sourced and with speculation as to what a Large Optionally-crewed Surface Vessel will look like! And we do now have the AUKUS Joint Leaders' Statement which outlined the ambitious plan for the acquisition, operation and support of an Australian nuclear-powered submarine fleet, and the subsequent formation of the Australian Submarine Agency which is already employing quite a number of our members.

Looking back over the past twelve months I feel that we can be quite proud of the Division's achievements, although there are some noticeable gaps between our intentions and these achievements, particularly in the area of succession planning. But, first, I would like to highlight some of these:

- A five-year agreement for student membership was signed with the Australian Maritime College, giving RINA access to provide free student membership to all their maritime engineering students.
- Our WA Section provided a significant presence at AOG Energy 2023, crewing a stand at the exhibition and hosting one day of the associated Knowledge Forum.
- The Division and the NSW Section again very successfully managed our highest profile event, the 2023 International Maritime Conference, and crewed the associated exhibition stand.
- The Division and SA Section members were instrumental in securing RINA's annual Warship conference for Adelaide in 2024, the first time this conference will be held outside of the UK.
- As indicated in last year's report, the Division's assets are now placed in an investment fund, overseen by our Investment Sub-Committee.
- RINA's status as an assessment entity for those wishing to become registered professional engineers in Queensland (RPEQ) has been successfully reinstated, although the same cannot yet be said for Victoria — still a work in progress!
- The Division has continued to engage with Government and, along with RINA HQ, has made submissions as appropriate, including a recent submission to the Senate FADT Committee Inquiry into the Australian Naval Nuclear Power Safety Bill 2023.
- Our members have stepped up to participate in various RINA bodies, including RINA's Membership and



Jim Black

Developing Careers committees, and continue to participate in RINA's IMO and Professional Affairs committees as well as being active members of the Board and Council. Others represent us on ISO and Australian Standards committees.

- We continue to play an active role on the RINA/Engineers Australia Joint Board for Naval Architecture and are actively monitoring EA's developing proposals for a Maritime Engineering Area of Practice.
- We have all our volunteers at Division Council and on the Section and other Committees around the country working hard on our behalf to provide the support which is expected of an international professional engineering institution, including an excellent standard of technical meetings, the high-standard journal *The Australian Naval Architect*, support and mentoring, and participation in important STEM activities.

So what have we not achieved? There are areas of communication, coordination, and support which we have talked about which could and should have been developed further, particularly in the areas of initial and continuing professional development. These projects have been somewhat hampered by the slower-than-expected "digital transformation" taking place at HQ but we do have our Division's Improvement Committee in place working on some of these matters. As I noted above, much less progress has been made on critical succession planning than I had intended but a start has been made and Division Council have this as a key action item.

Which brings me to the one achievement that I have not yet mentioned. Early in 2023 Professor Jonathan Binns agreed to take on the vacant position of Division Vice President and was warmly welcomed in to that position. At our December Division Council Meeting I advised that when my current two-year term as Division President is up at the March AGM I would not be seeking re-election and Jonathan volunteered and was subsequently elected unani-

mously to the position. I ask you all to congratulate him and to provide him with the excellent level of support that you have given me over the past two years. As Immediate Past President I will remain on Division Council as an ex-officio member and will likely retain some roles such as on the RINA/EA Joint Board and on the AMC Industry Advisory Committee, so you haven't heard the last of me yet!

And, finally, a reminder to you all: as a relatively small institution we are an organisation of professionals managing our profession. We need volunteers at all levels of the Division, from Sections through the Division to London-

based bodies (committees, Council and Board) and without sufficient enthusiastic volunteers the Institution cannot continue to function at the level required by its members — over to you!

It remains for me to thank you all for your support and wish you success in the coming year.

Jim Black

0418 918 050

jimblack.marine@iinet.net.au

Editorial

After what feels like a very long wait, the results of the independent analysis of the RAN's surface fleet, and the Government's response to it, have been released. The plan is ambitious—to double the size of the RAN's combatant fleet, albeit over a considerable period of years. The plan is also not without risk. This risk is recognised by the Independent Analysis Team. They state:

“Execution of our recommendations is not without risk, which will need deliberate mitigation. A number of challenges highlighted in the DSR will need to be addressed to deliver the strategic outcome. These include a sufficient and capable workforce, the appropriate number and type of Guided Weapons and Explosive Ordnance and infrastructure sufficient to provide basing and meet the operational need.”

A notable component of the plan is the rapid acquisition for the RAN of “At least seven, and optimally 11, Tier 2 ships, optimised for undersea warfare, to operate both independently and in conjunction with the Tier 1 ships to secure maritime trade routes, northern approaches and escort military assets.” The first three of these general purpose ships would be built overseas, with the remainder in Australia at Henderson in Western Australia. The Analysis has identified four ships currently built or under construction for other navies. They comprise designs from Germany, Japan, South Korea and Spain “as exemplars to form the basis of a selection process for this new general-purpose frigate.” The decision on a design for the new frigate is to be made next year.

The selection of an existing design “already under construction for, or in service with, a parent navy” has been an approach adopted on a number of occasions in the past. The aim has frequently been stated to reduce technical risk and to facilitate timely and cost effective construction. That aim has been achieved with some programs — the Anzac frigate construction in the 1990s comes to mind. However the acquisition of a modern warship is not like buying a car: select the model which suits your needs, choose some optional extras, pay a deposit and Bob's your uncle. Some design adaptation is usually required to incorporate the desired combat system, accommodation to Australian standards, and differences in operational practices, for example. That process can result in wide-ranging design changes which inevitably increase technical risk.

Some years ago the US Navy began the process of acquiring some 20 new frigates (FFG-62, Constellation class) which were to be based on an existing design. Four industry teams competed for selection and in April 2020 the US Navy

awarded the FFG-62 contract to the team led by Fincantieri/Marinette Marine (F/MM) of Marinette, WI. F/MM was awarded a contract for Detail Design and Construction for up to 10 ships in the program. The parent existing design for the frigates was to be the Italian FREMM multi-mission frigate.

It has recently been reported that the construction of FFG-62 is running at least a year late. Reasons include a shortage of labour at the shipbuilder's yard, but the adaption of the parent design to accommodate US Navy survivability and equipment requirements has proved to be a substantial task taking some two and a half years before 80% design completion was achieved. The resulting ship varies considerably from the parent FREMM. It is some 7.2 m longer, 0.8 m wider and displacement has increased by some 500 t. It is reported that the design changes affected almost every drawing of the parent FREMM design.

Of course, experiences like this need not be repeated, but they illustrate the challenges which can arise with major projects like these—risks to be managed if we are to select the design of our general-purpose frigate next year and start cutting steel for the first ship in 2026. Hopefully this schedule will prove achievable. As quoted above, the Independent Analysis has recognised the risks associated with these plans. Mention is made of the workforce needs, and the challenges which will arise from the need to provide basing and other infrastructure. Not only will the RAN's bases have to accommodate more ships, but the fleet will comprise larger ships—and the site for an east-coast submarine base remains to be decided.

One thing is quite certain, there will be no lack of work for those involved in Australian naval construction and sustainment in coming decades.

John Jeremy



COMING EVENTS

Australian Division AGM

The Annual General Meeting of the Australian Division of RINA will be held on Tuesday 19 March at 20:00 AEDT as a video-conference using RINA's Zoom platform; registration is required. See notice elsewhere in this issue.

NSW Section AGM

The Annual General Meeting of the NSW Section of RINA will be held on Wednesday 6 March immediately following the scheduled technical presentation of RINA (NSW Section) and IMarEST (ACT & NSW Branch) at 18:00 for 18:30 AEDT at the Royal Sydney Yacht Squadron, 33 Peel St, Kirribilli, and streamed live; registration is required. Notice of the meeting has been emailed to NSW Section members. It is expected that the AGM will commence at about 19:30 AEDT.

NSW Section Technical Presentations

Technical presentations are generally combined with the ACT & NSW Branch of the Institute of Marine Engineering, Science and Technology and held on the first Wednesday of the month (February through October) at the Sydney Mechanics School of Arts, 280 Pitt St, Sydney, or at a yacht club, and streamed live, starting at 18:00 for refreshments and 18:30 for the presentation, and finishing by 20:00. Guests are welcome.

The program of meetings for 2024 (with exceptions noted) is as follows:

- 7 Feb Jonathan Wall, Contractor to Defence
Operation and Maintenance of the Captain Cook Graving Dock: From the Defence Contractor Elysium's Perspective
- 6 Mar Michael Bakker, Sales Manager Oceania, Synchronlift
Latest Developments in Ship Docking Facilities and Equipment
Royal Sydney Yacht Squadron
- 6 Mar RINA NSW Section Annual General Meeting (follows technical presentation)
- 3 Apr IMarEST
- 17 Apr Jan de Kat, Regulatory Affairs Manager, Mærsk McKinney Møller Centre for Zero Carbon Shipping, Copenhagen
Towards Zero-carbon Shipping
Streamed live only
- 1 May David Firth, Principal Engineer SEA1788, Naval Shipbuilding & Sustainment Group, Department of Defence
STS Young Endeavour Replacement
- 5 Jun IMarEST
- 3 Jul Peter Thurling, Gibbs & Cox Australia, and Rob Tulk, Senior Naval Architect, One2three Naval Architects
The New AIMS Research Vessel
- 7 Aug IMarEST

- 4 Sep Sean Langman, Managing Director, Noakes Group, and John Butler, Principal, John Butler Design
Docking James Craig on the Floating Dock
Royal Prince Edward Yacht Club
- 2 Oct Levi Catton, Managing Director, Gibbs & Cox Australia
Autonomous Vessels
- 5 Dec SMIX Bash 2024

Tasmanian Section Technical Presentations

Technical presentations are generally arranged as in person events in either Launceston or Hobart, with a video link between them and large screens at each location, and streamed live, starting at 18:00 for refreshments and 18:30 for the presentation, and finishing by 20:00. Guests are welcome.

The program of meetings for 2024 is as follows:

- 12 Mar Launceston
Hongjun Fan, AMC, and Andrew Harris, BMT
Designing for Australia's Future Blue Economy
- 9 Apr Hobart
Michael Stoddart
The Blythe Star Tragedy
- 14 May Launceston
Tasmanian Section AGM, followed by
- 14 May Launceston
Gregor Macfarlane and Thomas Rehrmann, AMC
The AMC Towing Tank: Four Decades Solving Hydrodynamic Problems for the Maritime Industry
- 11 June Hobart
TBA
- 9 Jul Launceston
Martin Renilson, RMC
Structural Integrity and Safety of Older Ships in a Seaway
- 13 Aug Hobart
TBA
- 17 Sep Launceston
TBA
- 8 Oct Hobart
Graeme Elphinstone
Antarctic Expedition Programs

ASRG Dockmaster Course

The ASRG Dockmaster Course is a four-day course which covers the fundamentals and calculations required for all aspects of the safe docking and undocking operations of all vessel sizes and types. The course was developed exclusively for the Australian Shipbuilding & Repair Group to suit the needs of the Australian marine industry. The course is delivered face-to-face in a classroom setting with calculations in metric units. The course is approved by RINA for Continuous Professional Development. The ASRG Dockmaster Course is deemed to qualify for a 100% SADI

WARSHIP: FUTURE SURFACE COMBATANTS

**18th - 19th June 2024
Adelaide, Australia**

**Explore the future of naval design, addressing
engineering challenges and embracing
technological advancements.
Dive into cutting-edge surface ship developments.**



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ARCHITECTS

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rebate of course fees for particular SME companies who may qualify as a result of Defence Department engagement. The next course is scheduled to be conducted at ASC, Osborne, SA, on Tuesday 19–Friday 22 March 2024. Other courses will be advised in 2024 and may include Sydney, Cairns, Henderson and Darwin. Competitive rates are offered on application, with further discounts provided for eligible ASRG member companies and approved serving Defence-force personnel.

The course is suitable for those engaged in the shipping, shipbuilding or shiprepair and related industry sectors including

- Dockmasters
- Naval Architects
- Consultants
- Owners' Representatives
- Shipyard Managers
- Project Managers.

For details contact ASRG Chief Executive, Liz Hay, at liz.hay@asrg.asn.au or +61 7 5597 3550

Warship 2024 Conference

Sponsored by BMT and Supported by the RINA Australian Division, the Royal Institution of Naval Architects is once again hosting the highly popular Warship International Conference, with the 2024 instalment to be held on 18–19 June 2024 at the Adelaide Convention Centre, North Terrace, Adelaide.

The increasingly-complex warship design requires effective engineering assistance, design configuration control, supply-chain and inventory management to meet operational requirements. With the introduction of autonomy and disruptive developments such as quantum technologies, could future operating concepts evolve leading to a step change in design requirements? With vessel design lives between 25 and 50 years, naval architects need to consider the effects of current and future technological and operational developments now.

Early-bird pricing closed on 1 March.

From 1 Mar 2024

RINA Member	£900
RINA Non-Member	£1000
Concession (retired/students etc.)	£400
Authors	£200
Additional authors	£800

Registration is now open on the conference website (Click on Book Now in the black box on the RHS)

<https://rina.org.uk/events/events-programme/warship-2024-future-surface-combatants/>

Cancellations received in writing up to two weeks before the event takes place will be subject to administration charge of £200. Cancellations received after this time cannot be accepted and are subject to the full event fee. Delegates may be substituted; however, this must be sent in writing and confirmed with the RINA Events Team. It may be necessary for reasons beyond our control to alter the content and timing of the program. In the unlikely event that RINA cancels the event for any reason, our liability is limited to the return of the registration fee.

The conference will present technical developments in the design, construction and support of surface ships including, but not limited to, the following topics:

- Future navy surface fleet mix
- Design for constructability and supportability
- Facilities and shipbuilding
- Automation in ship design and construction
- Digital engineering
- Use of offboard autonomy—partially or fully autonomous ships
- Disruptive technologies

The call for papers was issued last year, and abstract submission closed on 1 November 2023.

For further information, contact the conference secretariat at <events@rina.org.uk>.

Indo Pacific 2025

The Indo Pacific International Maritime Exposition is the region's premier commercial maritime and naval defence exposition, connecting Australian and international defence, industry, government, academia and technology leaders, in the national interest. The three-day event is a platform for engagement and incorporates an international industry exhibition, specialist conference program featuring presentations and symposia from leading maritime institutions and networking opportunities. Indo Pacific is strongly supported by the Royal Australian Navy, the Australian Department of Defence and the NSW State Government.

AMDA Foundation in conjunction with the Royal Australian Navy has committed to the future dates of the Indo Pacific International Maritime Expositions. Indo Pacific is a critical platform for engagement where customer and industry suppliers promote their capabilities to decision-makers from around the world.

Planning has begun for the International Maritime Conference 2025, organised by the Royal Institution of Naval Architects, the Institute of Marine Engineering, Science and Technology and Engineers Australia, and will be held at the International Convention Centre Sydney on 4–6 November.

Indo Pacific 2027 is also planned for early November in that year. Put these dates in your diary now and plan to be there!



High Performance Yacht Design HPYD8

21–22 March 2024, Auckland and online.

HPYD returns to Auckland for another exciting edition. The conference, co-organised by RINA NZ and the University of Auckland, enables naval architects, engineers, designers, and researchers to present and hear papers on the current state of high-performance yacht and power-craft technology. This two-day edition incorporates 20 technical papers covering various topics; including aerodynamics and hydrodynamics, structural design and analysis, computational methods, wind tunnel or towing tank testing, wind-assisted ships and more!

A free public session (registration required) will showcase the best of the sailing world for 2024. Talks include the design of the AC40, presented by Emirates Team New Zealand, a presentation on IMOCA designs by Gurit, and a data-driven investigation of the 2024 sailing Olympic venue by Dr Laura Marimon Giovannetti. The public session will conclude with a panel discussion about the evolutions of foiling technology.

With limited space available, in-person attendees should book early to guarantee a spot. And for those unable to attend in person, don't worry—there is also an online attendee ticket option.

More information, pricing and registration is available at: <https://www.hpyd.org.nz/>

IODS 2024

The Indian Ocean Defence & Security (IODS) conference and exhibition will return to Perth in 2024 from 24–26 July.

This rapidly-growing event, presented by AMDA Foundation in partnership with the Western Australian Government, through the Department of Jobs, Tourism, Science and Innovation and Defence West, will feature a specialist conference program, international industry exhibition and networking opportunities.

Senior government, defence and industry representatives from around the world will come together at IODS 2024 to discuss the theme *Where AUKUS Meets the Quad* with confirmed speakers including:

- Australia's Chief of Navy, VADM Mark Hammond AO RAN
- Former US Chief of Naval Operations, ADM Gary Roughead, US Navy (Ret.)
- United Kingdom's First Sea Lord, ADM Sir Ben Key KCB CBE ADC

Don't miss this important event: Indian Ocean Defence and Security, 24–26 July 2024, Perth Convention and Exhibition Centre.

For more information and to join the IODS 2024 mailing list, visit iods.com.au

The image is a promotional graphic for the Indian Ocean Defence & Security (IODS) 2024 conference and exhibition. It features a dark blue background with a stylized globe and network lines. The main text is in white and yellow, with '2024' in a large blue box. The theme 'Where AUKUS Meets the Quad' is highlighted in yellow. The website 'www.iods.com.au' is at the bottom. There are also some small coordinate markers on the globe.

PARTNERS



ORGANISER



International Towing Tank Conference

Although it has the word “Conference” in the title, you cannot submit a paper and you cannot register to attend (unless you are a member or invited observer). So, what is the ITTC, and why is it so important that it is being held in Australia? And how can you get invited?

The origin of the International Towing Tank Conference was a meeting of the International Hydro-mechanical Congress held in Hamburg in 1932. The idea was to promote the improvement of ship model work and to reach mutual agreement on the standardisation of procedures. Over time, it evolved to its current incarnation.

It is now a voluntary association of worldwide organisations which have the responsibility for the prediction of the hydrodynamic performance of ships and marine installations based on the results of physical and numerical experiments. ITTC is recognised as an NGO with observer status to the International Maritime Organisation.

The ‘Full Conference’, comprising representatives of all member organisations, is held every three years. An Executive Committee is responsible for the day-to-day operation, and an Advisory Council for technical matters. A number of permanent and specialist technical committees perform defined work tasks between Full Conferences and report to the Full Conference. The venue of the Full Conference circulates between six defined world regions. This year the 30th ITTC will be in Australia.

Comprising over 100 organisations, from all around the world, the ITTC is arguably the leading authority of all things related to hydrodynamic experimentation. In each term, groups comprising members from each region, review activities within their field and address set tasks to develop procedures. The Permanent Committees cover core activities

such as ship resistance, seakeeping, and so on. There are also Specialist Committees which are tasked with emerging technologies/topics; for example, marine renewable energy devices. Committee members are permitted to serve three terms (nine years); ensuring that scientific ideas do not become entrenched.

So why is it good for Australia? Apart from the prestige of hosting the Full Conference, and showcasing our hydrodynamic capability to the world, the real benefit is the development of our people. For any early/mid-career maritime engineer striving to specialise in a hydrodynamic discipline, it is invaluable. Getting the opportunity to spend nine years collaborating with a dozen of the world’s most up-and-coming engineers in the field, can be career defining. The activities, reviewing all current work in the field and developing the most contemporary procedures, and seeing first-hand facilities all over the world, gives the individual a fundamental grounding. Moreover, rubbing shoulders with the best-of-the-best in their field develops life-long and career-defining friendships.

The Full Conference will take place in Hobart between 22–27 September 2024. In the opening it is mentioned that only members may attend. Nevertheless, as the host nation, we are in the privileged position of being allowed to invite observers. If you have an interest in attending the Full Conference, please feel free to make contact and discuss this with the Executive Council Chair for the 30th ITTC; A/Prof. Michael Woodward, <michael.woodward@utas.edu.au>. For more information visit itcc.info.

Michael Woodward

A/Prof. Marine Engineering
Australian Maritime College
College of Sciences and Engineering
University of Tasmania

NEWS FROM THE SECTIONS

ACT

HMS *Nottingham* Grounding

Simon Fleischer, Principal Mechanical Engineer with Gibbs & Cox (Australia), gave a presentation on *HMAS Nottingham Grounding* to a meeting at UNSW Canberra at ADFA, with the Chair of the ACT Section, Warren Smith, as MC on 27 February, and streamed live. The presentation was attended by *** with a further 29 participating online.

In July 2002, HMS *Nottingham* ran aground on the submerged but well-charted Wolf Rock, in the vicinity of Lord Howe Island. This presentation discussed the ship’s efforts to deal with the effects of the grounding, including Command and Control considerations, and the Damage Control practices undertaken to save the ship. It also covered aspects of the salvage operation as the ship was recovered back to Australia, and then to the UK. The standard of Damage Control during the incident is generally considered an exemplar of current-day practice, and continues to be influential on future surface combatant designs (including the Hunter-class frigates).

The presentation was not recorded.



HMS *Nottingham* arriving in Newcastle after tow from Lord Howe Island on 2 August 2002
(Photo John Jeremy)

The Presenter

Simon Fleischer is a Principal Mechanical Engineer with Gibbs & Cox (Australia) in Canberra, and joined the HCF Platform Engineering team in January 2021. He previously served as a Marine Engineering Officer for 20 years in the Royal Navy (RN) and the Royal New Zealand Navy (RNZN), and is a Fellow of the Institution of Mechanical

Engineers and Engineering New Zealand. Whilst serving in the RN, two of his key roles included Marine Engineering Officer of the Type 23 frigate HMS *Lancaster* and Chief Instructor for Combat Survivability Command and Control at the Phoenix School of Survivability

Jordan Rayson

Queensland

Z-drive Propulsion and Novel Bow/side thrusters

Jason Harris and Scott Redman of Twin Disc Pacific gave a presentation on *Z-drive Propulsion and Novel Bow/side thrusters* to a joint meeting with the IMarEST Queensland Branch on 5 December 2023 at the Twin Disc Customer Experience Centre in Coomera, Queensland and streamed live.

Twin Disc Pacific manufactures, markets and supports marine and heavy-duty power transmission equipment. They are also exclusive Pacific Region distributors for Veth Propulsion, Seakeeper Gyro Stabilisers and Sea Torque Propulsion Systems.

The novel methods in vessel propulsion and bow/side thrusters, with their drive trains by Veth, formed the special focus of this presentation. The knowledge imparted would help the selection of fit-for-purpose propulsion and manoeuvring equipment for naval architects, marine engineers, and vessel owners. Twin Disc Pacific has its Customer Experience Centre in Coomera near Boatworks and provided the presentation and showcased some of their equipment on the ground.

The presentation was not recorded.



Twin Disc Pacific showcase in Coomera
(Photo courtesy Jalal Rafieshahraki)



Twin Disc Pacific presentation in Coomera
(Photo courtesy Jalal Rafieshahraki)

End-of-year Dinner

The End-of-year Dinner Was held at the Boathouse Tavern in Coomera as a combined RINA Queensland Section and IMarEST Queensland Branch function, with partners invited, on Tuesday 5 December 2023.

Tom Ryan



RINA and IMarEST Qld annual dinner in the Boathouse Tavern
(Photo courtesy Jalal Rafieshahraki)

Western Australia

New Technology for Safe and Efficient Offshore Construction Lifting

Derrick Markwell of Roborigger, Tensa Equipment, gave a presentation on *New Technology for Safe and Efficient Offshore Construction Lifting* to a joint meeting with Engineers Australia in the Beeliar Auditorium at Engineers Australia in the Perth CBD on 5 December 2023 and streamed live.

This presentation discussed the use of correlation of the actual site and lifting conditions, unmanned lifting, and incremental steps to fully-autonomous lifting. The adoption of new technologies to enhance risk reduction and greater safety of offshore operations is extremely relevant for all stakeholders in offshore operations.

The presentation shared new technology in the field of offshore lifting, providing the opportunity for attending naval architects and engineers to improve their understanding and adopt new practices. These included novel technologies to forecast and minimise dynamic loading on cranes during offshore lifts, principles of unmanned lifting from marine vessels, and systems which minimise the risk exposure of offshore personnel.

New technological developments worldwide towards fully-autonomous lifting included remote operation of cranes, load orientation and sway control, real-time mapping of the work environment, and autonomous operation of cranes.

The presentation was not recorded.

The Presenter

Derrick Markwell is the Founder and Managing Director of Roborigger. He obtained his BE degree with honours from the University of Queensland and his professional experience of over 30 years has been achieved through a number of significant offshore structural projects while working for Pressure Dynamics, Hydra Energy, ICON Engineering, Worley and, currently, his own company

Roborigger. He is an innovator and specialist for offshore lifting and construction

Ken Goh

Tasmania

Solar Boat Challenge

RINA Tasmanian Section supported the annual Schools Solar Boat Challenge, held on Saturday 25 November 2023 at Clarence High School. Unfortunately, it rained on the day; however, enough UV light penetrated to ensure that all vessels performed well.

Chris Davies spoke with the National Organiser who is very keen to take the challenge nationally to all Australian schools in encouraging primary and early high school students on STEM. In fact, one teacher from Hobart High School is specifically going to run a complete *Solar Boat* class next year, the program so far has been such a success.



The Solar Boat Challenge race pond and team tents
(Photo courtesy Richard Boulton)



Chris Davies congratulating Abel Harris on taking out the fastest overall vessel on the day with stiff challenges from interstate Victorian teams which took out the team event
(Photo courtesy Richard Boulton)

Tasmanian Section Christmas party

The Tasmanian Section Christmas party was held at the Penny Royal Wine Bar and Restaurant in Launceston on the evening of Friday 1 December 2023. There is a replica of the brigantine *Tamar* which ‘floats’ on rails alongside but, unfortunately, attendees were not allowed to perform a roll period test!

Richard Boulton



The brigantine *Tamar* replica
(Photo courtesy Richard Boulton)



Some of the attendees at the Tasmanian Section Christmas party
(L to R) Alan Muir, Chris Davies, Gregor MacFarlane, Jeffrey Hawkins and Mal Wise
(Photo courtesy Richard Boulton)



Organisers of the Tasmanian Section Christmas party
Chris Davies and Michael Woodward
(Photo courtesy Richard Boulton)

New South Wales

Committee Meetings

The NSW Section Committee met on 11 November 2023 and, other than routine matters, discussed:

- SMIX Bash 2023: Arrangements are proceeding according to plan for the flier, TV, program printing, and the raffle; sponsorships are coming in; progress payments have been made.
- TM Program 2024: RINA to arrange five presentations in 2024 and IMarEST four; we have four lined up and ideas for another were canvassed.
- Liaison with Nautical Institute: Arrangements have been made for the ACT Section to liaise with NI SE Australian branch; NSW will continue to circulate fliers of our TM presentations to them and they will be welcome to attend our presentations in person or online.
- Google Forms: Access to GF has been arranged for another member of the committee for set-up of registrations for technical presentations.

The NSW Section Committee also met on 13 February 2024 and, other than routine matters, discussed:

- SMIX Bash 2023: This event resulted in a small surplus which will be shared equally with the IMarEST; the proceeds of the raffle will be donated to the Sydney Heritage Fleet, and approval was given for the Treasurer to disburse the funds accordingly.
- SMIX Bash 2024: This event has been pencilled in with the Sydney Heritage Fleet on board *James Craig* for Thursday 5 December from 1730 to 2200.
- TM Program 2024: We have five in-person/streaming presentations lined up and a further streaming-only presentation on *Towards Zero-Carbo Shipping* for mid-April; IMarEST is busy lining up their presentations.
- NSW Committee 2024: All committee members agreed to serve for a further year, with some changes in positions: Phil Helmore becoming Assistant Secretary and Ehsan Khaled taking over as Technical Meeting Program Coordinator. The new RINA website may require a member (TBA) to update the Section's web pages.

The next meeting of the NSW Section Committee is scheduled for 9 April 2024.

SMIX Bash

The 23rd SMIX (Sydney Marine Industry Christmas) Bash was held on Thursday 7 December aboard the beautifully-restored *James Craig* alongside Wharf 7, Darling Harbour, from 1730 to 2200. The Bash was organised jointly by RINA (NSW Section) and the IMarEST (ACT & NSW Branch). About 200 guests came from the full spectrum of the marine industry, including naval architects, marine engineers, drafters, boatbuilders, machinery and equipment suppliers, regulators, classifiers, surveyors, operators, managers, pilots, navigators, researchers, and educators. Equally importantly, the full spectrum of age groups was represented, from recent graduates to the elders of the marine community. It was also great to see interstate visitors among the guests, including Liz Hay from Brisbane, Gregor Macfarlane, Kate Wallace and Gabriel Tooker from Launceston, Ken Goh, Bill Hicks

February 2024

and Justin McPherson from Perth, and Greg Hellessey from Canberra.

Sydney turned on a beautiful evening, partners in attendance enjoyed the view from the decks of *James Craig*, and many tall tales and true were told.

Drinks (beer, champagne, wine and soft drinks) and finger food (Peking duck pancakes, roast pumpkin and fetta tartlets, salt-and-pepper prawn cutlets with a chili glaze, Thai-style spring rolls with sweet chilli, and parmesan-crust chicken skewers) were served on the main deck. A delicious buffet dinner was served in the 'tween decks, including hot, cold and salad selections, and mixed breads and butter. Desserts included individual ice-creams, mini mixed tarts and cream, Australian cheese and crackers, followed by brewed coffee and tea selection.



James Craig alongside Wharf 7
(Photo Phil Helmore)



The registration desk in full swing
(Photo Phil Helmore)



Some of the crowd enjoying drinks and finger food on board
James Craig
(Photo Phil Helmore)



More of the crowd enjoying drinks and finger food on board
James Craig
(Photo Phil Helmore)

Formalities were limited to a speech from the Chair of the SMIX Bash Organising Committee, Belinda Tayler, who welcomed the guests and thanked the industry sponsors and the others on the Organising Committee, and short speeches by representatives of the Platinum sponsors. These were Scott Willey for Atlantic & Peninsula Australia, Rory Cull for Shadbolt Group, Sean Langman for Noakes Group, and Tony Armstrong for Teekay Shipping (Australia).

The lucky-door prize was drawn by Sean Langman of Noakes Group, who donated the prize, and the winner was Samantha Pritchard-Jones, who scored a \$100 gift voucher for Boat Books Australia.

The raffle was drawn by Tony Armstrong of TeeKay Shipping (Australia), who donated the hampers, and the winners were:

Third:

Jeffrey Molony Chandon Celebration Hamper

Second:

Liam Cull Moet with Australian Sweets
and Nuts Hamper

First:

Keryn de Rosayro Christmas Bites with Moet
Hamper



Belinda Tayler welcoming guests and thanking sponsors
(Photo Phil Helmore)



Scott Willey of A&P Australia addressing the guests
(Photo Phil Helmore)



Rory Cull of Shadbolt Group addressing the guests
(Photo Phil Helmore)



Sean Langman of Noakes Group addressing the guests
(Photo Phil Helmore)



Tony Armstrong presenting the third prize in the raffle
to Jeffrey Molony
(Photo Phil Helmore)



Tony Armstrong of Teekay Shipping Australia addressing
the guests
(Photo Phil Helmore)



Tony Armstrong presenting the second prize in the raffle
to Liam Cull
(Photo Phil Helmore)



Sean Langman presenting the Lucky-door Prize
to Samantha Pritchard-Jones
(Photo Phil Helmore)



Tony Armstrong presenting the first prize in the raffle
to Keryn de Rosayro
(Photo Phil Helmore)



The servery for dinner in the 'tween decks
(Photo Phil Helmore)



Guests enjoying dinner in the 'tween decks
(Photo Phil Helmore)



More guests enjoying dinner in the 'tween decks
(Photo Phil Helmore)

This year's event was sponsored by the following organisations:

Platinum

- Atlantic & Peninsula Australia
- Noakes Group
- Shadbolt Group
- TeeKay Shipping (Australia)

Gold

- Adroitia
- AkzoNobel
- Chillflow Solutions
- Asena
- Ausbarga Marine Services
- Ausbright Electrical Solutions
- Babcock
- DNV Australia
- Electrotech Australia
- Eptec Group
- Halliday Engineering
- SDS
- Wärtsilä Marine Power

Silver

- AMC/UTas
- Concept Paints
- Damen Shipyards
- High Risk Management Solutions
- MAN Energy Solutions
- Maritime Survey Australia
- Thompson Clarke

Bronze

- Australian Shipbuilding & Repair Group
- Lightning Naval Architecture
- One2three Naval Architects
- Twin Disc Pacific

Our thanks to them for their generosity and support, without which SMIX Bash could not happen.

It is rumoured that some of the stayers, who were shown the gangway late in the peace, rocked on to other venues and continued to party until the wee small hours.

Operation and Maintenance of the Captain Cook Graving Dock

Jonathan Wall, Contractor to Defence, gave a presentation on *Operation and Maintenance of the Captain Cook Graving Dock: From the Defence Contractor Elysium's Perspective* to a joint meeting with the IMarEST on 7 February in the Henry Carmichael Theatre at the Sydney Mechanics School of Arts in the Sydney CBD. The presentation was attended by 16 with an additional 7 online.

The Captain Cook Graving Dock at Garden Island is essential for the delivery of ship repair services to Royal Australian Navy vessels. Elysium developed, implemented, and managed the Dock Operation and Reticulated Services Contract, a key contract for the operation and maintenance of the Captain Cook Graving Dock, a strategic national asset at the Garden Island Naval Dockyard in Sydney.

This presentation looked at the operation and maintenance of the graving dock for maintenance of Royal Australian Navy vessels for fulfilment of the contract.

The presentation was not recorded.

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

Phil Helmore

CLASSIFICATION SOCIETY NEWS

ABS Approves Methanol-fuelled Sustainable 70 m Superyacht

Lateral Naval Architects recently received approval in principle (AiP) from ABS for its new design of a methanol-fuelled 70 m superyacht.

Lateral's design focuses on reducing carbon emissions by utilising alternative fuels, specifically green methanol. ABS utilised the *ABS Requirements for Methanol and Ethanol Fuelled Vessels* to review the design and award the AiP.

"ABS is proud to collaborate with forward-looking companies like Lateral who continuously explore and promote innovative solutions for their clients. This superyacht design promises to capitalise on the experience gained from commercial vessels utilising methanol to meet greenhouse-gas emission-reduction targets," said Daniele Bottino, ABS Manager, Business Development, Yacht Sector Lead.

"It's fantastic to have the support of ABS as we develop the energy transition platform. ABS has great experience in working on methanol projects, and we appreciate their help in ensuring that our interpretation of the methanol fuel requirements is correct," said Simon Brealey, Chief Mechanical Engineer, Lateral Naval Architects.

ABS News, 12 December 2023

DNV Statistics show Maritime Decarbonisation Efforts Propelled by Orders for Alternative-fuelled Vessels

The latest statistics from DNV's Alternative Fuels Insight (AFI) platform found that a total of 298 ships with alternative-fuel propulsion were ordered in 2023; an 8% increase year on year. The year also saw methanol go mainstream, with a sharp increase in orders (138), putting it neck-and-neck with LNG (130). Additionally, 2023 marked a breakout year for ammonia, with 11 orders for vessels run on this fuel, and more in the pipeline.

Faced with increasing pressure to reduce greenhouse gas emissions, including stricter targets set by the International Maritime Organization (IMO) in July 2023, the maritime sector is considering a range of decarbonisation options. Through its AFI platform, DNV registers the industry's efforts related to newbuild vessels and retrofitting, with 298 orders for vessels able to run on alternative fuels logged in 2023, and a total of 1281 ships overall.

Knut Ørbeck-Nilssen, CEO Maritime at DNV, said "As we navigate towards a greener maritime future, the growing demand for alternative-fuelled vessels speaks volumes. These orders send pivotal signals to fuel providers and other important partners on shipping's decarbonisation journey. While it is clear that the maritime fuel technology transition is already underway, we now need to ensure that the fuels powering these engines become available.

"It is, however, crucial to emphasise that focussing solely on fuels may divert our focus from achieving a significant impact in this decade. What is required are concrete measures which actively lower emissions. Energy-efficiency

initiatives can yield decarbonisation outcomes both now and leading up to 2030."

By a small margin, methanol proved the most-popular alternative fuel choice in 2023, with 138 ships ordered (excluding methanol carriers), a steep increase compared to the 35 ordered to run on this fuel the year before. The dominating segment for this fuel was container ships (106), followed by bulk carriers (13) and car carriers (10).

The second alternative fuel of choice in 2023 was LNG with 130 vessels ordered, down from 222 in 2022. However, when looking at newbuilds alone, LNG would be in the lead as a considerable proportion of methanol orders were for retrofits. Last year also saw LNG finally break the 1000 vessel barrier (excluding LNG carriers), showing the fuel's continued importance in the maritime energy transition. In 2023, the container segment was the most active (48) for LNG, followed by car carriers (40), and tankers (30). The year also saw the first orders for vessels due to run on ammonia (11) come through whereas, with just five orders, hydrogen was a less-popular choice compared to the previous year (18).

Martin Wold, Principal Consultant in DNV's Maritime Advisory business, commented "Investments in alternative-fuelled vessels have been heavily driven by the container and car carrier newbuild boom over the last three years. It remains to be seen if this trend continues into 2024."

DNV News, 9 January 2024

LR JDP Analyses GHG Emissions over a Vessel's Life Cycle

Alternative fuels, green steel and renewable energy are fundamental to greenhouse gas (GHG) emissions reduction during the life cycle of a vessel, reveals a study carried out by LR, Knutsen, HDKSOE and HHI in a Joint Development Project (JDP).

The six-month study, which began in June 2023, measures the carbon emissions generated throughout the entire life cycle of a 174 000 m³ newbuild LNG carrier, from cradle (raw material extraction) to gate (shipbuilding), gate to end-of-life (operation), and end-of-life and to grave (demolition, recycling, and waste disposal).

Research carried out as part of the joint development project reveals that the majority of emissions are created during the operational period of a vessel's life cycle, but that these can be reduced by approximately 90% through the use of zero- or low-carbon fuels.

Of the overall operations figure, 79% of GHG emissions are generated through ship operations (tank-to-wake), with 21% attributed to mining and transport (well-to-tank) of the fuels, highlighting the significant positive impact of low- or zero-carbon fuels on emissions reduction.

The study also reveals that GHG emissions during the shipbuilding stage (gate) can be significantly reduced if green steel—steel with low or zero GHG emissions embodied at the manufacturing stage—is introduced into the process. The use of renewable energy could also lead to a GHG emissions reduction of around 60% at the yard level.

The study takes into account all emissions (Scope 1, 2 and 3) associated with the vessel throughout its life cycle. Scope 1 emissions are the direct emissions created during shipbuilding and operation. Scope 2 emissions are indirect emissions related to energy, water and steam, for example powering the yard during the build. Scope 3 emissions encompass indirect emissions created both upstream (supply chain) and downstream (distribution chain); for example, emissions created during production, transport and storage of materials and equipment, and during the vessel recycling process. By incorporating all three scopes a complete emissions profile over a vessel's life cycle can be obtained.

LR Chief Commercial Officer, Andy McKeran, said "Lloyd's Register is delighted to be part of this JDP study, which is an industry first for shipping. The IMO regulations are progressively evolving to encompass the entire value chain and Scope 3 emissions disclosures are gaining traction. The methodology created and tested as part of the study will provide a baseline for all life stages of a new construction vessel and serve as a benchmark for comparing the life-cycle emissions of other LNG carriers. LR is seeing strong demand for LCA, with leading shipowners keen to identify the most impactful measures to reduce their environmental footprint, and charterers looking to minimise their Scope 3 emissions."

Knutsen Director of Newbuilding and Innovation, Jarle Østenstad, said "We are delighted to announce that our collaboration with HDKSOE and LR has yielded significant results in the Life Cycle Assessment (LCA) of the LNG-fuelled LNG carrier. In preparation for the forthcoming EU Corporate Social Responsibility Directive (CSRD), and other similar regulations across the globe, shipowners will be required to produce sustainability reports disclosing their Scope 3 emissions and outline strategies for mitigation. This LCA analysis brings owners one step closer to meeting these requirements."

HDKSOE and HHI Senior Managing Director, Yong-Hwa Yeo, said "We are pleased to have obtained significant outcomes from the LCA of the LNG-fuelled LNG carrier through our collaboration with Knutsen and LR. Drawing from the insights of this Life Cycle Assessment study, we will continue to explore measures for mitigating greenhouse gas emissions throughout the entire value chain. Particularly, it underlines the imperative need for technological readiness in transitioning to low- and zero-carbon fuel alternatives for ships. Expanding on this LCA expertise, we will expand the Life Cycle Assessment to cover all our key flagship products, enabling us to more transparently communicate the environmental impacts of our products with the stakeholders."

LR News, 1 February 2024

LR awards AIP to Hydrogen Fuel-cell Ro-pax Ferry for Estonia

Lloyd's Register (LR) has awarded Approval in Principle (AiP) to the Estonian State Fleet for a hydrogen fuel-cell ferry designed by Finnish ship design and engineering company Deltamarin. The zero-emissions ferry is to be operated between the Estonian mainland and the islands of Saaremaa and Hiiumaa, on the Virtsu-Kuivastu and Rohuküla-Heltermaa routes, which connect the Baltic nation to its two largest islands.

The Australian Naval Architect

As part of the certification, LR approved the current stage of the design process to be suitable for further design, construction and procurement of the ro-pax ferry. The thorough AiP process was conducted by LR experts and led by its Hamburg Technical Support Office.

LR Key Account Manager, Patrick Wrede, said "LR is pleased to have acted as a trusted adviser on this project with Estonian State Fleet to provide the Estonian government with a new battery-hydrogen-fuelled ferry for the Virtsu-Kuivastu and Rohuküla-Heltermaa routes. Not only will this ferry help to progress the transition towards low- and zero-carbon vessels, but it will also provide improved connectivity between Estonia and its largest islands."

Esa Jokioinen, Sales Director at Deltamarin, said "We would like to sincerely thank all parties which have been involved and supported the development of this state-of-the-art ferry design. It is a result of very extensive and thorough research of requirements of end users, where particular attention has been paid to safety, efficiency and environmental matters. The vessels will provide a new level of connectivity for the people travelling to the islands, and are able to deliver this service at exceptionally small environmental footprint."

Andres Laasma, Director General of the Estonian State Fleet, said "The Estonian State Fleet is committed to leading the way in innovation within its sector. To achieve this, we have undertaken a project to develop a passenger ship with a remarkably high level of autonomy. Despite the challenges involved in this complex endeavour, including regulatory hurdles, technological risks, and significant initial investments, the potential benefits are considerable. These benefits include cost savings, market leadership, innovation, and a positive impact on the environment. The Estonian State Fleet is confident that this strategic advantage will propel us to the top of our industry, setting the standard for others to follow."

Valentin Bratkov, Project Manager at the Estonian State Fleet, said "Receiving the AiP from leading experts is valuable proof that our environmental and energy-efficient ferry with innovative hydrogen fuel-cell battery propulsion will lead to further construction. Lloyd's Register's expertise ensures that the pioneering work we are doing is professional and competent."

LR News, 6 February 2024



FROM THE CROWS NEST

WSR Spirit 2

On 8 October 1978, 45 years ago, Ken Warby blasted across Blowering Dam to set his second (and current) Unlimited World Water Speed Record of 317.6 mph (511.1 km/h).

Dave Warby of Warby Motorsport is attempting to break his father Ken's Water Speed Record in their latest vessel, *Spirit of Australia 2*.

The Warby Motorsport team was back on the water at Blowering Dam on the weekend of 18–19 November 2023 to continue testing and ramping up the speed towards the record.

The team had a good day on the Saturday, achieving six runs, three in each direction, and a top speed of around 260 mph (418 km/h) being talked about.

However, on the first run on Sunday morning, two or three ducks lifted off from the water ahead of Dave when he was coming onto the course at a speed of around 220 mph (354 km/h), and at least one hit the boat—at the bow, the jet engine intake and then into the engine, with some also hitting the horizontal stabiliser. Dave shut the engine down immediately and he was towed back to shore by one of the support boats. Of course, the engine then had to be checked for damage, ending the weekend.



Spirit of Australia 2 at speed on Blowering Dam
(Photo from Warby Motorsport Facebook page)

The Warby Motorsport Team repaired the damage, and were looking forward to returning to Blowering Dam for further trials in February. The boat is running true now, so they expected to be increasing the speed gradually with each run.

However, February has arrived and, being summer, it is difficult to access Blowering Dam for February–April due to all the school holiday (understandably). So the team are now looking forward to returning to Blowering on the weekend of 11–12 May with a clean, smooth running engine

Martin Grimm

Phil Helmore

WSR Longbow

Britain has re-entered the contest for the Water Speed Record with a new vessel, *Longbow*, having commenced construction in April 2018.

Progress has been slow over the last few months, especially as it has been mid-winter in the UK, with temperatures below those require to set epoxy, Dave Aldred has had to buy a

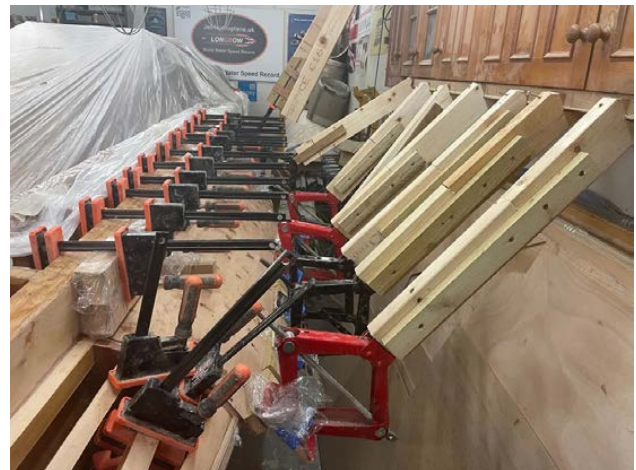
heater for his garage, and that has done the job!

Recent achievements include the fitting of the exit pipes for the twin jet engines to the transom, and fitting the marine plywood outer layer to the top of the sponsons on *Longbow*, I which required serious clamping.

Longbow website



Jet exit pipes fitted to the transom on *Longbow*
(Photo from Longbow website)



Installation of the plywood top to the port outboard sponson
(Photo from Longbow website)

SP80 Aims for World Sailing Speed Record

The world sailing speed record is currently held by Australian Paul Larsen in *Vestas Sailrocket 2* at an average speed of 65.45 kn (121.1 km/h) over the 500 m track.

SP80 is the vessel being designed and built by engineering students from the Swiss engineering school École Polytechnique Fédérale de Lausanne (EPFL) to attempt the world sailing speed record and take it back to Europe. They are aiming for a speed of 80 kn (148 km/h) using a boat with shaped hulls, propelled by the usual kite wing, while the overall stability is achieved via super-ventilating hydrofoils.

The team and boat have transferred from initial trials on Lake Geneva to Leucate, France, where the record will be set. Leucate was chosen because the boat needs very specific conditions to sail: flat water, stable wind coming from the shore, and a beach long enough to allow the boat

to accelerate, make the speed run and decelerate. Thanks to the Tramontane wind, Leucate meets all of these conditions! Now at Leucate a new part of the challenge has begun. Over the last few weeks, they have connected a small (12 m²) kite to the boat so that the pilots could make their first tests. Launching a kite from the sea has been quite a challenge and they have had to work hard to validate a launch procedure which is safe for the pilots, team and boat. With the boat moored alongside, a safe procedure has been gradually worked out.

Then it was time for the first run on the water. The kite was launched from one of the two chase boats, with the lines being gradually tightened between SP80 and the chase boat. With the kite powering the boat, a speed of 5 kn upwind was achieved, and the pilots felt that they could control the boat's speed and direction. They were completely happy with the first run!

Now there is a steep earning curve while they get used to how the kite handles, and then they can switch to the bigger 25 m² kite! Exciting times ahead.

SP80 website



SP80 on the water on the day of the first kite run
(Photo from SP80 website)

Sail GP Series 4

The Australia SailGP Team has now won the coveted SailGP Trophy three times, winning it in Seasons 1, 2 and 3.

Series 4 kicked off in Los Angeles, USA, on 22–23 July 2023, with Australia, Great Britain, Canada, Denmark, France, Germany (a newcomer), New Zealand, Spain, Switzerland and USA all competing.

Subsequent events have been held in Saint Tropez (France) 9–10 September, Taranto (Italy) 23–24 September, Andalucia-Cadiz (Spain) 14–15 October, Dubai (UAE) 9–10 December, Abu Dhabi (UAE) 13–14 January and Sydney 24–25 February.

Results show Australia currently at the top of the table with 66 points, New Zealand second with 58 points and Denmark third with 52 points.

There are five venues remaining to complete the series, as follows:

Auckland	23–24 March
Bermuda	4–5 May
Halifax	1–2 June
New York	22–23 June
San Francisco	13–14 July

For all the details, visit the Sail GP website at <https://sailgp.com>.

Phil Helmore



The Australian and Canadian boats at a rounding mark during the first race on the second day of the SailGP event in Sydney on Sunday 25 February
(Photo John Jeremy)

GENERAL NEWS

The Shape of the Future RAN

On 20 February, the Government released its blueprint for a larger and more lethal surface-combatant fleet for the Royal Australian Navy, more than doubling the size of the surface-combatant fleet under the former government's plan.

This follows the recommendations of the independent analysis of the surface-combatant fleet, commissioned in response to the Defence Strategic Review.

The Navy's future fleet will be integral to ensuring the safety and security of our sea lines of communication and maritime trade, through operations in our immediate region. This fleet will constitute the largest number of surface combatants since World War II.

The independent analysis of Navy's surface-combatant fleet lamented that the current surface-combatant fleet was the oldest fleet the Navy has operated in its history, and emphasised the need for immediate action to boost the Navy's air defence, long-range strike, presence and anti-submarine warfare capabilities.

In line with independent analysis' recommendations, the Navy's future surface-combatant fleet will comprise 26 major surface combatants consisting of:

- Three Hobart-class air-warfare destroyers with upgraded air-defence and strike capabilities.
- Six Hunter-class frigates to boost the Navy's undersea warfare and strike capabilities. The first is due to come into service in 2034 and the last in 2043.
- 11 new general-purpose frigates which will provide maritime and land strike, air defence and escort capabilities. Selection of the frigate design has commenced with potential designs from Spain, Germany, South Korea and Japan under consideration. A decision will be made next year with steel cutting to commence in 2026. The first three ships will be built overseas in a yard which is constructing vessels to that design now. The first RAN ship is to be completed by the end of this decade.

- Six new Large Optionally-crewed Surface Vessels (LOSVs) which will significantly increase the Navy's long-range strike capacity. The LOSVs are under development in the United States. Whilst they will have the capacity to operate without crews, the RAN intends to crew the vessels which will operate with the Hobart-class destroyers. They will come into service from the mid-2030s to the mid-2040s.

Six Anzac-class frigates will remain with the two oldest ships, *Anzac* and *Arunta*, to be decommissioned in line with their planned service life. HMAS *Anzac* will not go to sea again and will be decommissioned in the near future.

The Government has also accepted the independent analysis' recommendations to have 25 minor war vessels to contribute to civil maritime security operations, which includes six Offshore Patrol Vessels (OPVs).

The Hunter-class frigates will be built at the Osborne shipyard in South Australia, and will be followed by the replacements for the Hobart-class destroyers. The Hobart-class destroyers will be upgraded at Osborne with the latest US Navy Aegis combat system.

The new general-purpose frigate will be accelerated to replace the Anzac-class frigates, meaning that the Transition Capability Assurance (TransCAP) upgrades are no longer required. These new general-purpose frigates will be modern, capable and more lethal, requiring smaller crews than the Anzac-class frigates. Designs identified as possible contenders are the Meko A-200, Mogami 30FFM, Daegu class FFX Batch II and III and Navantia's ALFA3000.

Consolidation of the Henderson precinct in Western Australia is currently underway, as recommended by the Defence Strategic Review. Successful and timely consolidation will enable eight new general-purpose frigates to be built at the Henderson precinct, and will also enable a pathway to build the six new Large Optionally-crewed Surface Vessels in Western Australia at Henderson.

The Government has stated its commitment to continuous naval shipbuilding in Australia and the design of the Navy's



A model of Navantia's Tasman-class corvette on display at Indo Pacific 2023. It is based on the Navantia ALFA3000 which has been named as a possible contender for Australia's general-purpose frigate

(Photo John Jeremy)

future fleet will provide a stable and ongoing pipeline of work to the 2040s and beyond.

Budget

In order to implement the recommendations of the independent analysis, the Government has committed to funding the planned acquisition and sustainment of the future surface fleet.

This will see the Government inject an additional \$1.7 billion over the Forward Estimates and \$11.1 billion over the next decade in Defence for an accelerated delivery of the Navy's future surface-combatant fleet and to expand Australia's shipbuilding industry.

This comes on top of the Government's investment of an additional \$30.5 billion in Defence's Integrated Investment Program out to 2032–33.

This additional \$11.1 billion of funding for the future surface fleet alone brings both acquisition and sustainment investment in the fleet to \$54.2 billion in total over the next decade, providing a clear pathway for the shipbuilding industry and workforce in South Australia and Western Australia.

The Government has thanked VADM William Hilarides, USN (Retd), Ms Rosemary Huxtable AO PSM and VADM Stuart Mayer AO RAN for their leadership of the independent analysis and contribution to the most comprehensive update to the Navy's fleet in decades.

More information can be found at: <https://www.defence.gov.au/about/reviews-inquiries/independent-analysis-navy-surface-combatant-fleet>.

Hunter-class PDR Complete

At the end of November, BAE Systems' Hunter-class frigate program successfully completed its Preliminary Design Review (PDR). The review, which started in July 2023, is a technical assessment which ensures that the design is operationally effective and underpins the more detailed work which will now be undertaken.

More than 1800 people are now working on the Hunter program, which is transforming Australia's shipbuilding industry by helping build a world-class continuous naval shipbuilding capability.

A celebratory event to mark the completion of the PDR was held at the Company's Osborne shipyard to mark the milestone.

BAE Systems Australia's Managing Director Maritime, Craig Lockhart, said "The Hunter-class frigate program has come a long way from initial head contract signing, to the acceptance of the shipyard, start of prototyping work, and commencement of the first Schedule Protection Block. The completion of the preliminary design review is another significant step forward for the program which is developing Australia's sovereign industrial capability and is growing the nation's engineering workforce."

Companies from across Australia are working with BAE Systems to support the manufacture of the first batch of three Hunter class frigates.

It is anticipated that the program will create and sustain more than 5000 jobs at BAE Systems and the wider Australian

defence supply chain, including up to 1000 apprentice and graduate roles.

"Through this national endeavour, we are committed to maximising opportunities for Australian industry. More than 80 contracts have been placed with Australian businesses to support the program," said Craig Lockhart.



BSE Systems employees celebrate the Preliminary Design Review completion
(Photo courtesy BAE Systems)

Strategic Shipbuilding Agreement

Last November, Austal Limited announced that it has signed a Heads of Agreement (HoA) with the Commonwealth of Australia to establish a Strategic Shipbuilding Agreement (SSA) between Austal and the Commonwealth. If ultimately signed, a Strategic Shipbuilding Agreement would see Austal selected as the Commonwealth's strategic shipbuilder at Henderson, Western Australia.

As part of a pilot program under the SSA HoA, it is proposed that Austal will construct and deliver the Birdon-designed Landing Craft (Medium) capability to the Australian Army under the Commonwealth's LAND8710 project.

In addition, the Commonwealth has also ordered two additional Evolved Cape-class patrol boats at an acquisition cost of \$157 million, an important order for Defence to optimise its surface fleet and for Austal to ensure workforce stability.

Austal's CEO, Paddy Gregg, said that the SSA Heads of Agreement was an important first step in developing a head contract framework under which future contracts can be formed for further work in Western Australia. The Cape-class extension would provide important job security for Austal's shipbuilders as the last vessel of the current program moves through to completion and delivery of the final two vessels, and the Landing Craft project would introduce a new-build program for Austal at Henderson.

The SSA Heads of Agreement sets out the key principles and provides a framework for further discussions and other due diligence activities to establish the SSA. The creation of the Heads of Agreement also reflects the intent of both Austal and the Commonwealth to ultimately establish the SSA on mutually-acceptable terms.

Under the HoA, Austal and the Commonwealth have committed to working towards concluding the formal Strategic Shipbuilding Agreement by the last quarter of CY2024.

As part of a pilot project to be undertaken under the SSA, the Commonwealth has nominated Austal to work to

construct and deliver the Birdon-designed LAND8710 Landing Craft (Medium) capability for the Australian Army. The Commonwealth is now working with Birdon to undertake further design maturation to prepare the Landing Craft (Medium) design for the construction of these vessels at Henderson.

Subject to the program's performance and conclusion of the SSA, Austal understands that the Government also intends to build the Landing Craft (Heavy) capability through Austal under the framework of the SSA.

The two additional Cape-class vessels sought by the Government from Austal add to the 18 vessels previously ordered by the Commonwealth.



Austal's CEO, Paddy Gregg (left) and Deputy Secretary, Naval Shipbuilding and Sustainment, Australian Department of Defence, Jim McDowell, signing the Heads of Agreement at Austal's Henderson, Western Australia, headquarters on 23 November 2023 (Photo courtesy Austal)

NUSHIP *Eyre* Launched by Luersssen Australia

On 22 November 2023 Luersssen Australia launched the second Arafura-class Offshore Patrol Vessel, NUSHIP *Eyre*, at the Osborne Naval Shipyard in South Australia

NUSHIP *Eyre* is the second of the Arafura-class OPVs which are being designed and built by Luersssen Australia for the Royal Australian Navy, in collaboration with its many Australian partners.

NUSHIP *Eyre* is the last one of its class being built in South Australia.



NUSHIP *Eyre* on the Shiplift at the Osborne Naval Shipyard (Photo courtesy Luersssen Australia)

The ceremony was steeped in Navy tradition, including a blessing of the ship by its sponsor, the Hon. Justice Natalie Charlesworth, who smashed a bottle of water from the Eyre Peninsula onto the bow of the ship.

Luersssen Australia's CEO, Jens Nielsen, said that the launch of the vessel is a testament to the hard work and cooperation of everyone at Osborne Naval Shipyard:

"We would not be launching this ship without the commitment and passion from our production and shipbuilding teams, including the Naval Construction Branch and Navy, everyone has worked tirelessly to deliver a formidable vessel to the RAN. You can be proud of your efforts." Mr Nielsen said.

Offshore Patrol Vessel Project of Concern Summit

On 8 December 2023 the Minister for Defence Industry, the Hon. Pat Conroy MP, Luersssen Australia's Chairman, Tim Wagner, and senior Defence and Luersssen Australia officials met at a Projects of Concern Summit in Canberra to discuss the SEA 1180 Phase 1 — Offshore Patrol Vessels (OPV) project.

The OPV project was listed as a Project of Concern in October 2023, with the project experiencing delays in delivery of both the vessels and the associated support system. Schedule delays with the project first emerged in 2021.

Defence and Luersssen Australia recommitted to working collaboratively to resolve the significant challenges experienced with the delivery schedule for the OPV capability.

The Project of Concern process is a proven way to remediate challenging projects through ministerial oversight and bringing Defence and industry together for constructive discussions.

Royal New Zealand Navy trials Uncrewed, Renewable-powered Vessel

It was announced on 4 December 2023 that the Royal New Zealand Navy was to take delivery of a 6.8 m renewable-powered Uncrewed Surface Vessel (USV) to trial on a short-term lease.

USVs offer potential to undertake a wide variety of roles for the New Zealand Government. These could include fishery protection, border protection or providing meteorological data.

HMNZS *Aotearoa* transported the vessel from Sydney to Auckland and, once operational, it will be able to undertake maritime tasks at sea without fuel or personnel on a trial basis.

The Bluebottle is designed and manufactured by Sydney-based Ocius Technology, which has already sold a number of USVs to the Australian Defence Force and worked with Australian Border Force and other energy and scientific agencies.

The solar-, wind- or wave- powered vessel uses a retractable rigid sail to provide wind propulsion. Photo-electric cells on the sail can drive its motor.

In the absence of sunlight and wind, the Bluebottle has a

unique flipper and rudder device to steer and propel itself. It has a top speed of 5 kn and the ability to operate at sea indefinitely in sea states up to 7 (wave heights of six to nine metres).

Sensors allow both safe and effective control of the system and identification of other vessels. Sensors include radar, and electro-optic and infra-red cameras.

The USV will be constantly monitored and operated from a control room at Devonport Naval Base. Communication with the control room is through mobile phone signal while close to shore or via high- and low- bandwidth satellite when further offshore.

The sheer size of New Zealand's Exclusive Economic Zone (EEZ) is one of the reasons the RNZN's Maritime Component Commander, CDRE Garin Golding, is excited about the potential capability of the USV.

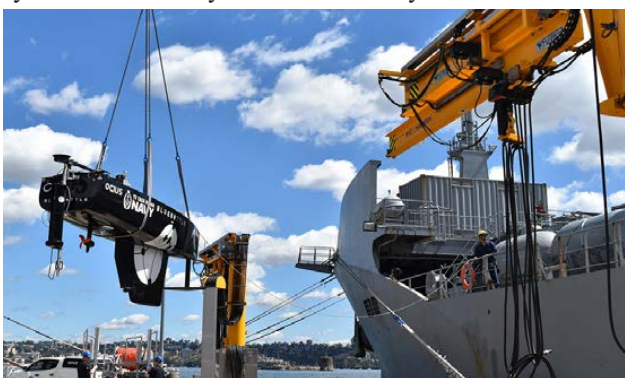
"Our EEZ is the fifth largest in the world at more than 4 million square kilometres. Coupled with the 30 million square kilometre search and rescue area that New Zealand has responsibility for, that is a lot of ocean to cover," Commodore Golding said.

"The evidence we've seen from our partner militaries overseas is that uncrewed drone aircraft and vessels can provide real value in fulfilling some of these search and surveillance tasks."

The RNZN's Autonomous Systems Staff Officer, CMDR Andy Bryant, is also looking forward to the USV demonstrating its potential.

"The Bluebottle has already undertaken a range of activities in support of the Australian Government for long periods of time without the need for refuelling, recharging or crew respite.

"I'm confident we will see similar benefits from the time we have with the vessel, particularly a better understanding of how to operate and sustain uncrewed vessels, and this will provide a great opportunity to share experiences on the new system with the Royal Australian Navy."



The Bluebottle *Bellona* (named after the post-WWII cruiser of that name) being loaded on board HMNZS *Aotearoa* in Sydney for transport to the Devonport Naval Base (RNZN photograph)

Navy Maintenance Contract for Thales

Last November Thales Australia was appointed as the Regional Maintenance Provider for the new Regional Maintenance Centre East at Defence's Garden Island Precinct.

The Australian Naval Architect

The \$2 billion contract will create up to 120 direct defence industry jobs and around 800 jobs in the broader industrial ship-repair workforce. It will ensure that Australia has the sovereign industrial base to maintain and sustain Australia's naval fleet into the future.

The seven-year contract includes incentives to ensure that local and regional small and medium businesses are given a fair opportunity to compete for work.

The new maintenance centre will support the sustainment of Navy's Canberra-class landing helicopter docks, Hobart-class guided missile destroyers and HMAS *Choules*, a landing ship dock.

It is a part of a new national approach to sustainment, establishing a consolidated network of maintenance centres around Australia, to support continuous naval shipbuilding and respond to a more challenging strategic environment.

Australian Hull Steel for Australian Nuclear-powered Submarines

Australian-made steel will be used in the construction of Australia's conventionally-armed nuclear-powered submarines to be built at Osborne Naval Shipyard, South Australia, subject to a comprehensive qualification process.

The Australian Submarine Agency has entered into a contract with the Australian steel manufacturer, Bisalloy Steels, for the qualification of Australian steel for use on Australia's future SSN-AUKUS submarines.

The \$15 million contract will put Australian products at the forefront of our submarine construction.

The comprehensive qualification process, involving more than 4500 tests, is expected to be completed in the first half of 2025. Bisalloy Steels will perform the advanced heat-treatment process on the raw plate steel to produce high-grade submarine pressure-hull steel which meets or exceeds both the UK and US standards. The raw plate steel will be supplied by another Australian company, BlueScope.

The qualification of the steel to both the UK and US standards will increase the resilience of the AUKUS trilateral supply chain. Not only will the steel produced under this contract be used for qualification purposes, it will also be used to develop the necessary welding procedures, and used in early production demonstration activities occurring ahead of the commencement of construction of Australia's first SSN-AUKUS submarine later this decade.

Captain Cook Graving Dock Contract for Thales

In December 2023 the Government said that it is partnering with Thales Australia to operate and maintain the Captain Cook Graving Dock in Sydney.

The continued operation of the graving dock at the Garden Island Defence Precinct is vital to the sustainment of the Royal Australian Navy fleet.

Thales Australia has been awarded a five-year contract, valued at approximately \$50 million, which will create up to 30 direct defence industry jobs and support an industrial ship repair workforce of approximately 300 people in the Sydney region.

The asset management of the Garden Island Defence Precinct’s reticulated services and supporting systems will be undertaken by Thales Australia, highlighting the critical role that industry plays as a partner in building Australia’s naval sustainment capability.

Thales Australia will coordinate and conduct the docking of naval vessels which require out-of-water maintenance, repair and overhaul and will play a key role in Defence’s national approach to sustainment under the new Maritime Sustainment Model.

Australia’s Maritime Defence Capability to be Strengthened in the North

Defence maritime capability and industry jobs will be bolstered in Australia’s Top End with a new contract to deliver a strategically-important defence maintenance hub.

Late last year NORSTA North Pty Ltd was awarded the Regional Maintenance Provider contract for a Regional Maintenance Centre, known as RMC North, located in Darwin.

The five-year \$150 million contract is expected to create up to 37 direct defence industry jobs. The contract will also support a broader industrial ship-repair workforce of approximately 56 people in the region.

The company will coordinate the delivery of maintenance for Navy vessels in the region, supporting Defence’s national approach to sustainment of the Royal Australian Navy fleet.

RMC North is the fourth and final addition to a national network of strategically-located sustainment centres and is on track to be fully operational in the second quarter of 2024, initially supporting the sustainment of Navy’s Cape-class patrol boats.

A key priority area identified in response to the Defence Strategic Review is improving the ability of the Australian Defence Force to operate from Australia’s northern bases.

Austal Delivers 18th Guardian-class Patrol Boat

In November 2023 Austal Australia delivered the 18th Guardian-class Patrol Boat (GCPB) to the Australian Department of Defence. The vessel, *Nafanua III*, was accepted by representatives from the Department of Defence

and was then gifted by the Australian Government to the Samoa Police Service at a handover ceremony held at HMAS *Stirling* in Western Australia on 22 November 2023.

Austal’s Chief Executive Officer, Paddy Gregg, said that *Nafanua III* is the third Guardian-class patrol boat delivered by Austal in 2023, and one of five vessels in total delivered by the company’s Western Australian shipyards that calendar year. “The Austal team has yet again shown how capable, productive and efficient they are with the delivery of this latest Guardian-class patrol boat. *Nafanua III* is the third Guardian we’ve delivered in 2023, in addition to two 58 m Evolved Cape-class Patrol Boats to the Royal Australian Navy.

“Austal’s Western Australian shipyards, our skilled local workforce and our valued supply-chain partners continue to demonstrate a sovereign capability to design, build and sustain naval vessels for Australia and export markets. In fact, since November 2018, Austal Australia has delivered a total of 29 ships—18 Guardians, six Evolved Capes, two Capes and three large high-speed ferries. That’s an impressive track record of shipbuilding, of which all stakeholders can be proud,” Mr Gregg said.

The Pacific Patrol Boat Replacement Project was awarded to Austal Australia in May 2016, with subsequent contract options awarded in April 2018 and November 2022 taking the project to 22 vessels, valued at more than \$350 million in total. Papua New Guinea, Fiji, the Federated States of Micronesia, Tonga, Solomon Islands, Cook Islands, Kiribati, Marshall Islands, Palau, Samoa, Tuvalu, Vanuatu, and Timor-Leste are receiving vessels.



Nafanua III is the 18th Guardian-class patrol boat to be delivered by Austal to the Australian Department of Defence under the Pacific Patrol Boat Replacement Project (Photo courtesy Austal)

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Austal to Build Incat Crowther-designed Catamaran for Rottneest Fast Ferries

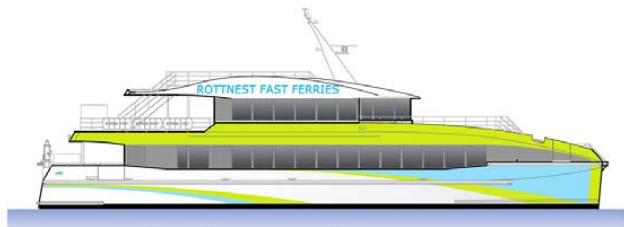
Austal has been awarded a contract to construct a 32 m catamaran for Rottneest Fast Ferries, based in Hillarys, Western Australia. Collaborating with vessel designer, Incat Crowther, Austal will commence construction of the aluminium catamaran at the company's Philippines shipyard in the first quarter of 2024.

Austal's Chief Executive Officer, Paddy Gregg, said that the new contract continues a long and successful association between Austal and the Australian-based designer Incat Crowther which has delivered multiple vessels over several decades.

"Austal and Incat Crowther have been successfully working together to deliver commercial vessels for over 20 years, including multiple ferries and crew-transfer vessels for customers throughout Southeast Asia and the Middle East," Mr Gregg said.

"We're delighted to be working with Incat Crowther again, on this exciting new catamaran for Rottneest Fast Ferries; locally owned and operated from Hillarys Boat Harbour in Perth, Western Australia.

The 32 m aluminium catamaran will have the capacity for up to 400 passengers and five crew seated over three decks, and extensive cargo space available for passenger's bicycles and baggage securely stored on two decks. With two 1029 kW MAN D2862 diesel engines driving fixed-pitch propellers, the vessel will have an operating speed of up to 25 kn on the 45 minute journey from Hillarys Boat Harbour to Rottneest Island.



Austal Philippines will construct a new 32 m catamaran, designed by Incat Crowther, for Rottneest Fast Ferries, based in Hillarys Western Australia.
(Image courtesy Austal)

Birdon Selected as Preferred Designer for Landing Craft (Medium) Capability

Birdon welcomed the announcement in November 2023 that they had been selected as the preferred designer for the Landing Craft (Medium) capability. The Commonwealth will work with Birdon and Austal as part of the strategic shipbuilder pilot, to undertake further design maturation to prepare the Landing Craft (Medium) design, for the construction of 18 vessels at Henderson, Western Australia.

The Landing Craft (Medium) will provide independent shore-to-shore and ship-to-shore capability to enable movement and sustainment of the amphibious Joint Force over extended ranges in restricted littoral and riverine environments. The new fleet will be capable of carrying the Joint Forces current and planned armoured and protected vehicles, as a combat-laden mission system in high sea states. The vessel will also be interoperable with the RAN's

Landing Helicopter Docks and Landing Ship Dock.

"We're proud that our Landing Craft (Medium) design has been selected for the next phase of securing Australia's sovereign shipbuilding capability. We look forward to working with the Commonwealth and Austal to deliver this capability to the Army," said Joe Smith, General Manager Defence, Birdon.

Birdon's solution has been designed from the keel up, specifically for the Australian Army's needs, and leverages Birdon's intimate knowledge and experience of Australian and international military watercraft programs and operational requirements.

"As an Australian-owned private firm with a global reach, we deeply value and advocate for the pivotal contributions of businesses within Australia's manufacturing and supply landscape. Birdon's Landing Craft (Medium) design is integrating a high level of Australian industry capability," said Birdon's Chief Executive, Jamie Bruce.



An impression of Birdon's Landing Craft (Medium) Design
(Image courtesy Birdon)

Birdon Selected to Develop US Heavy Landing Craft

It was announced in January that the US Marine Corps had selected Birdon's advanced Heavy Landing Craft H260 design to be part of a test-and-evaluation exercise focused on the missions which it envisages Marines executing in the future.

The H-260, a long-range, shallow-draft, independent vessel, shares a common lineage to Birdon's proposed Landing Craft (Heavy) for the Australian Army LMV-H. It embodies Birdon's extensive knowledge of the Indo-Pacific's demanding area of operations, both sea states and landing conditions, and Birdon's understanding of the US Marine Corps and Australian Defence Force littoral warfare concepts.

Looking outwardly similar to many oil and gas offshore support vessels, but with integrated signature reduction features, the 78.8 m craft features a payload of 400 t, deck space of 736 m², the ability to accommodate 72 marines and 26 crew, a range of over 5000 n miles, and a draft of only 1.97 m, allowing it to access a far larger proportion of beach and riverine offload locations than similar-sized vessels. Its inherent robustness and resilience enable the H260 to adapt to a wide range of mission profiles and sustain multiple deployments.

The aft loading and forward enclosed ramps enable rapid load transfer while adding flexibility to cope with a wider range

of landing sites. Its forward wheelhouse and accommodation are distanced from the noise and vibration of the propulsion systems and, combined with the proprietary bow, reduces pitching moment and accelerations on embarked personnel, all of whom have bunks, delivering an enhanced habitability. Crew and commanders have extensive visibility for all operational activities.



An impression of Birdon's H260 design
(Image courtesy Birdon)

12 m Patrol Boat from Norman R. Wright & Sons

In response to industry demand, Norman R. Wright & Sons Managing Director, Tony Riek, approved the research and development of a new-generation composite 12 m patrol vessel to overcome deficiencies often experienced with aluminium RIBs which are popular in this class. The vessel has been designed in-house by Senior Naval Architect, Adam Evripidou, and brought to life by their naval architect Angus Cameron. The vessel was built at Norman R. Wright's new facility in Brisbane.

The result is the 12 m XLW Class Patrol Boat with the following key features and advantages which clients have been seeking:

- A large configurable volume with "big boat" feel, providing significantly-improved accommodation levels with features such as full standing bathroom, fully appointed galley, 7 kW air conditioning, large storage areas (including below-deck spaces), wide side decks, and multi-height intercept zones including over-the-bow boarding
- Significantly reduced maintenance costs and increased vessel life due to corrosion-resistant composite construction, fully-accessible bilges (i.e. no reliance on underdeck foam flotation), and Norman R. Wright's pilot-vessel-proven long-life fendering systems in place of high-maintenance inflatable tubes.
- Operating efficiencies, extended range, and emission reductions due to reduced displacement and improved hullform offered by composite construction.
- Choice of outboard or inboard configurations

Key to achieving these goals is the XLW (eXtra Long Waterline) planing hullform which has been developed in-house with CFD optimisation and proven on the 14 m XLW-class Pilot Vessels. This allows us to fit a 12 m deck length boat onto the hull bottom from a vessel with much greater measured length, thus significantly improving efficiency and seakeeping. The warped planing hull provides greater stability at rest and improved efficiency at cruising

speeds over the competitors. We have seen improvements in maximum speed over the competition in the region of 18%!

The platform has been designed to be a multi-purpose patrol vessel which can operate in extreme conditions. The foam-cored epoxy composite structure is approved to DNV 1A HSLC R2 Patrol (S) and achieves a single-compartment subdivision standard, without the need for flotation foam, so that if any one compartment should flood, the vessel will stay afloat. Weight savings of around 15% are realised compared with aluminium vessels in this class.

To date we have delivered vessels to the Queensland Police Service (QPS), pictured, with triple Yamaha 425 outboards, the Great Barrier Reef Marine Park Authority with two Yamaha 425 outboards, and the NSW Police Force with diesel Volvo IPS drives. A further two vessels are in construction for the NSW Police Force.



Norman R. Wright's 12 m patrol boat for the Queensland Police Service on trials
(Photo courtesy Norman R. Wright & Sons)



The main cabin of the new 12 m patrol boat
(Photo courtesy Norman R. Wright & Sons)

Optional features which have already been delivered to clients include:

- Continuous safety rail with harnesses
- 2 t towing post
- Gyro stabilisation.
- Tender with davit
- Lifting swim platform

The platform is designed to be fully customisable and can have an accommodation level exceeding 72 hours if required and range of up to 400 n miles at cruising speeds. Typical use cases for the 12 m XLW Class are police, fire and rescue, marine parks, fast interceptor, and dive operations.



The forward cabin of the new 12 m patrol boat
(Photo courtesy Norman R. Wright & Sons)



The helm position in the new 12 m patrol boat
(Photo courtesy Norman R. Wright & Sons)

Principal Particulars of the 12 m XLW Patrol Boat for QPS are

Length OA	14.09 m
Length WL	11.04 m
Beam	3.74 m
Draft	0.62 m (engines raised)
Displacement	10.6 t (fully loaded)
Fuel	1700 L
Seating	2 × suspension, 8 bench seats
Berths	4
Crew	2
Personnel	8
Galley	Sink, microwave, fridge/freezer
Main Engines	3×Yamaha F425 XTO, 425hp petrol outboards
Genset	Westerbeke 6.2 kW, petrol
Survey	NSCV Class 2C
Construction	FRP cored composite, epoxy, carbon/E-glass
Speed	50+ kn, fully loaded 30 kn, cruise

Adam Evripidou

Miss Outre-Mer from Incat Crowther

A new 36 m custom-built passenger ferry has been delivered to Guadeloupe-based operator CTM Deher by Incat Crowther. The new ferry, named *Miss Outre-Mer*, was designed using Incat Crowther’s digital shipbuilding process. The process saw CTM Deher and Incat Crowther work closely together to deliver the complete digital ship design before physical construction began at PT Kim Seah Shipyard in Batam, Indonesia. In addition to the design aspects, Incat Crowther supported the operator with shipbuilder selection, commercial framework and due diligence, interior design, and construction oversight of the project.

The new 316 seat passenger ferry has been designed to safely and efficiently service CTM Deher’s passenger and tourism routes in the French West Indies and began operating in late 2023.

With a strong focus on elevating the customer experience, *Miss Outre-Mer*’s main and upper decks are connected by a large midship staircase. The main deck seats 221 passengers and provides space for four wheelchairs while featuring a kiosk, TV screens and wi-fi for entertainment, as well as six bathrooms. The upper deck can transport up to 143 passengers, including 48 people in exterior seats.

Designed to service the busy tourist route between Trois-Rivières and Les Saintes in Guadeloupe, the vessel has several large cargo and luggage racks. Overhead gantries have also been installed to assist with the movement of large, heavy luggage trolleys.

The elevated wheelhouse on the upper deck provides the vessel’s crew with good visibility in all conditions.

Capable of reaching speeds of up to 28 kn, *Miss Outre-Mer* is powered by twin MTU 12V4000 main engines and will have a service speed of 25 kn. Ever pushing to improve its service, CTM Deher has opted for Humphree HLS stabilisers to enhance comfort, which is of great importance to the customer experience on these routes.



Port side of *Miss Outre-Mer*
(Photo courtesy Incat Crowther)

Incat Crowther listened carefully to CTM Deher’s specific needs in terms of its operations, and was able to translate these into a design which met the expectations of the company’s customers. Antoine Deher from CTM Deher said that Incat Crowther’s collaborative design process was an important aspect of the successful delivery of *Miss Outre-Mer*. “The delivery of *Miss Outre-Mer* is an important milestone for our company, and Incat Crowther’s digital shipbuilding process meant that we were able to provide



Miss Outre-Mer on passage in Guadeloupe
(Photo courtesy Incat Crowther)

our input and work with Incat Crowther’s team of naval architects every step of the way,” said Mr Deher.

“*Miss Outre-Mer* will provide our guests with an unrivalled customer experience. The vessel has been tailored completely to our needs and high standards, and will allow us to expand our service offering during the busy peak tourist season,” said Mr Deher.

Incat Crowther’s CEO, Brett Crowther, said “Our digital shipbuilding solution brings the digital design, build and delivery stages of a ship build into one cohesive process from conception through to final delivery. In delivering *Miss Outre-Mer*, this included Incat Crowther providing an assigned representative on site at PT Kim Seah Shipyard in Indonesia to oversee the construction of this vessel,” said Mr Crowther.

Principal particulars of *Miss Outre-Mer* are

Length OA	36.0 m
Length WL	36.0 m
Beam OA	9.80 m
Depth	3.40 m
Draft (hull)	1.50 m
Passengers	316
Crew	6
Fuel oil	10 000 L (day tanks) 15 000 L (long-range tanks)
Fresh water	2500 L
Sullage	1000 L
Main engines	2×MTU 12V4000 M53 each 1380 kW @ 1800 rpm
Propulsion	2×propellers
Speed (cruising)	25 kn
(maximum)	28 kn
Construction	Marine-grade aluminium
Flag	Guadeloupe (French flag)
Class/Survey	I ✕ HULL ✕ MACH, HSC Category A, Sea Area 2



Port bow of *Miss Outre-Mer*
(Photo courtesy Incat Crowther)



Port quarter of *Miss Outre-Mer*
(Photo courtesy Incat Crowther)

32 m Catamaran Passenger Ferry from Incat Crowther

Incat Crowther is partnering with Gulf Craft LLC in Franklin, Louisiana, to design and deliver a new USCG Subchapter-K approved, 32 m catamaran passenger ferry for the government of the US Virgin Islands. Construction of the new ferry began in November 2023.

The new ferry will service the busy tourist and commuter

route between Red Hook on the island of St Thomas, and Cruz Bay on the island of St John. Currently, two other Incat Crowther-designed 28 m vessels service this route.

The simple yet stylish new ferry has been designed with accessibility and an elevated customer experience in mind and will be capable of transporting up to 300 passengers at speeds of up to 28 kn. The vessel will also be fitted with the latest diesel engine emission-control technologies in compliance with EPA Tier 4.

The air-conditioned main cabin provides seating for up to 202 passengers, including five dedicated wheelchair-accessible spaces. Two ADA-compliant bathrooms and a fully-enclosed luggage room are also provided on the main-deck level, along with integrated side boarding ramps for a safe and efficient boarding experience.

The vessel's upper deck will transport up to 100 passengers in spacious outdoor seating, while the vessel's wheelhouse provides the captain with an excellent line-of-sight and 360 degree visibility. Wing helm stations are also provided for the captain to ensure safe docking of the vessel.



Starboard bow of 32 m passage ferry for US Virgin Islands (Image courtesy Incat Crowther)



Starboard quarter of 32 m passage ferry for US Virgin Islands (Image courtesy Incat Crowther)

Commenting on the project, Incat Crowther USA's Managing Director, Grant Pecoraro, said that the commissioning of the new ferry adds to Incat Crowther's growing footprint in the Caribbean. "Incat Crowther has a proven track record of designing and delivering tailored passenger ferries for operators throughout the Caribbean. We are pleased to be collaborating with our longstanding partner, Gulf Craft, to

deliver another vessel to this region," said Mr Pecoraro.

"Our team of naval architects understands that no two routes are the same. Our digital shipbuilding process enables us to carefully focus on specific operational requirements to ensure that our designs are tailored specifically for local conditions, existing dockside infrastructure and with the operator and its customers in mind. It is evident that the two existing Incat Crowther ferries which have been successfully servicing this route for over a decade provided confidence to the US Virgin Island Government to again select an Incat Crowther vessel to service the local community in the future," said Mr Pecoraro.

Principal particulars of the new vessel are

Length OA	31.8 m
Length WL	30.7 m
Beam OA	8.53 m
Depth	2.99 m
Draft (hull)	1.42 m
Passengers	300 including 5 wheelchair spaces
Crew	5
Fuel oil	7570 L
Fresh water	1892 L
Sullage	1892 L
Urea	1514 L
Main engines	2×CAT C32 ACERT EPA Tier 4, each 895 kW
Propulsion	2×fixed-pitch propellers
Generators	2×65 ekW
Speed (service)	24 kn
(maximum)	28 kn
Construction	Marine-grade aluminium
Flag	USA
Class/Survey	USCG Subchapter K

First Two of Five 30 m CTVs from Incat Crowther

The number of Incat Crowther-designed crew transfer vessels (CTVs) servicing the global offshore wind industry continues to grow with the delivery of two new 30 m CTVs to WINDEA CTV, a US-based joint venture owned by MidOcean Wind LLC and Hornblower Wind LLC. The new BV-classed vessels, *WINDEA Intrepid* and *WINDEA Courageous*, are the largest newbuild CTVs delivered to the offshore wind industry in the US to date.

WINDEA Intrepid, built by Louisiana-based shipyard Gulf Craft LLC, and *WINDEA Courageous*, built by St Johns Ship Building in Florida, are the first of five identical CTVs Incat Crowther is designing for WINDEA CTV. The third and fourth vessels in the series are under construction at St Johns Ship Building, and construction of the fifth vessel is well underway at Breaux Brothers in Louisiana.

The USCG Subchapter L-certified CTVs are capable of transporting 24 technicians in the safety and comfort of a resiliently-mounted superstructure. In addition to spacious seating, the main deck level of the superstructure features a large galley and mess area, two bathrooms and dedicated internal storage space.

The upper-deck level of the vessels feature a large elevated wheelhouse, as well as two single cabins, two double cabins



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and three bathrooms for up to six crew. A large, 100 m² forward deck and a 35 m² aft deck provide ample space for carriage of cargo to offshore wind installations. Each vessel has the capability of transporting a deadweight of 50 t. Powered by four Volvo D13 marine diesel engines with a quad Volvo IPS system, each vessel is also future-proofed and ready for the retrofit of the Volvo parallel hybrid system. Transfer capability is enhanced by the Incat Crowther resilient-bow technology which reduces impact forces applied to wind turbine boat landings.

Commenting on the delivery of the two new CTVs, Incat Crowther's US Managing Director, Grant Pecoraro, said that the global digital shipbuilder was perfectly placed to service the rapidly-developing offshore wind sector in the US.

"The delivery of these two new CTVs builds on Incat Crowther's proven track record of designing state-of-the-art operationally-efficient and flexible CTVs for operators servicing the expanding global offshore wind industry.



Starboard side of *Windea intrepid*
(Photo courtesy Incat Crowther)

The design and construction of these 30 m CTVs has been a collaborative effort with MidOcean Wind and the respective builders, ensuring that the design is tailored specifically to meet the unique set of domestic regulations in the US. We are incredibly grateful that MidOcean Wind entrusted Incat Crowther to design this new fleet of vessels, and we are pleased that vessel performance has exceeded the contractual requirements," said Mr Pecoraro.

Principal particulars of the new vessels are

Length OA	30.0 m
Length WL	27.9 m
Beam OA	10.0 m
Depth	4.35 m
Draft (hull)	1.40 m
Personnel	24
Crew	6
Fuel oil	36 000 L
Fresh water	3500 L
Sullage	2500 L
Deadweight	50 t
Main engines	4×VOLVO D13 each 515 kW @ 2250 rpm
Propulsion	4×VOLVO IPS
Generators	2×Kohler 40EKOZD
Speed (service)	25 kn
(maximum)	27 kn
Construction	Marine-grade aluminium
Flag	USA
Class/Survey	BV and USCG Subchapter L

34 m Passenger Ferry from Incat Crowther

Incat Crowther has been commissioned by US shipbuilder Gladding-Hearn Shipbuilding, Duclos Corporation, to design a new 300 passenger high-speed catamaran for US operator Yankee Freedom. The new vessel, *Yankee Freedom IV*, will replace the 250 passenger *Yankee Freedom III*, which was also designed by Incat Crowther. Like its predecessor, *Yankee Freedom IV* will provide service on the 70 n mile route between Key West in Florida and the Dry Tortugas National Park.

The commissioning of *Yankee Freedom IV* reinforces Incat Crowther's position as one of the most trusted passenger ferry designers in North America. When construction is complete, *Yankee Freedom IV* will join the more than 130 Incat Crowther-designed and US-built passenger ferries now in operation in the region.

The vessel's main deck will transport up to 130 passengers and will feature tables as well as a snack bar with an attached storage room, and an audio-visual passenger information centre. The aft main deck will feature an open, covered area for passengers as well as a shower area and stowage for kayaks and camping gear. Passengers will be able to enjoy sweeping views while on board via a passenger viewing area on the open bow deck.

Yankee Freedom IV's second deck will feature enclosed seating and tables for 60 passengers, as well as exterior seating for 72 passengers. Seating for an additional 40 passengers will be located on the open-air upper deck.

In a bid to further reduce the vessel's environmental footprint beyond EPA standards, *Yankee Freedom IV* will be fitted with exhaust-gas treatment for its generating sets, solar panels, energy-efficient LED lighting and a zero-discharge black and grey water system. In addition, heavy-metal-free bottom paint and zero-VOC vinyl marine film will be used on the exterior instead of paint.

Yankee Freedom IV will be capable of reaching a top speed of 28 kn and will be powered by a pair of MTU 12V4000M65R EPA Tier 4-compliant diesel engines.



Starboard bow of *Yankee Freedom IV*
(Photo courtesy Incat Crowther)

Commenting on the project, Grant Pecoraro, Incat Crowther's US Managing Director, said "We are thrilled to have this opportunity to work with Gladding Hearn and Yankee Freedom on this exciting project. They are both wonderful organisations and it is our pleasure to collaborate with them to bring this new vessel into service. We are

grateful for the confidence they have in Incat Crowther to be their design partner once again."

Delivery of *Yankee Freedom IV* is expected to take place in 2026.

Principal particulars of *Yankee Freedom IV* are

Length OA	34.3 m
Length WL	33.7 m
Beam OA	9.65 m
Depth	3.80 m
Draft (hull)	1.60 m
Passengers	300
Crew	6
Fuel oil	9460 L
Fresh water	3030 L
Sullage	3800 L
Urea	1514 L
Main engines	2×MTU 12V-4000M65R each 1491 kW
Propulsion	2×fixed-pitch propellers
Generators	2×John Deere
Speed (service)	26 kn
(maximum)	28 kn
Construction	Marine-grade aluminium
Flag	USA
Class/Survey	USCG Subchapter K



Starboard quarter of *Yankee Freedom IV*
(Photo courtesy Incat Crowther)

39 m Passenger Ferries from Incat Crowther

Singapore's Majestic Fast Ferry has commissioned Incat Crowther to design a new second-generation 39 m passenger ferry as the basis of its future fleet.

Incat Crowther's range with PT Cahaya Samudra covers four vessel lengths; 29 m, 32 m, 39 m and 42 . All four designs are now already in their second generation, having proven themselves in service worldwide.

Eleven of Majestic's first-generation Incat Crowther/PT Cahaya Samudra vessels have been sold to operators in Europe, Asia, the Middle East and the South Pacific, and have been replaced in service by second-generation vessels.

The order brings the number of second-generation Incat Crowther-designed and PT Cahaya Samudra-built 39 m vessels to 13, and comes in addition to three second-generation 42 m vessels launched less than 12 months ago.

Once the new fleet of second-generation 39 m passenger ferries is finalised, there will be over forty vessels designed



Majestic Peace, a new 35 m passenger ferry for Majestic Fast Ferry
(Photo courtesy Incat Crowther)

and delivered by Incat Crowther and PT Cahaya Samudra in service worldwide.

The second-generation 39 m vessels can transport up to 312 passengers at a speed of 32 kn and feature a range of design improvements which build on the proven capabilities of the first-generation ferries. The design of the vessel has been optimised to provide fuel efficiency gains for operators, while the customer experience has been enhanced via a sleek design, featuring updated window aesthetics, the addition of a centre aisle and increased passenger seating spaces.

Commenting on the commissioning of the new fleet, Incat Crowther’s CEO, Brett Crowther, said that it reaffirmed confidence in the second-generation Incat Crowther ferries, while the demand for the first-generation vessels on the used market proves that the vessels are a smart investment for operators around the world. “With over forty first- or second-generation Incat Crowther passenger ferries now either under construction or in operation around the world, this range of Incat Crowther passenger ferries has proven operational capabilities and longevity for operators,” said Mr Crowther. “The fact that Majestic could confidently sell its fleet of first-generation Incat Crowther ferries to allow it to invest in a larger replacement fleet, proves that this class of ferry can be a sound, strategic investment for operators. Not only do these vessels form a reliable fleet, but Incat Crowther’s team of naval architects also works closely with operators to tailor each vessel to their unique customer and operational requirements. These ferries have proven to be operationally efficient, while also holding their value on the used market,” said Mr Crowther.

Principal particulars of the new 39 m vessels are

Length OA	39.0 m
Length WL	38.7 m
Beam OA	10.0 m

Depth	3.25 m
Draft (hull)	1.16 m
Passengers	312
Crew	8
Fuel Oil	10 000 L
Fresh water	4000 L
Sewage	1000 L
Main engines	2×MTU 16V2000 M72 each 1439 kW @ 2250 rpm
Propulsion	2×fixed-pitch propellers
Generators	2×Perkins 6TWGM
Speed (service)	28 kn
(maximum)	32 kn
Construction	Marine-grade aluminium
Flag	Singapore
Class/Survey	BV 1 <input checked="" type="checkbox"/> Hull <input checked="" type="checkbox"/> Mach Passenger
Vessel Coastal	

Stewart Marler

Cruising in NSW

The summer cruise season has moved into high gear, with visits to Sydney in late November by *Brilliance of the Seas*, *Pacific Adventure*, *Royal Princess*, *Majestic Princess*, *Carnival Splendor*, *Coral Princess*, and *Ovation of the Seas*.

December saw return visits by most of these vessels and added visits by *Resilient Lady*, *Viking Orion*, *Seabourn Odyssey*, *Celebrity Edge*, *Noordam*, *Silver Whisper*, *Disney Wonder*, *Crystal Symphony*, *Star Breeze*, *Silver Muse*, *Regatta*, *Seven Seas Explorer*, *Norwegian Spirit*, *Azamara journey* and *AIDA Sol*. January saw return visits and added visits by *Seven Seas Navigator*, *Europa*, *Queen Elizabeth* and *Vasco da Gama*, and early February saw return visits and added visits by *Island Princess*, and *Viking Sky*.

The number of scheduled cruise-vessel visits to Sydney is now back at pre-pandemic level.



Resilient Lady at the Overseas Passenger Terminal in Sydney on 6 December 2023
(Photo John Jeremy)

Cruise vessels operating out of Sydney and Melbourne have continued to call at Eden, NSW, with vessels berthing at the Cruise Ship Wharf and passengers going ashore to visit local sights, shops and museums.

Azamara Journey (three times), *Brilliance of the Seas*, *Coral Princess*, *Crystal Symphony*, *Disney Wonder* (three times), *Europa*, *Majestic Princess*, *Norwegian Spirit* (five times), *Ovation of the Seas*, *Queen Elizabeth* (twice), *Seabourn*

Odyssey (twice), *Silver Muse* (twice), *Silver Whisper* (three times), *Star Breeze*, *Vasco da Gama* and *Viking Sky* all visited between mid-November and mid-February.

The number of scheduled cruise-vessel visits to Eden now far exceeds the pre-pandemic level (mainly due to completion of the Cruise Ship Wharf).

Phil Helmore



Queen Elizabeth berthed at the Eden Cruise Ship Wharf on 14 January
(Photo courtesy Robert Whiter)

Limited Meaning: Misunderstanding the Role of Class Org

Dr Kenneth W. Fisher¹

Publication Note

Two of the sections of this paper, slightly edited, were published by SNAME in the October 2023 issue of (*mt*) Marine Technology at Pages 57–61. The two sections are *Limited Significance of Classification Certificates* and *Lesson of the MV MOL Comfort*.²

Abstract

Misunderstandings of the roles, capabilities, standards, and procedures of ship classification organisations have contributed to physical casualties, financial losses, and loss of life of shipboard personnel. The purpose of this paper is to shine light on the actual roles of classification organisations and thereby assist the marine industry in understanding why unchallenged reliance on classification standards and assessments may not be suitable in certain instances.

Introduction

Structural failures of ships, while infrequent, are of great concern due to the impact on personnel, environment and contamination of the seas, as well as the financial consequences. Each failure, whether a complete loss or a limited-damage scenario, presents an opportunity to learn from it by thorough post-casualty analyses. A major factor in the design of ships is the set of rules, standards and procedures which are prescribed by the classification organisation which is involved in the ship construction, ship modification or ship repair project.

The role of a project’s involved classification organisation has an historical basis. Namely, classification for commercial ships is primarily due to marine insurance requirements. The marine insurance industry generally does not provide hull and machinery insurance unless an independent agency—not the shipowner or shipbuilder—assesses the design and construction to be worthy of the insurance risk being undertaken by the marine insurers. This was the starting point for the development of classification organisations, starting in 1760 (that is not a typo, yes, 1760).

Gradually, multiple classification organisations developed worldwide. Each one established its own set of rules, standards, and procedures which it would use to measure and assess the suitability of the design and construction of vessels. Knowing that those rules and standards would be used to assess the insurability of the vessels, designers and shipbuilders used conformance to those classification standards as their targets in the design and construction. Generally, designers, shipbuilders and shipowners understood that achievement of those classification standards would be sufficient to ensure reasonable performance during the life of the vessel.

In many instances, reliance on that understanding of the sufficiency of those classification standards has been inappropriate. It was a misunderstanding. There are multiple factors which have contributed to those misunderstandings of the roles, responsibilities, obligations and sufficiency of the standards and assessments produced by the classification organisation.

However, the actual commitments of the classification organisations are not as generally perceived. Compliance with classification standards does not guarantee that the ship is tight, staunch, strong, or seaworthy. Rather, the actual commitments of the classification organisation are found in the contracts between the classification organisations and their clients.

Accordingly, the purpose of this paper is to shine light on the actual roles of classification organisations and thereby assist the marine industry in understanding why any unchallenged reliance on classification standards and assessments may not be suitable in certain instances.

The Role of Classification Organisations

As of this writing in 2023, there are eleven (11) major widely-used and recognised classification organisations (“class orgs”), in addition to several lesser-used ones. These eleven, in order of their founding dates, are listed in Table 1. Together they constitute the International Association of Classification Societies (IACS).

Table 1 International Association of Classification Societies

Lloyd’s Register	1760
Bureau Veritas	1828
Registro Italiano Navale	1861
American Breaud of Shipping	1862
Det Norske Veritas*	1864
Nippon Kaiji Kyokai	1899
Polish Register of Shipping	1936
Croatian Register of Shipping	1949
China Register of Shipping	1956
Korean Register of Shipping	1960
Indian Register of Shipping	1975
* DNV merged with Germanischer Lloyd in 2013	

1 Dr. Kenneth W. Fisher, FRINA, LMSNAME, Managing Director, Fisher Maritime LLC, Derry, New Hampshire, USA, <kfisher@fisher-maritime.com>.

2 Space limitations in (*mt*) required the omission of the other sections of this paper.

Lloyd's Register

Lloyd's Register, the oldest known class org, describes its founding in 1760 and its purpose in its own publication (Lloyd's Register, 2023).

To turn back to 1760 is to realise just how much the world has changed since Lloyd's Register was founded. At that time the sailing ship was the only reliable and speedy form of transport and the steam engine's full potential was only just being developed. Industrialisation of the western world had not yet accelerated to encourage the widespread exploitation of natural resources such as oil and gas, and the nuclear and jet ages were not even envisaged. The Society for the Registry of Shipping was set up in 1760 by customers of Edward Lloyd's Coffee House in Lombard Street, London. The aim was to give merchants and underwriters recorded information on the quality of their vessels. The Register Book listed vessels rated, or classed, after the condition of their hulls and equipment had been surveyed. The subscriptions generated by the Register Book paid for the surveyors to carry out the work. This was the true beginning of classification and the Society was the world's first classification society.

Classification was, and continues to be, all about quality. Put simply, it is an assessment against defined standards of the condition of a ship either under construction or already in existence. From 1768 the Society used a 1 to indicate a ship of the highest class. From 1775 A1 was used and is now famous as a symbol of quality.

Note that the central focus of classification, as defined in that statement, is “an assessment against defined standards of the condition of the ship”. This explains why the significance of a class certificate is only that it meets the class org's own interpretation (“assessment”) of its own rules (“defined standards”). This is not a criticism of the classification process. Rather, it clearly spells out a fundamental limitation of the significance of a certificate of classification. It does not indicate an assessment that the vessel is tight, strong, staunch or seaworthy.

American Bureau of Shipping

The origins of the current form of the American Bureau of Shipping are also commercially based. The pre-1900 organisation (the American Shipmasters' Association) which evolved to become the American Bureau of Shipping had several key functions in the development of the US fleet of east-coast commercial ships, including standards for the crewing of vessels, some safety issues, and the rating of the quality and durability of ships, among other functions. The crewing and safety functions were essentially transferred to government agencies, leaving the ship design and construction assessments as the basis of its business (ABS, 2016).

Starting in 1900,

“[t]he organization [ABS] was now completely committed to ship classification and looked for ways to take its business into the future and its presence across the country—a difficult task, considering the declining state of the US Merchant Marine and competition from other classification societies. ... the newly-elected ABS President, Anton A. Raven, served only in a part-time capacity, as his predecessors had done. Most of his time was spent as President of the Atlantic Mutual Insurance Company.”

This excerpt from the ABS publication confirms two important factors. Firstly, it was a commercial-like organisation competing with other class orgs for business. As an example, to capture the Great Lakes region's market for ship classification, ABS absorbed a North American branch of Bureau Veritas in 1916. Secondly, ABS was led by insurance interests. Initially, ABS's major client was a single insurance entity. But gradually the client base was expanded to other marine-insurance organisations. This is not a criticism of ABS, but simply reflects the fact that ABS's growth was fuelled by a need to serve the marine insurance industry's requirement for an independent assessment of the design and construction of the ships it would insure.

Det Norske Veritas

A similar history of development and business relationships had also developed the foundations for class orgs in other western countries (DNV, 2023).

Det Norske Veritas (DNV) was founded as a membership organization in Oslo, Norway, in 1864. Norway's mutual marine insurance clubs banded together to establish a uniform set of rules and procedures, used in assessing the risk of underwriting individual vessels. The group aimed to provide “reliable and uniform classification and taxation of Norwegian ships”.

This excerpt from DNV, again, emphasises that the purpose of the formation of this class org was to serve the needs of the marine insurance industry. It would be done using “a uniform set of rules and procedures” developed by DNV. The foundational relationship between class orgs and marine insurers is central to understanding the role of them.

Also, illustrating the commercial-like and competitive nature of its business, DNV merged with another class org, Germanischer Lloyd, in 2013. Prior to that merger, DNV had acquired several commercial consultancies having specialist practices in the marine industry. Similarly, before the DNV–GL merger, GL had acquired commercial consultancies serving other segments of the marine industry. Similar histories of the commercial-like activities of other IACS member organizations can be cited.

Classification: A Business Organisation

Class orgs are commercial businesses; they are not government organisations. The employees of class orgs are not government employees. The revenues received by class orgs do not go into the coffers of governments. Some of the world's class orgs enjoy the non-taxing benefit of being registered as a charity or tax-free (not-for-profit) entity; but that does not alter the fact that they are commercial-like, non-governmental entities.

Class orgs are supported by the fees they are paid in accordance with the agreements or contracts they have with their clients. Class orgs have sought to increase their size and revenues by marketing themselves to owners of previously-unclassified vessels. Although the class orgs started as an adjunct to the marine insurance industry for commercial vessels, they now also regularly provide their services to government organisations. Those client government organisations include governmental owners of ferries, search-and-rescue vessels, coast guards, naval auxiliary ships, and naval combatants, among others. This has proven to be a significant addition to their annual revenues.

Further, although class orgs started as being part of the marine industry, some of them now provide classification services to land-based industrial facilities, including the non-marine oil, gas, chemical, and power-generation sectors.

This appreciation of the fundamental characteristic of class orgs as business entities, not altruistic charities or providers of government services, is not meant to be a negative characterisation. Rather, it is provided only to point out that reliance on the products (i.e. certifications) and services of class orgs do not merit uncritical acceptance but, rather, should be used with the same caution which any other commercial products and services are developed and provided.

Most importantly, those products and services should be accepted as useful only within the limits of their applicability as spelled out in the contracts between the class org and its client. Those contractual limitations of usefulness and applicability represent the class org's risk-minimisation technique—a reasonable business practice. As illustrated by examples described in this paper, those contractual limitations often mean that uncritical reliance on the class org's products and services is misplaced and can lead to a disappointing—or possibly disastrous—outcome.

Qualifications of Classification Staff

Every class org has a staff of engineers and analysts who are well educated in their respective fields. These staff often include persons holding higher degrees in specialised fields of study and analysis. The class orgs sometimes re-examine their own rules (“defined standards”) of “assessment” used to rate the quality of a ship to determine whether modification of those rules is merited. Class orgs hire naval architects, marine engineers, structural engineers, materials engineers, and persons qualified in other similarly-specialised fields which are applicable to ships (and sometimes other forms of structures).

However, the individual staff members of class orgs do not inherently possess greater skills, greater understandings, deeper insights or greater experience than do the staff members of other commercial consultancies or government agencies. Class org staff members do not inherently have skills that are not available to the staff of a commercial consultancy or a government agency.

The significance of this appreciation is that reliance on class orgs as the source of the most-appropriate analyses and detailed design decisions is not merited. Class orgs do not have all the correct answers. Class orgs have their rules which may lead to results which have not been as thoroughly developed as other entities may expect. As illustrated by the rudder stock example and the *MOL Comfort* example below, such reliance may constitute a misunderstanding which can lead to significant negative consequences.

Yacht Rudder Stocks

An example of possibly-misplaced reliance on class orgs pertains to the dimension of rudder stocks on production sailing yachts, as identified by Dr Kim Klaka (Klaka, 2020). There are three published standards which provide a methodology for determining an appropriate diameter of a yacht's rudder stock for a specified type and grade of material (stainless steel or aluminum). The standards are published by two class orgs and ISO. For a specified vessel design, the three methodologies result in approximately the same rudder stock diameter. Such commonality of results appears to give credibility to each of them.

However, historically, the rudder stocks incorporated into such yachts have experienced a high failure rate, as described by Klaka (2020). It is noted that rudder-stock failures occur on “close to 1%” of all ocean crossings (Casey, 2017). The 1998 Sydney–Hobart race had a 2% rudder failure (CYCA, 1999). Also, 6% of the yachts in the 1979 Fastnet race experienced rudder failures (Forbes *et al.*, 1979).

These constitute a significant failure rate, yet the methodologies used to determine the size of the yacht rudder stocks appear to be relied upon because they are published by class orgs and ISO. The 2020 analysis by Klaka proposed a modification to the methodologies, in which different fundamental assumptions about possible boat speed (when coming down off a large wave), and a particular force coefficient, merit re-examination. In other words, designers of rudder stocks for those yachts have relied on possibly-misleading design criteria simply because those criteria are published by class orgs and ISO.

That is, because those standards are published by those organisations, they have been assumed to have adequate credibility, leading the yacht-designing naval architects to not undertake their own, independent analyses, as Dr Klaka has done. Notably, the actual number of experienced rudder failures appears to indicate that those methodologies result in

misleadingly-insufficient results.

As noted previously, the engineers and analysts employed by class orgs do not inherently possess greater insights, more advanced methods, or deeper understandings of the science of naval architecture than any other equally-educated and qualified naval architects. Reliance on a class org's standards and rules is misplaced if such reliance is based on a fundamental misunderstanding which ascribes to classification's engineers and analysts greater capabilities than other qualified engineers and analysts. Apparently, just because classification advocates a methodology, does not guarantee that it is correct or appropriate.

Limited Significance of Classification Certificates

Assumptions regarding the nature and extent of obligations which arise from the issuance of certificates of classification are, more likely than not, misunderstandings. The misunderstandings are not those of class orgs. They are misunderstandings of other parties involved in the ownership, construction and maintenance of ships. The conclusions drawn from the following *Sundancer* example are far from unique to this case.

Sundancer foundered after striking rocks soon after it was converted from being a North Sea ferry to become a cruise ship. The immediate extent of damage was within the allowable floodable length, meaning that the water ingress should not have resulted in complete sinking. However, as described below, the vessel subsequently experienced progressive flooding into other compartments. As seen in Figure 1, the vessel sank onto the seabed by a pier due to insufficient watertight integrity which was not noticed by the class org that had issued a certificate of classification and had issued a certificate



Figure 1: *Sundancer* at Roberts Bank, BC, Canada in July 1984
(Photo courtesy Campbell River Museum)

of compliance with applicable SOLAS regulations.

The following indented sections are the words of the US Court of Appeals (Court of Appeals, 1993). The order of the selected paragraphs has been modified, and references to law and prior court cases are omitted to make these excerpts serve the limited purpose of illustrating the misunderstandings arising from the role of classification.

In early 1984 Sundance purchased an overnight car ferry and converted it at a Swedish shipyard into a luxury cruise ship capable of making week-long voyages along the west coast of North America, with accommodation for over seven hundred passengers.

On 5 March 1984, Sundance formally retained ABS by executing ... an agreement denoted "Request for Classification Survey and Agreement". By that agreement, ABS was engaged to inspect the vessel to determine its compliance with ABS class rules and to perform regulatory checks on behalf of the Bahamian government in connection with the issuance of [applicable] statutory and class certificates. Classification of a vessel by ABS represents that the ship has been found structurally and mechanically fit for a particular use or service in accordance with ABS rules and standards.

ABS representatives were on site during some portions of the conversion process in the Swedish shipyard. Sundance provided ABS with many plans for the vessel, although for some reason no plans for the grey-water piping system, which channels water from the ship's showers and sinks, were ever provided. Inspections of the converted ship took place in Sweden and on board the vessel during its initial voyages.

On 14 June 1984, acting on behalf of the Bahamian government, ABS issued a five-month provisional Load Line

certificate and a SOLAS passenger ship safety certificate to the vessel. The SOLAS certificate represented, among other things, that the vessel possessed the water-tight integrity required by the SOLAS Convention. Shortly thereafter, ABS issued a provisional classification certificate to the vessel, which represented that the vessel was in compliance with ABS's rules, including rules on the watertight integrity of vessels.

On 29 June 1984, the luxury cruise ship Sundancer struck an underwater rock off the coast of British Columbia and sank.

Sundancer was a two-compartment ship, meaning that it could survive the flooding of any two of its thirteen watertight compartments. When Sundancer struck the underwater rock, its hull was breached below the waterline. While only two watertight compartments initially flooded, progressive flooding of other compartments occurred when water passed through two holes in Bulkhead 124 and through the unvalved grey-water system. As a result of the progressive flooding, the vessel listed heavily and eventually sank at a nearby pier.

The absence of valves in the grey-water system was a SOLAS violation; the two holes in Bulkhead 124 were a violation of both SOLAS and ABS's rules. Neither violation had been reported by ABS. Sundancer was declared a constructive total loss, and some passengers and crew members were injured. Fortunately, no lives were lost.

Sundance claims that the vessel would not have sunk but for ABS's (1) negligence, (2) gross negligence, (3) negligent misrepresentation, (4) breach of contract, and (5) breach of [an] implied warranty of workmanlike performance in issuing the relevant certificates ABS was paid a fee of \$85,000 under the contract. Sundance seeks actual and punitive damages totalling \$264,000,000.

Firstly, the great disparity between the fee charged (\$85,000) by ABS for its services and the damages sought by Sundance (\$264,000,000) is strong evidence that such a result was not intended by the parties. We can only conclude that the small fees charged could not have been intended to cover the risk of such liability; the ship classification industry could not continue to exist under such terms (... "fact that price [charged] is relatively small suggests that it was not intended to cover the risk of such liability").

Secondly, and probably most significantly, the shipowner, not ABS, is ultimately responsible for, and in control of, the activities aboard ship. In the case of Sundancer, for example, Sundance had full responsibility for the conversion, repairs, and maintenance of the vessel. This ongoing responsibility for the vessel is supplemented by the maritime-law requirement that the shipowner has a nondelegable duty to furnish a seaworthy vessel. ABS cannot be said to have taken over Sundance's obligations in this regard by agreeing to inspect and issue a classification certificate to Sundance.

We affirm the district court's dismissal of all of Sundance's tort and contract claims against ABS. ... In addition, Sundance did not provide any evidence that it suffered damage from ABS's issuance of the classification certificate [that would not otherwise have been encountered]; Sundance may not create a condition of unseaworthiness, exercise all control over the reconstruction and servicing of the vessel and then burden a classification society with liability that is seven hundred times that of the fee for the classification contract.

Clearly, the actions of ABS did not meet the expectations of the shipowner who retained ABS. The court determined that the actions of ABS in issuing certificates of class and SOLAS compliance were erroneous, but nevertheless did not cause the fatal progressive flooding. The actions of ABS were found to not have relieved the vessel owner of the fundamental obligation to ensure that the vessel was seaworthy. This example, among others that could be cited, reminds the marine industry that classification does not serve to relieve others of their fundamental obligations.

Moreover, the contracts between class orgs and their clients serve to define the limited purposes and objectives of the products and services provided by the class orgs. In other words, classification means only that the vessel reasonably complies with the class org's own interpretation of its own rules, and no other organisation can make such interpretations to determine whether the vessel merits being classed.

Competition: The Origin of Common Structural Rules

As noted above, class orgs are commercial institutions. Further, class orgs compete with one another. Sometimes that competitive marketing of a class org's services can lead to unexpected and possibly disastrous results. When a major corporation is in the process of enlarging its fleet, often two or more class orgs each seek to be retained as the one which will issue the new vessels' classification certificates. Class orgs will also review the entire material selection and manufacturing process of items of equipment used for ships, to allow the manufacturer to market its products as being acceptable for ship-classification purposes. This earns the class org additional fees. But first, the class org must be selected by the ship owner to be the class org for those vessels.

Historically, the rules and standards of the class orgs were not uniform. Each class org developed its own rules and standards which would minimise the risk undertaken by marine insurers for having insured against damage or loss of the vessels due to insufficient design, construction, or maintenance of the vessels.

As the size of ocean-going tankers grew in the 1970s to 1990s, the financial and environmental consequences of a vessel loss also grew, both categories of which had to be addressed by marine insurers and their client shipowners. Concurrently, to capture a larger share of the market demand for classification of tankers, the class orgs realised that they could compete in a particular manner. That form of competition focused on the total weight of steel which was determined appropriate

for those large tankers. It was appreciated that, if the steel weight of a large tanker could be reduced, the cargo-carrying capacity could be reciprocally increased. That is, for every 100 t of steel mass reduction, the ship could transport an additional 100 t of cargo, resulting in greater revenue and profit for the shipowner. Lower capital costs were also realised by the lighter ships.

As a consequence of these realisations, especially as it pertained to large tankers, some of the class orgs modified their structural rules to allow less steel mass. For example, a ship that would have, say, 24 000 t of steel under one class org's rules, might need only 23 640 t of steel under a different class org's rules—a 1.5% reduction in lightship displacement, resulting in a corresponding increase of 360 t of cargo capacity. This competitive “shaving” of steel mass had consequences. Namely, tanker owners and their marine insurers began to see disproportionately-increased vessel structural damages and losses. By the 1990s, associations of tanker owners began to consider developing their own class org that would not be competing with other class orgs to ensure that the structures of their tankers were adequately robust to reduce losses.

Faced with the possibility of losing a significant portion of their classification business, the members of IACS determined that it would be necessary to have a non-competing set of common structural rules for those large tankers. If such common structural rules were implemented, they would no longer face the possibility of losing tanker owner clients. This was accomplished by the IACS members, as noted in an IACS publication. (IACS, 2023).

On 14 December 2005, the Common Structural Rules for Double Hull Oil Tankers (CSR-OT) and Common Structural Rules for Bulk Carriers (CSR-BC) were unanimously adopted by the IACS Council, for implementation to take effect on 1 April 2006. The Council was satisfied that these Rules were based on sound technical grounds, and achieved the goals of more robust and safer ships.

These two sets of Rules were developed independently and, in order to remove variations and achieve consistency, IACS decided to harmonise these Rules. There is now a single set of Rules “Common Structural Rules for Bulk Carriers and Oil Tankers” (CSR BC & OT) comprising two parts; Part 1 gives requirements common to both Bulk Carriers and Double Hull Oil Tankers and Part 2 provides additional specialised requirements specific to either Bulk Carriers or Double Hull Oil Tankers.

In other words, that IACS publication implicitly acknowledges that the prior competition among the class orgs did not always result in adequately “robust and safer ships”. By removing variations of the structural weights amongst the class orgs, they would now “achieve consistency”, i.e, eliminate competitive weight shaving which endangered the ships. Prior to the IACS adoption of common structural rules, shipowners and their marine insurers had relied on the suitability of each class org's structural rules. But this was a significant misunderstanding which resulted in vessel structural damage and losses, environmental damage, as well as personnel losses.

However, typically, the class orgs were not held accountable for those losses, in whole or in part, because the contract between each class org and its client shipowner typically stated that the issuance of a certificate of classification meant only that the design, construction and maintenance of the vessel reasonably complied with the class org's own interpretation of its own rules, and specifically did not guarantee that the vessel was tight, staunch, strong or seaworthy.

Lesson of the MV *MOL Comfort*

The 8110 TEU container ship *MOL Comfort* was constructed in Japan, owned by a Japanese firm, but registered in the Bahamas. The ship experienced a compression and buckling at the lower midship hull while transiting the Indian Ocean in June 2015. At first, the two halves of the hull remained joined, as shown in Figure 2. Within a few days, the actions of the sea on the vessel caused the two halves to separate and subsequently sink.



Figure 2: Buckled *MOL Comfort* before separation of hull sections
(Photo from Core77 website)

Close-up photos of the side of the still-joined halves of the hull show that the main deck remained connected, but that the double bottom had buckled, allowing the ship to take the shape shown in Figure 2. Analytical reports identifying the cause of the structural failure were performed by several organisations, including ClassNK which had classed the vessel continuously since its construction five years earlier in 2008 (Class NK, 2014 and Bahamas 2020). Documentation during construction showed that the structure of *MOL Comfort* had been in accordance with the intended design, including all structural components and their welded joints.

Post-casualty investigations included examination of the structural condition of several sister ships. They were found to have experienced the commencement of buckling in their double bottoms. The several sister ships were temporarily taken out of service to have structural modifications made which would prevent such buckling from commencing or continuing.

ClassNK confirmed that the scantlings (steel thicknesses and connections) were based on anticipated vertical flexing of the hull (hogging and sagging) from hull encounters with waves. The strength and fatigue life calculations assumed that the hogging and sagging would be roughly equal, with the vessel having an at-rest position of a level keel.

This level-keel assumption proved to be erroneous. It was determined that, due to the routine method of cargo loading, the hull would normally be in a hogged condition, creating longitudinal compressive forces on the double bottom. Typical loading was with greater cargo loads fore and aft, while the majority of buoyancy was near midships. That is why the typical loading would create a hogged configuration, not a level keel, thereby increasing the longitudinal compressive stresses in the double bottom. This appears to have been an erroneous assumption by the involved class org (and possibly other class orgs, as well).

A second factor contributing to the structural failure was the determination that, as the ship proceeds through significant waves, the vessel also flexes horizontally. In fact, this phenomenon can be seen in a video tape from *MOL Excellence*, which is slightly shorter than *MOL Comfort*. In that video, a camera was secured on the aft bulkhead of the box girder just below the main deck. The box girder has no intermediate transverse bulkheads, allowing the camera to focus on the collision bulkhead about 150 m forward.³ That video clearly shows that the hull is flexing horizontally as well as vertically as the vessel proceeds through an oblique sea.

The horizontal flexing introduces alternating tension/compression stresses at the midship outboard portions of the double bottom as well as at the main deck. These horizontally-induced stresses do not necessarily occur concurrently with the vertically-induced stresses. But when they do occur concurrently, the stress levels are much higher than those arising from only vertical flexing and an assumed level keel basis. Those horizontally-induced stresses also serve to increase the number of flexes which the affected structure encounters, thereby reducing the fatigue life of the affected structure. ClassNK appears to acknowledge that these stresses from horizontal flexing were not considered when developing the rules for containership structural design.

The Japanese Governmental Committee on Large Container Ship Safety, which also included ClassNK, joined by Bahamas Maritime Authority, made recommendations to the IMO Maritime Safety Committee in 2015. The recommendations included the necessity of addressing the lateral loads (horizontal flexing) which would be experienced in addition to the consequences of vertical flexing when considering the hull girder strength.

An IACS statement responding to that June 2015 submission to the IMO Maritime Safety Committee included the following in 2015.

[The proposed revision to the standard] relates to the bi-axial stresses which would be induced by lateral loading, i.e. external pressure on the bottom shell. Most, if not all, IACS Members have for many years addressed these bi-axial stresses in their individual rules and procedures. However, to ensure that in the future all IACS Members consider this effect in a consistent way, text has been included in the new IACS Longitudinal Strength Standard for Container Ships ...

This appears to be an implicit acknowledgement that hull strength calculations made by IACS members may not have included consideration of the described bi-axial flexing of the hull girder and the residual hogging of the vessels. In other words, the rules and procedures which class orgs had been applying to proposed containership design and construction were based on an insufficient understanding of the actual conditions that would be encountered.

This description of the loss of *MOL Comfort* reinforces the previous observation regarding the analytical capabilities and engineering practices used by class orgs to develop their rules, standards, and procedures. Specifically, a class org's capabilities and practices are not superior to those achievable from other consultancies and governmental agencies. Further, reliance on such a fundamental misunderstanding as to a class org's capabilities may be a predicate to damage and/or loss of vessels and personnel. Lastly, as seen in the discussion regarding yacht rudder stocks, commonality of results from several class orgs' rules does not "prove" they are correct.

Summary of Common Misunderstandings about Classification

- (a) The benefits of the products (certificates) and services provided by a class org are limited to only those benefits which are described within the contract between a class org and its client. It is a misunderstanding of the significance of that contract to expect any other benefits.

³ The 38 minute video on *MOL Excellence*, time compressed to 2.7 minutes, shows that the hull is flexing horizontally as well as flexing vertically: <https://www.youtube.com/watch?v=rHlEXn37dVg>.

- (b) Typically, the contract between a class org and its client limits the meaning of a vessel's classification to a representation by the class org that the design, construction, and maintenance of the vessel reasonably complies with the class org's own interpretation of its own rules, standards, and procedures. It is a misunderstanding by the client of a class org to believe that the classification status assures to any extent that the vessel is tight, staunch, strong or seaworthy.
- (c) Achievement of compliance with the class org's rules, standards and procedures may be necessary to obtain marine insurance on the vessel, but such compliance is not necessarily sufficient to achieve a vessel's expected operational characteristics and long-term capabilities. It is a misunderstanding of this limitation to believe that nothing more than such minimal compliance is needed for shipowners to achieve their ownership goals.
- (d) It is a misunderstanding to believe that, by awarding a classification to a vessel, the class org has assumed any responsibility relieving the shipowner of its nondelegable duty to furnish a seaworthy vessel.
- (e) The professional qualifications and expertise of a class org's engineers and analysts are not inherently superior to those of similarly educated engineers and analysts at other consultancies and within governmental organisations. It is a misunderstanding of that lack of inherent superiority to rely on class org analyses and standards instead of those of other similarly qualified engineers and analysts.
- (f) Class orgs are simply commercial consultancies providing independent analyses of the design, construction and maintenance of vessels owned and operated by other entities. Regardless of the name or title it gives itself, a class org is only an independent consultancy. It is a misunderstanding to equate the products and services of a class org with those of a governmental agency.
- (g) Class orgs compete with one another for business, even when they are not competing on structural design matters, as in the use of the common structural rules. It is a misunderstanding to believe that each class org provides products and services that are equivalent to those provided by competing class orgs. They are no more equivalent than are mechanical components from different manufacturers.
- (h) Some class orgs provide reporting services to governmental organisations which are substitutions for the use of government surveyors and inspectors. These reporting services, effected through a contract (a.k.a. memorandum of understanding), do not replace the governmental organisation's authority to determine compliance with applicable regulations and laws. Those services are separate from the class org's normal form of classification services. It is a misunderstanding to believe that a class org can stand in the shoes of a governmental organisation when the class org is only reporting, separate from classifying per its own rules and standards.
- (i) The rules, standards and procedures used by class orgs to assess suitability for classification are not necessarily sufficient for their intended purposes. On multiple occasions, the rules, standards, and procedures used by class orgs have been found to be insufficient for a vessel to achieve the expected operational characteristics and long-term capabilities. It is a misunderstanding to believe that such rules, standards, and procedures never need to be revised, amended, changed, or replaced in order to be appropriate. This is especially relevant as new technologies are introduced into the industry, as well as when existing technologies are extended into areas which have not previously utilised those technologies. Also, this is equally relevant when new forms, shapes, and functional capabilities of vessels are being developed.
- (j) Commonality of designs which concurrently minimally satisfy the requirements of multiple class orgs does not constitute proof that the rules, standards, and procedures of those class orgs are sufficient. It is quite possible that different class orgs make the same erroneous assumptions when engaging in complex analyses. It is a misunderstanding of the limitations of analyses based on possibly-rroneous assumptions to disregard the possibility that several class orgs can be simultaneously wrong about the same subject (e.g. *MOL Comfort* and yacht rudder stocks).

References

- ABS (2016) *The History of the American Bureau of Shipping: 150th Anniversary*, American Bureau of Shipping. April. Accessed 3 May 2023 from <https://issuu.com/abs.eagle/docs/abshistory150>.
- Bahamas Maritime Authority (2015) *Report of the Investigation into the Sinking of the MOL Comfort in the Indian Ocean*, September. Accessed 8 May 2023 from <https://www.bahamasmaritime.com/wp-content/uploads/2020/10/BMA-Investigation-Report-Loss-of-the-MOL-Comfort.pdf>.
- Casey, D. (2017) Know Your Rudder, *Sail Magazine*, August. Accessed 29 April 2023 from <https://www.sailmagazine.com/diy/know-your-rudder>.
- ClassNK (2014) *Investigation Report on Structural Safety of Large Container Ships*, Nippon Kaiji Kyokai. September. Accessed 8 May 2023 from https://www.classnk.or.jp/hp/pdf/news/Investigation_Report_on_Structural_Safety_of_Large_Container_Ships_EN_ClassNK.pdf.
- Court of Appeals (1993) *Sundance Cruises vs American Bureau of Shipping*, United States Court of Appeals, Second Circuit, 7 F.3d 1077 (2d Cir. 1993).
- CYCA (1999) *Report of the 1998 Sydney Hobart Race Review Committee*, Cruising Yacht Club of Australia, May.
- DNV (2023) *The History of DNV Goes Back to 1864*, Det Norske Veritas AS. Accessed on 12 May 2023 from <https://www.dnv.com/about/in-brief/our-history.html>.

Forbes, H., Laing, M. and Myatt, J. (1979) *1979 Fastnet Race Inquiry Report*, Royal Yachting Association and Royal Ocean Racing Club, Blackmore Press, Shaftesbury, UK.

IACS (2023) *Common Structural Rules*, International Association of Classification Societies. Accessed 16 May 2023 from <https://iacs.org.uk/publications/common-structural-rules>.

Klaka, K. (2020) Why Yacht Rudders Break, *International Journal of Maritime Engineering*, Royal Institution of Naval Architects, vol 162, par A4, p.A-445.

Lloyd's Register (2023) *A Concise History of the World's First Classification Society*, Lloyd's Register of Shipping. Accessed 16 May 2023 from <https://www.lr.org> > who-we-are > brief history.

Naval Hull Surveying in the 1970s to the 1990s

Hugh Hyland

In the 1970s there were Naval Dockyards at Garden Island in Sydney and at Williamstown in Melbourne. The latter held Technical Authority over vessels such as the Type 12 frigates, the oceanographic ships, the hydrographic ships and the local support craft. The dockyard employed four surveyors. Garden Island (GID) covered the remainder—not just those ships based in Sydney but also the rest of Australia and the vessels in the Territory of Papua and New Guinea which continued for some years after independence in 1975. They employed ten surveyors, eight covering metals (steel and aluminium) with boilermaker backgrounds and two covering non-metals (timber, GRP and concrete) with shipwright backgrounds. In 1986 Williamstown was privatised and lost its surveyors, and Garden Island then covered the whole of Australia and took on an additional two surveyors. In the 1970s the Surveyors at GID were under the Superintendent Job Planning (SJP) in the Planning Division, but subsequently moved to Naval Architect Quality (NAQ) in the Technical Services Division. The other staff in NAQ were involved in tasks such as weapons alignment and air-conditioning balancing. The following describes the survey activities based in Sydney.



HMA Naval Dockyard, Garden Island Sydney, in the 1970s
(RAN Historical Collection)

When a surveyor position became vacant, the occupant(s) in one or more levels underneath would shuffle up in promotion, and the base level of Technical Assistant Grade 1 (TA1) would be filled from the most suitable applicant with a trade background. Eventual promotions could be through TA2, Technical Officer Grade 1 (TO1), TO2, to the top position of Senior Technical Officer Grade 1 (STO1).

Naval Architects were involved as follows. On graduation and appointment as a Naval Architect Class 1 they were rotated around GID, subsequently on higher duties (HDA) as a Class 2, followed by promotion to Class 3 after a minimum of three or four years. It was an unbending but unwritten rule that to be promoted to Class 3 included a requirement for at least two-year's service outside of GID. Part of this could be 18 months with the General Overseer and Superintendent of Inspection (GOSI) at Cockatoo Dockyard, qualifying as a Naval Overseer and as such being mentored and achieving recognition in ship (but not submarine) surveying and overseeing surface ships under refit. The Sydney office of GOSI at Edgecliff was also in the scheme of rotations and was responsible for overseeing the refits of timber workboats around the several small private boat-yards in Sydney Harbour, where the proprietors' shipwrights would undertake the surveys and the GOSI representative would authorise the work. Subsequent rotations through NAQ would see the Class 2 naval architect in charge of the Professional Assessment of Surveying amongst other duties. This would include an onsite examination of each significant defect (including travelling for surveys interstate) and vetting each survey report prior to release. Subsequently the Class 3 naval architect in NAQ would sign off the certificate of structural and watertight integrity for the next several years on behalf of the General Manager. Furthermore he could, and did, sentence that a ship could not proceed to sea until a critical repair was made.

Surveys were conducted during maintenance availabilities for non-urgent rectification to be actioned at the following maintenance availability, with occasional surveys whenever significant defects were found in service, e.g. reported by ship's staff, and these would also be professionally assessed by a naval architect and could even be sentenced as a "ship stopper" if serious enough. Defects which were found under survey were categorised into those new ones (growth) which must be repaired, and those which could be deferred till the next maintenance availability when they would be included in the planned work package. If a defect required a non-standard repair, either as a practical departure due to access etc., or as a modification to avoid re-occurrence, then a naval architect would conduct a professional assessment under the Technical Authority.

Towards the end of the maintenance availability the surveyors would check all the defects nominated for repair to confirm that they had indeed been rectified in an acceptable way. Any significant deviation would require a naval architect to undertake a professional assessment, whereby it could be categorised as either an interim repair or a permanent design change which would then be processed through the Drawing Office.

GID used to work within an overall budget, however in 1986 Trust Fund Accounting was introduced, which meant that vessels homeported at interstate bases thereafter had to cover all the funding of a surveyor's travel costs and salary, and this significantly constricted interstate travel for surveyors and surveys became overdue. In 1989 GID became a Government Business Enterprise and no longer held Technical Authority, but the costs and charges increased. As a result of all these changes the amount of interstate work and, hence, the surveyor numbers decreased, resulting in a growing number of overdue surveys which then saw the introduction of local contractors taking on some of the surveys. From around the turn of the century, as Garden Island staff numbers decreased, they were replaced by contractors under a new Departmental survey regime set up to address the situation. In the meantime, from about 1987 to 2000, ships homeported in WA were prevented from "falling through the cracks" by conducting progressive part-surveys by NAQ staff when occasionally funded to go to WA as well as taking the opportunity alongside GID when ships were visiting Sydney. From 1993 to 2000, comprehensive surveys were also undertaken by three of us with the experience who had transferred to WA from Sydney, and who lobbied for new formal coverage. Thereafter contractors were employed under the new survey regime and were mentored until they were fully conversant with each class of ship. Likewise mentoring was given to the survey staff of Classification Societies when ships were placed under Class from about 2000.



INDUSTRY NEWS

Babcock, Bechtel Australia and HII sign MoU to Identify Opportunities to Support Australia's Nuclear-powered Submarine Program

In an AUKUS-first collaboration, Babcock Australasia (Babcock), Bechtel Australia and HII announced in December 2023 that they had agreed to work together to identify opportunities to leverage their complementary set of skills and experience to establish and support Australia's conventionally-armed nuclear-powered submarine program and have signed a Memorandum of Understanding (MoU).

It is the first group of companies in Australia to announce that they are collaborating in this way to identify opportunities to support the required nuclear-powered submarine program from infrastructure build through to the end-of-life of the submarines.

It builds on the recent announcement that Babcock and HII have combined forces in Australia to support nuclear-powered submarine capability under the AUKUS endeavour.

The three companies will work together to identify ways in which they can help to overcome short- and long-term challenges required to deliver Australia's nuclear-powered submarines including:

- Skilled workforce development.
- Nuclear infrastructure design and build.
- Submarine defuelling and decommissioning.
- Nuclear waste and material management.

Collectively, Babcock, Bechtel Australia and HII have more than 150 years of experience supporting the UK, USA and Australian submarine fleets, as well as experience delivering complex, large infrastructure projects and critical workforce development.

Cavendish Nuclear, a wholly owned subsidiary of Babcock International Group, and Bechtel have an established track record of successfully working together at Sellafield, the UK's oldest nuclear storage facility, and through its collaboration to support infrastructure upgrade work at Babcock's Devonport site in Plymouth, UK.

Greenroom Robotics joins Patrol Boat Autonomy Trial

In November 2023 Austal Australia announced that West Australian-based Greenroom Robotics had joined the Patrol Boat Autonomy Trial, underway for Trusted Autonomous Systems and the Royal Australian Navy.

Greenroom Robotics will integrate their Uncrewed Surface Vessel (USV) control software, known as GAMA, into *Sentinel* (a decommissioned Armidale-class patrol boat) which will allow autonomous navigation, remote pilotage and control, mission planning and operations.

Austal Australia's Chief Technology Officer, Glenn Callow, said that Greenroom Robotics brings a proven and tested autonomous technology which will facilitate risk-reduction

activities, explore fleet-optimisation objectives, and enable collaborative learning opportunities.

"We're delighted to welcome Greenroom Robotics to the Patrol Boat Autonomy Trial and look forward to GAMA integrating seamlessly with the vessel's command and control systems, including Austal's proven MARINELINK technology. GAMA's specifications and capabilities align perfectly with the objectives of the trial which includes a number of risk-reduction activities, fleet-optimisation and learning objectives."

Greenroom Robotics, Chief Technology Officer, Harry Hubbert, said "GAMA is an effective autonomous maritime capability from an Australian partner, offering innovation, adaptability, and efficiency. We're thrilled to be working with Austal on the Patrol Boat Autonomy Trial and looking forward to successfully demonstrating our locally-developed technology on *Sentinel*."

The Patrol Boat Autonomy Trial (PBAT) is a collaboration between Austal, Trusted Autonomous Systems (a Defence Cooperative Research Centre) and the Royal Australian Navy Warfare Innovation Navy (WIN) Branch. The Trial aims to establish robotic, automated and autonomous elements on a patrol boat, providing a proof-of-concept demonstrator, for optionally-crewed or autonomous operations for the RAN into the future. The trial is also exploring the legal, regulatory pathways and requirements of operating an autonomous vessel at sea.



Greenroom Robotics has joined the Patrol Boat Autonomy Trial featuring *Sentinel*, the former HMAS *Maitland*, an Armidale-class patrol boat. (Photo courtesy Austal Australia)

Austal Australia MoU with Harland & Wolff Group

Austal Australia has signed a Memorandum of Understanding (MoU) with the Harland & Wolff Group to pursue shipbuilding opportunities in the United Kingdom.

The MoU, signed at the Indo Pacific 2023 Maritime Exposition in Sydney in November 2023, includes the transfer of technology, skills, and shipyard capabilities required to build the next generation of patrol vessels for the United Kingdom for maritime security agencies.

Both parties have identified opportunities in the UK market, including the Border Force vessel replacement programme, and intend to work jointly in a non-exclusive partnership on such opportunities.

Austal Ships and Birdon sign Landing Craft MoU

Austal Ships and Birdon have announced that they have signed a Memorandum of Understanding (MoU) to jointly develop defence shipbuilding capability in Western Australia to deliver the Australian Department of Defence Landing Craft (Medium) (LCM) Project.

The formation of the MoU commenced in late November 2023 when the Minister for Defence Industry, the Hon. Pat Conroy MP, announced a Heads of Agreement to establish a Strategic Shipbuilding Agreement between Austal and the Commonwealth, and named Austal as the preferred vessel constructor. Birdon was selected by the Commonwealth as the preferred designer for the LCM project.

Under the MoU Austal and Birdon have agreed to work with each other to jointly develop a costed proposal for the LCM project, along with exploring a range of other potential Defence shipbuilding opportunities.

Austal USA Expands Manufacturing Capacity

On 6 February Austal USA announced the start of design for a new manufacturing facility signifying a major expansion of the company's Mobile, AL. shipyard capability. The infrastructure expansion, which will be to the south of Austal USA's current waterfront facility, will include a new assembly building, waterfront improvements, and a new shiplift system. Start of construction on the project is planned for the northern summer of 2024.

The construction of this new building and waterfront support area, which includes a Pearlson-designed shiplift, continues the expansion which Austal USA began in March 2021 with the ground-breaking of the steel panel line. In addition to the manufacturing capacity of the new buildings, the shiplift will provide a safe and reliable system to launch ships as they are completed in the assembly buildings. The system will also enable retrieving ships and bringing them back on to the land-side facility.

Austal USA has partnered with Pearlson & Pearlson Inc., program manager and owner's representative; Kiewit Infrastructure South Co., lead for design and construction; and, Pearlson Shiplift Corporation, designer and builder of the shiplift system, to execute the project. The new assembly building will consist of three bays and enable erection of recently-awarded steel ship contracts as well as provide the flexibility to manufacture modules for submarine and other surface ship programs. The assembly building will be approximately 121 m long by 145 m wide, providing over 17 545 m² of covered manufacturing space occupying 1.8 ha.

The Pearlson-designed shiplift system will feature an articulated lifting platform approximately 136 m long by 38 m wide, capable of lifting and launching vessels in excess of 18 000 t. This capacity will facilitate the launch and docking of the US Navy Constellation-class frigates, TAGOS-25 class ocean surveillance ships, Independence-variant littoral combat ships, and the US Coast Guard Heritage-class offshore patrol cutters.

When complete, Austal USA's Mobile, AL. facility will include a 1561 m² steel panel line, two module manufacturing facilities totalling over 91 827 m² of covered manufacturing space optimised for serial production, and seven assembly bays providing over 36 730 m² of indoor erection space. In all, the Mobile facility covers some 73 ha and, when this project is complete, over 137 000 m² of indoor manufacturing space.

Contract for Two Additional Evolved Cape-class Patrol Boats for the Royal Australian Navy

Austal announced on 22 February that Austal Australia has been awarded a contract extension for the construction of two additional Evolved Cape-class Patrol Boats for the Royal Australian Navy.

The \$157 million contract follows the procurement announcement made by the Commonwealth of Australia on 23 November 2023 and brings the total number of Evolved



An impression of the expanded Austal USA facilities in Mobile, AL.
(Image courtesy Austal USA)



Two Evolved Cape-class patrol boats under construction at Austal's facility in Henderson, Western Australia (Photo courtesy Austal)

Cape-class Patrol Boats being delivered to the Navy, under the SEA1445-1 Project, to ten.

Austal's Chief Executive Officer, Paddy Gregg, reiterated the importance of the Evolved Cape-class Patrol Boats to both the Australian defence industry and the Royal Australian Navy.

"These additional Evolved Capes, designed and constructed by Austal in Henderson, Western Australia, are helping us to retain and build our sovereign, naval shipbuilding workforce and continue to engage supply-chain partners from across Australia," Mr Gregg said.

"The Evolved Capes are also enhancing the Navy's operations throughout Northern Australia, adding greater capability for maritime surveillance and border patrols, as part of the ongoing Operation Sovereign Borders mission."

The SEA1445-1 project, initially constructing six 58 m aluminium monohull patrol boats for the Royal Australian Navy from May 2020, was extended by two vessels in April 2022. The first five Evolved Cape-class Patrol Boats, *Cape Otway*, *Cape Peron*, *Cape Naturaliste*, *Cape Capricorn* and *Cape Woolamai* were delivered within an eighteen-month period, from March 2022. Following the sixth and most recent delivery, *Cape Pillar*, in October 2023, there are two Evolved Capes currently under construction.

The Evolved Cape-class Patrol Boats feature larger amenities to accommodate up to 32 people, improved quality-of-life systems and advanced sustainment intelligence systems which further enhance the Royal Australian Navy's ability to fight and win at sea. The patrol boats are utilised for a wide variety of constabulary and naval missions and play a critical role in Australia's national security, as a high-performing, reliable and effective maritime asset.

In-service support for the Cape, Evolved Cape and Guardian-class Patrol Boat fleets operated by the Australian Border Force, Royal Australian Navy and Pacific Island nations is provided by Austal Australia through dedicated service centres located in Henderson, Western Australia; Cairns, Queensland; and Darwin, Northern Territory.

Incat's Expansion Plan Backed

Incat's Expansion Plan has received a significant boost with a commitment from the Tasmanian Liberal Party.

The Tasmanian Premier, Jeremy Rockliff, visited the Incat shipyard on 28 February to announce that, if re-elected, the Tasmanian Liberals will commit \$5.25 million to support Incat's plans for future growth.

Incat's Managing Director, Craig Clifford, said that he is thrilled with the announcement.

"This significant commitment from the Tasmanian Liberals will underpin jobs growth and shows their belief in our company and our vision for the future", Mr Clifford said.

"We need to employ hundreds of more Tasmanians as we pursue our aim to make zero-emission vessels more readily available to the world and we are ready to showcase what the future of environmentally-friendly maritime transport looks like."

"Incat is in the unique position of being the only shipyard in Australia capable of building large zero-emission ships in a state which has already achieved net-zero. This is something we are extremely proud of, and the rest of the world is starting to take notice."

Incat's Chief Executive Officer, Stephen Casey, said that the company's expansion plans are already underway, and

the financial commitment from the Tasmanian Liberals will help to secure Incat's future for decades to come.

"The Incat Expansion Plan is a strategic program of recruitment, investment and process improvement focussing on workforce growth, increasing production, and expanding our production facilities with the aim to double Incat's current capacity over coming years."

"We are investing significantly into workforce growth to attract and retain the workforce we require to produce more zero-emission ships for the world market and provide opportunities to as many Tasmanians as possible. Our plan is to increase our 450 strong workforce to around 1000 over the next three years."

"We also plan on installing state-of-the-art marine recharging facilities at the shipyard to enable the charging of Incat's new builds and provide charging options for other vessels, including electric ferries, as the marine industry transitions to battery electric in the coming years."

Laser Scanning Technology Trials at Osborne Naval Shipyard

BAE Systems Australia announced in December 2023 that it had conducted successful trials at the Osborne Naval Shipyard and Henderson shipyard utilising laser scanning technology to create 3D models of pipes on the Hunter class frigate.

The week-long trials, which followed initial testing at the Line Zero—Factory of the Future facility in Adelaide's south and BAE Systems Australia's Henderson shipyard, proved the capability of the technology in a real manufacturing environment.

Working together with both production and dimensional control teams, the research and technology team identified potential efficiencies in time spent checking the quality of product produced by specialist pipe-bending equipment.

Each Hunter-class frigate requires thousands of pipes with unique dimensions and using a hand-held scanner, the pipes—of varying sizes, some up to three metres long—can be scanned and a 3D model created in as little as five minutes. The equipment, and software, are precise up to 100-200 microns.

The 3D model can be stored to create a digital twin of each individual pipe used in construction, resulting in a more accurate digital representation of the Hunter-class frigate.

The technology will not only help to streamline production processes on the Hunter program but also has the potential to support the sustainment of Australia's existing fleet of warships, with the capability to reverse engineer, produce and then replace pipes and connecting pipework.

BAE Systems Australia's Business Development and Continuous Naval Shipbuilding Director, Sharon Wilson, said "We are working with cutting-edge technology to drive as much efficiency as possible in the shipyard."

"This is yet another example of adapting commercially-available equipment, which we have tested in the open environment at Line Zero—Factory of the Future, for use in the shipyard."

Austal and Gotlandsbolaget Sign MoU to Construct a Gas Turbine Powered High-Speed Catamaran

On 16 February Austal announced that Austal and Gotlandsbolaget of Sweden have signed a Memorandum of Understanding (MoU) to develop a construction contract for the Gotland Horizon X catamaran concept, first announced in April 2023.

Gotland Horizon X is a high-speed aluminium catamaran which will utilise gas turbines in a combined cycle to transport up to 1450 passengers, cargo and vehicles between the Swedish mainland and the island of Gotland.

Under the terms of the MoU and proposed construction contract, the high-speed catamaran will be designed by Austal and constructed at the Austal Philippines shipyard.

Announcing the MoU, Austal's Chief Executive Officer, Paddy Gregg, said that Austal is ready to deliver a catamaran which is not only the largest, longest, and most technologically-advanced ferry design developed by the company, but also enabling Gotlandsbolaget to achieve their climate-neutral emissions targets.

"Gotland Horizon X is an incredibly exciting project which is going to redefine commercial ferry capabilities, with a multi-fuel and hydrogen-capable combined-cycle powerplant and a class-leading efficient hull design; leading the transition to decarbonisation of commercial ferries. .

"This MoU further strengthens our commitment to Gotlandsbolaget to deliver a high-speed catamaran which meets climate-neutral emissions targets, while also providing an exceptional customer experience for passengers."

Gotlandsbolaget's Chief Executive Officer, Håkan Johansson, said "Thanks to the developments made by our team at Gotland Tech Development in collaboration with Austal, we can now move forward in supplementing our existing fleet of larger passenger and cargo vessels with a high-speed catamaran.

"We are diligently working on producing an attractive and winning tender to maintain responsibility for operating the ferry route between Gotland and the (Swedish) mainland. We are convinced that a high-speed catamaran can significantly enhance the traffic.

"Our primary focus is on securing the route contract, but even if we are unsuccessful, the new catamaran could still play a relevant role for both us and Gotlandstrafiken. Serving Gotland and the mainland is part of our DNA, and we plan to continue to do so," Mr Johansson added.

Going forward, Austal will utilise Austal's proprietary DeepMorpher™ AI technology to further develop and finalise an energy-efficient hull which minimises energy requirements and optimises seakeeping.

Through ongoing collaboration between Austal, Gotland Tech Development and supply-chain partners, the design team is continuing to confirm and optimise various attributes of the vessel, including power, load capacity, and speed.

The introduction of this multi-fuel low-emission powered catamaran is a vital component in achieving Gotlandsbolaget's goal of climate-neutral crossings between Gotland and the mainland by 2045, at the latest.

US Navy Announces the Launching of USV *Vanguard*

The US Navy's newest Overlord Unmanned Surface Vessel *Vanguard* (OUSV3), was recently launched from Austal USA's shipyard in Mobile, Alabama. *Vanguard* is the first USV for the US Navy purpose-built for autonomous operations from the keel up.

Vanguard is being jointly developed by a team led by Austal USA and L3Harris. Once outfitting and testing is completed, *Vanguard* will autonomously transit to San Diego, joining sister ships, OUSV2 *Ranger* and OUSV4 *Mariner*, as part of the Navy's USV Division 1. USVDIV 1 is the Surface Navy organisation responsible for the experimentation and tactical development of USVs. The unit also operates two additional USVs, *Sea Hunter* and *Seahawk*, which were developed separately from the Overlord program.

"We are excited to see the progress which the L3Harris and Austal teams are making on the construction of *Vanguard*," said CAPT Scot Searles, Program Manager of the Unmanned Maritime Systems (PMS 406) program office. "Designed and built as a USV from the beginning, *Vanguard* will bring new built-in capabilities which our previous OUSVs did not possess."

The Overlord program is managed by the US Navy's Program Executive Office for Unmanned and Small Combatants (PEO USC) and executed by PMS 406. The Overlord program has played a critical role in jumpstarting the Navy's experimentation with USVs and accelerating fleet knowledge and experience in using USVs in operations. The knowledge gained from Overlord plays an important role in the development and refining of requirements for the US Navy's future Large USV program.

Wärtsilä Introduces Four Methanol Engines

Wärtsilä will introduce another four methanol engines to its portfolio, setting a new industry benchmark with the broadest methanol engine portfolio currently on the market. In addition to the Wärtsilä 32 methanol engine launched in 2022, Wärtsilä will add the Wärtsilä 20, Wärtsilä 31, Wärtsilä 46F and Wärtsilä 46TS to its portfolio of engines capable of operating with methanol fuel.

Methanol is one of the primary alternative fuel choices for the shipping industry to achieve net-zero carbon emissions by 2050. For example, 'green' methanol can be produced using renewable energy sources and carbon-capture technology, making it a sustainable and carbon-neutral option. It can also be rather easily integrated into existing shipping operations as it can be stored and transported using the existing infrastructure for conventional liquid fuels.

Throughout the Wärtsilä diesel engine portfolio, covering both new engines as well as those currently in operation, Wärtsilä is developing the corresponding methanol retrofit capabilities. Methanol upgrades are either available or under development for the Wärtsilä 31, Wärtsilä 32, Wärtsilä 46F, Wärtsilä 46TS and Wärtsilä ZA40S engines. Whereas the Wärtsilä 20 engine family can be ordered with methanol combustion capabilities. By making these engines capable of running on methanol fuel, Wärtsilä has expanded its methanol offering to a wide range of vessel types across the marine industry.

"Decarbonisation is front and centre to our strategy going forward, and the development of engines capable of running on future fuels is crucial to that. Wärtsilä takes an innovative approach to supporting the marine industry's transformation to more sustainable operations,



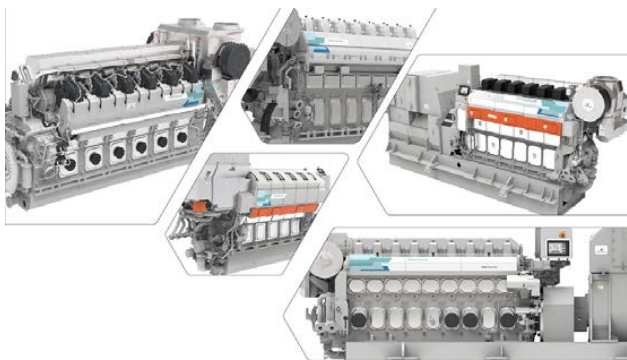
The launching at Austal USA of *Vanguard* (OUSV3), the first US Navy vessel purpose-built for autonomous operations from the keel up. *Vanguard* is being jointly developed by a team led by Austal USA and L3Harris (US Navy photograph)

and this broad range of methanol engines emphasises this,” said Roger Holm, President of Wärtsilä’s Marine Power business.

“Wärtsilä is backing its extensive experience with strong investments in developing new fuel flexible technologies and products. We recognise that it is vital for ship owners to have maximum flexibility and to keep options open as the industry navigates the uncertain pathway to net zero, and we are working hard to deliver this operational flexibility. Our track record is already very solid, and this expanded engine portfolio adds to both our accomplishments and our long-term commitment to the maritime industry,” said Stefan Nysjö, Vice President of Power Supply, Wärtsilä Marine Power.

Wärtsilä is one of the few marine engine builders with extensive experience of methanol engines, having converted the first of four engines on the ferry *Stena Germanica* in 2015. In 2022, the Wärtsilä 32 Methanol engine and MethanolPac storage-and-supply system were launched, becoming one of the first commercially-available solutions for using methanol as a fuel in the maritime industry. The Wärtsilä 32 Methanol engine has received type approval certificates from several classification societies.

The four new methanol engines will be available for deliveries at different points from 2025 onwards.



Wärtsilä will introduce another four methanol engines to its portfolio, setting a new industry benchmark with the broadest methanol engine portfolio currently on the market (Image courtesy Wärtsilä)

Wärtsilä to Supply one of Europe’s Most Advanced Simulators to new Finnish Maritime Training Facility

Wärtsilä is to supply its latest simulator technology for a new maritime training centre in Finland. The order has been placed by the South-Eastern Finland University of Applied Sciences (Xamk) and the Joint Authority of Education of Kotka-Hamina Region (Ekami). It was booked by Wärtsilä in November 2023. The simulator will be installed in Xamk’s new campus in Kotka, Finland, where part of Ekami’s maritime training will also take place in the future. The simulator will feature the latest versions of Wärtsilä’s Navi-Trainer professional and Techsim simulation software, as well as the latest Navi Sailor and NACOS Platinum bridge systems. These include multi-pilot workstations for Electronic Chart Display and Information System (ECDIS), radar and conning applications.

The training centre will have two large and three medium

sized full-mission navigational bridges with 360-degree visualisation. They include digital chart tables as well as a separate bridge wing console operated in virtual reality. For technical training, the centre will have two engine room simulators implemented with two fully-loaded control rooms. The simulators come with touchscreen technology, making it easy to swap between any of the engine room models.

“This new learning environment provides students with a unique opportunity to develop their practical skills and prepare for demanding maritime tasks. We are fortunate to have Wärtsilä’s highly-advanced simulator technology as the basis for this training. Many critical operations cannot be safely practised on an actual vessel so, in addition to acquiring technical skills, a versatile and realistically functioning simulation environment will significantly enhance the safety of vessels,” said Olli-Pekka Brunila, Director of Education, South-Eastern Finland University of Applied Sciences.

“The state-of-the-art Wärtsilä simulator system will be one of the largest and most advanced in Europe. It will enable students to obtain the most realistic level of operational experience possible in an educational environment. We are proud to be supporting Xamk and Ekami with their goal of preparing students for their future maritime careers,” commented Ola Lundqvist, Product Sales Manager, Voyage Services at Wärtsilä.



The new Wärtsilä simulator will feature the latest versions of Wärtsilä’s Navi-Trainer professional and Techsim simulation software, as well as the latest Navi Sailor and NACOS Platinum bridge systems. These include multi-pilot workstations for ECDIS, radar and conning applications (Image courtesy Wärtsilä)

In addition to the various system features, there will be several instructor and debriefing rooms capable of working with any part of the simulator. There will also be a dedicated command centre for vessel traffic service, oil-spill response, search-and-rescue, terminal cargo office, and more training applications.

Hannu Mäntymaa, Vice President for Voyage Services, Wärtsilä and Managing Director of Wärtsilä Finland added “With decarbonisation as a core focus for the industry, maritime organisations are looking for unique end-to-end solutions which enable them to optimise their vessel and port operations. This new maritime training centre from Xamk and Ekami will play an integral role in unlocking

synergies here. After all, if organisations are going to benefit from future-fuel engines, for example, crews must be highly competent, operate with the highest levels of safety and have access to continuous training programmes.”

The Wärtsilä equipment is scheduled for delivery in August 2024. Xamk is an existing customer to Wärtsilä,

Hunter Class Mast Proof-of-concept

BAE Systems Australia’s shipyard in Henderson, WA, has taken the first steps in constructing the proof-of-concept mast for the Hunter-class Frigate Program.

While the Hunter-class frigates are being built at the Osborne Naval Shipyard, BAE Systems’ Henderson team is using their decades of experience in building aluminium masts for the Anzac-class frigates—namely Anti-Ship Missile Defence (ASMD) and SEA1448 projects—to apply the latest mast manufacturing techniques for Australia’s newest class of warship.

The first steps have been taken, with the manufacture of eight different types of jigs, which are individually purpose-built constructions which support the different components of the mast throughout the manufacturing process.

Each Hunter-class frigate is made up of 22 blocks, or sections, and 21 of these will be constructed at Osborne, while the remaining one—the mast—is planned to be manufactured at Henderson and then shipped to Osborne for installation.

The mast will incorporate CEA Technologies’ CEA phased-array radar, giving the ships a world-class detection system. After completion of the jigs, the proof-of-concept mast will begin construction in early 2024, with a project team made up of design engineers, manufacturing engineers, and tradespeople from Melbourne, Osborne, and Henderson.

WinGD secures Bureau Veritas AiP for X-DF-A Ammonia Engine Safety Concept

Bureau Veritas has added its vote of confidence to Swiss marine power company WinGD’s ammonia-fuelled X-DF-A dual-fuel engine, granting an approval in principle (AiP) for the engine’s safety concept.

The safety concept describes how risks associated with using ammonia as a fuel are controlled under reasonably foreseeable abnormal conditions, as well as possible failure scenarios and their control measures. It is therefore a key element for demonstrating a safe engine room concept and the capability for safe vessel operation using ammonia as fuel.

WinGD Director Sales Volkmar Galke said “Our steady and systematic approach to the new fuel technology, coupled with collaborative efforts with esteemed partners like Bureau Veritas, reaffirms our commitment to safety, reliability, efficiency, and sustainability. This latest AiP underscores WinGD’s leadership in introducing carbon-free ammonia power to the deep-sea fleet. Teaming up with expert partners, such as BV, ensures that these cutting-edge technologies will be available well ahead of emission targets, providing operators with essential planning space and valuable hands-on experience.”

Bureau Veritas, Senior Vice President, Marine & Offshore

North Asia & China, Alex Gregg-Smith, emphasised the crucial need for trust in new technologies within the maritime industry’s ongoing evaluation of diverse transition pathways. He said “This AiP instils confidence in early adopters that, subject to careful considerations in design, build, integration, and operation, the ammonia two-stroke engine can effectively address the rising demand for sustainable solutions. BV is proud to have collaborated with WinGD on this groundbreaking development.”

The AiP comes after confirmed orders for X-DF-A in two bore sizes. The first engine to be developed, the 52-bore X52DF-A, will be available for delivery from Q1 2025 and is applicable to a range of vessels, including gas and bulk carriers. As the industry moves at an accelerated pace towards a carbon-free future, the safety concept AiP is among the necessary steps giving shipowners the assurances they need to move ahead with ammonia-fuelled vessel designs.

X-DF-A engines will operate on the diesel principle in both diesel and ammonia modes, maintaining the same rating field as WinGD’s existing X-engines

Wärtsilä signs Electrification and Integration Services Agreement for USA’s First Zero-emission High-speed Ferries Project

Wärtsilä has signed a strategic partnership agreement to provide its Fleet Electrification and Systems Integrator Services for a project to build the first zero-emission high-speed ferries in the USA. The fully-electric vessels will be built for San Francisco’s Water Emergency Transportation Authority (WETA), the operator of the San Francisco Bay Ferry system.

The project, and several others Wärtsilä will work on under this partnership, are a part of the agency’s Rapid Electric Emission-Free (REEF) Ferry Program, a phased decarbonisation of high-speed high-capacity ferry service in the San Francisco Bay. Wärtsilä’s track record with hybrid and zero-emission ferry projects, as well as its expertise acting as an integrator for the delivery of hybrid and fully-electric propulsion solutions were key factors in the company’s selection as a project partner. Wärtsilä will work within the WETA project team to finalise vessel and charging system concepts.

“We’re proud to operate the cleanest high-speed ferry fleet in the nation, but a zero-emission future for our system is within reach,” said WETA Executive Director, Seamus Murphy. “Wärtsilä’s expertise and experience will be incredibly valuable given the complexity which our ferry decarbonisation program entails.”

After completing the conceptual phase, WETA will move on to the initial construction phase of a multi-vessel programme. This phase will involve the building of three smaller ferries with a capacity of approximately 150 passengers each and two larger ferries capable of carrying at least 300 passengers. Additionally, the scope of this phase will encompass the inclusion of battery-charging floats. The construction of the first electric-powered vessel was slated to commence before the conclusion of 2023, with commercial operations expected to launch in 2025.

EDUCATION NEWS

UNSW Canberra

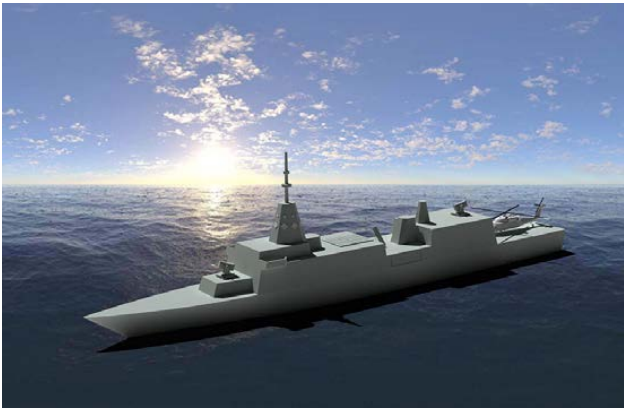
In December 2023 we celebrated the graduation of SBLT Cooper Woods and the milestone it represented as our first graduate in naval architecture. He achieved an excellent result with the award of Honours Class 1 for his degree, and he has set a high bar for those who follow him.

Two highlights were his final-year project *Platform Performance of a Hypothetical Corvette with Varying Integrated Mission Packages for Naval Operations*, sponsored by DSTG, and his final year design of a 106 m DWL Corvette/Light Frigate.

We wish Cooper well as he moves to the next phase of his career as a Marine Engineering Officer by way of the Marine Engineering Application Course at HMAS *Cerberus*.

A/Prof. Warren Smith

Naval Architecture Program Coordinator
School of Engineering and Technology
UNSW Canberra at ADFA



SBLT Cooper Woods' design of a 106 m Corvette/Light Frigate
(image courtesy Warren Smith)

Apprenticeship Surge at Incat

With Incat leading the world in the transition to zero-emission ferries, more people than ever before want to be a part of this shipbuilding revolution. Incat welcomed 15 new apprentices in January, including the highest intake of female apprentices in the company's history.

Incat's Chairman, Robert Clifford, said that it's great to have the new apprentices on board.

"It has never been a more exciting time to join the company. We are currently building the largest battery-electric zero-emission ship in the world, and we are also well advanced with our discussions for the next build as well," he said.

"We had a record number of applications for this apprenticeship intake at almost three times the amount for the same period last year. This shows that people want to be a part of our plans to revolutionise the industry by delivering more zero-emission ships more efficiently than anyone else."

"Because of our commitment to build zero-emission ships, our apprentices can undertake Clean Energy Apprenticeships and receive additional support from the Australian Government over the course of their apprenticeships."

Incat's CEO, Stephen Casey, said that plans to grow the workforce and shipyard are progressing well.

"With this latest intake of apprentices, it brings the total number of apprentices on site to 63 and we're proud to be employing more Tasmanians," he said.

"Our apprentice training program is one of the best in the world and this shows in the number of people who want to work at Incat."

The January intake of apprentices will undertake a Certificate III in Welding and Fabrication. Incat's next apprenticeship intake will be in July 2024. Incat is the largest single-site employer of trainees and apprentices in Tasmania.



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 200 dpi. A resolution of 300 dpi is preferred.

THE PROFESSION

AMSA

Survey Matters

Survey Matters is AMSA's e-Newsletter relating to domestic commercial vessel (DCV) survey and is published approximately six times per year. You can request placement on the mailing list by emailing DCV Survey <dcvsurvey@amsa.gov.au>. The e-Newsletters are now also available online at

<https://www.amsa.gov.au/news-community/newsletters#collapseArea612>

Items in the December 2024 e-Newsletter included:

- Audits and application assessments
- Compass adjustment requirements
- Unmanned barges
- Electrical components must be approved for use in Australia
- Electrical plan approval
- Operational policy for large commercial yachts operating under the National Law
- Specific exemptions
- Important notice regarding 10-year surveys for accredited marine surveyors
- AMSA586 Survey activity report and temporary operations
- Photographs provided as supporting documentation

The article on *Electrical Plan Approval* is reproduced below.

Phil Helmore

Electrical Plan Approval

AMSA has recently received several applications featuring solar charging and/or lithium-ion battery extra-low voltage (ELV) installations. These installations are deemed to be “complex ELV systems” under the National Law—Marine Surveyors Accreditation Guidance Manual (SAGM) Table 2 and require additional consideration compared to standard ELV installations.

The schematics for complex ELV installations require plan approval by a recognised organisation (RO) or an accredited marine surveyor (AMS) accredited for electrical plan approval.

Solar-array installation requires additional licensing for land-based installations. In the absence of an equivalent accreditation category for DCV installations, AMSA requires owners or builders to engage the services of a solar-array installer who is licensed in the state or territory where the vessel is located. The attending AMS must obtain an installation certificate from the installer to be used as third-party documentation to support their recommendation for survey. The installer must declare that the installation has been carried out in accordance with the approved schematics.

Installations incorporating lithium-ion batteries must be verified against the approved schematics by the attending AMS. The AMS must consider the location of lithium batteries to ensure that, in the event of a thermal runaway, there are no additional risks to onboard safety.

Survey Matters, December 2023



No; Sydney ferries are not now being run in convoy, the occasion was the ever-popular Ferrython on Australia Day
(Photo John Jeremy)

MEMBERSHIP

Australian Division Council

The Council of the Australian Division of RINA met on the afternoon of Tuesday 12 December 2023 by Zoom conference under the chairmanship of our President, Jim Black in Perth with links to Airlie Beach, Gold Coast, Sydney, Canberra, Melbourne, Hobart, Adelaide and Perth.

Among the items discussed were:

Division President for 2024–26

Council unanimously elected Prof. Jonathan Binns as President for the coming term.

Lower Secondary Brochure

Council was advised that the brochure had been printed and copies distributed to Sections and at Indo-Pacific 2023. Further copies are available from the Secretary on request.

Subscriptions Paid Through an Australian Account

Council noted that, whilst the definitive response from HQ had been that such payment was not an option, the Institution's new payments system provided more user-friendly options than previously, such as through internet bank transfer.

WARSHIP 2024, Adelaide 18–19 June 2024

Council welcomed a progress report that arrangements were proceeding well, aiming at a cap of 200 participants, keynote speakers were being approached, a pre-conference tour of the ASC shipyard was well advanced and selection of submitted abstracts would be completed before Christmas.

Details are posted on the website and the program is due to be published as we go to print.

Maritime Engineering Related Secondary Courses

Council, through the Improvement Committee, continues its work in establishing contact on this subject with state Departments of Education. The work is being led by the Improvement Committee.

This work includes national promotion of the *Subs in Schools* and *Model Solar Boat* competitions. It had been hoped that an article on the subject might be included in this issue of *The ANA* but it was not available before deadline.

Indo-Pacific 2023 Expo and IMC

Council considered a number of aspects of these events, both arguably the most successful yet, and concluded that no major changes were necessary for the next iteration in 2025.

Succession Planning

In addition to the immediate need to elect a new Vice President following the election of Jonathan Binns to the Presidency, Council noted that a number of important positions for the Division were likely to require replacement of their longstanding incumbents in coming years. As a first step in securing replacements, Council agreed to develop job descriptions for the positions of Secretary, *The ANA* editors and Council members.

Joint Board on Naval Architecture

Council received a report on the Joint Board meeting held the previous day including the following outcomes:

- RINA to assume the chair of the Board for the next two years.
- RINA to contact with EA staff regarding possible joint STEM activities.
- EA is conducting meetings of a working group on the proposed *Area of Practice in Maritime Engineering*, including naval architecture.
- Discussion of successful Indo-Pacific IMC as discussed in Item 4.4.
- Existing RINA–EA Agreement of Cooperation continues in effect with amendment on hold for the time being.

Improvement Committee

Council considered a proposal for the Committee to conduct a workshop to identify new and contemporary ways in which the RINA can be of value to its membership. While the proposal was favourably received in-principle, the Committee was asked to review it to bring the costs down to a level commensurate with the Division's resources.

Victorian/Queensland Engineer Registration

Council received a report that Queensland re-approval as an assessment entity had been issued on 8 December and that resubmission of the Victorian application was expected in the near future [*actually happened the following day*].

The draft minutes of the meeting have been circulated to Council members and are available to other members by request.

In closing this report, I would bring your attention to the fact that the Institution is a member-driven organisation and therefore need its members to actively participate in all of its forums, from Sections through the Division Council (as referred to above under *Succession Planning*) to the Council and Technical Committees of the Institution as a global body. I commend to you the President's words on this subject at the foot of his column in this issue.

Rob Gehling AO

Secretary

<rinaaustraliandivision@gmail.com>

0403 221 631

Free Papers for Members

Members should be aware that they are entitled to four free copies of RINA papers each year. This includes papers from previous transactions, conferences, etc., and is especially useful if you are interested in just one or two papers from a particular conference as you don't then need to buy a copy of the entire proceedings.

Papers published by RINA are searchable on the RINA website www.rina.org.uk; click on

Publications>Search Publications and Order.

The procedure for obtaining a free copy is to email your request to publications@rina.org.uk, with the subject line "Member's Free Paper", and specify the author(s) and year, the title of the paper, where the paper appeared (transaction year/volume, conference name and year, etc.) and, finally, your name and RINA membership number.

Free Places for Student Members at RINA Conferences

RINA also makes available two free places for Student Members of RINA at conferences organised by the Institution, including the Indo Pacific International Maritime Conferences in Sydney.

The procedure for obtaining a free student place is to email your request to the Chief Executive, Chris Boyd, at <cboyd@rina.org.uk>, and specify the conference, your name and membership number.

Changed contact Details?

Have you changed your contact details within the last three months? If so, then now would be a good time to advise RINA of the change, so that you don't miss out on any of the Head Office publications, *The Australian Naval Architect*, or Section notices.

Please advise RINA London, *and* the Australian Division, *and* your local section:

RINA London hq@rina.org.uk

Australian Division

rinaaustraliandivision@iinet.net.au

Section

ACT rinaact@gmail.com

NSW rinansw@gmail.com

Qld rinaqlddiv@gmail.com

SA/NT rinasantdiv@gmail.com

Tas tassec@rina.org.u

Vic vicsec@rina.org.uk

WA wa@rina.org.uk

Phil Helmore



THE ROYAL
INSTITUTION
OF NAVAL
ARCHITECTS

AUSTRALIAN DIVISION

NOTICE OF ANNUAL GENERAL MEETING

TUESDAY 19 MARCH 2024

Notice is hereby given that the Annual General Meeting of the Australian Division of the Royal Institution of Naval Architects will be held as a virtual meeting by Zoom at 20:00 Australian Eastern Daylight Time on Tuesday 19 March 2024.

Please register attendance or apology with the Secretary using [this link](#) (or alternatively by email to the address below, changed since last year) no later than Sunday 17 March 2024 to enable documents and Zoom meeting details to be sent to you before the meeting.

AGENDA

1. Opening
2. Apologies
3. To confirm the Minutes of the AGM held on 28 March 2023
4. To receive the President's Report
5. To receive, consider, and adopt the Financial Statements and Auditor's Report for the year ending 31 December 2023
6. Announcement of appointments to the Australian Division Council
7. Other Business

Relevant documents will be made available to registrants as they become available.

R C Gehling

Secretary

rinaaustraliandivision@gmail.com

0403 221 631)

8 February 2024

THE INTERNET

New RINA Website

The new RINA website has had a long gestation due to a number of factors, but things have happened and content is appearing.

Australian Division and Sections

These pages have been set up and are operational with all sections showing the current committee (click on the Key Contacts bar), and further content being added. You can find the new pages at

Australian Division

<https://rina.org.uk/branch/australian-division/>

NSW Section

<https://rina.org.uk/branch/new-south-wales-section/>

ACT Section

<https://rina.org.uk/branch/australian-capital-territory-section/>

Qld Section

<https://rina.org.uk/branch/queensland-section/>

Vic Section

<https://rina.org.uk/branch/victoria-section/>

Tas Section

<https://rina.org.uk/branch/tasmania-section/>

SA&NT Section

<https://rina.org.uk/branch/sa-nt-section/>

WA Section

<https://rina.org.uk/branch/western-australia-section/>

The Australian Naval Architect Archive

Members will be most pleased to know that the entire archive of issues of *The Australian Naval Architect* has been restored to the web, right back to v.1 n.1 in March 1997. You can check it all out at

<https://rina.org.uk/publications/the-australian-naval-architect-archive/>

Sections to be Able to Edit and Update own Web Pages

Sections will continue to be able to send updates for their pages to London for posting on the web as usual.

However, some sections and branches have asked for the ability to be able to update their own pages, and London has incorporated this facility in the new website. The plan is that someone in the section would undertake a short online training package on how to do the editing and updating.

There are, of course, pluses and minuses to self-updating. On the plus side, it is an incentive for sections to provide details of upcoming events and have an active website. On the minus side, it is another task for someone.

However, remember that it will be updating only, when each section site has had initial content added by London (as is being progressively done now). As I see it, updating should consist of

- (a) updating members of the section committee (now called Key Contacts), probably once per year following an AGM;
- (b) posting details of upcoming technical presentations as they occur; this could be once per month for some sections, or once every two months for others; and
- (c) posting any relevant section news, which could be summaries of technical presentations which have been held, or items such as currently published in the *RINA WA Bulletin*.

Each section can choose which method of updating it prefers.

RINA Webcasts

RINA has set up a YouTube channel and RINA webcasts can be viewed there. The RINA YouTube channel is at

https://www.youtube.com/channel/UChb1sfHbWfQmG-iwpp_QGJg

Bookmark this website and keep your eye on it!

Video recordings of Australian section presentations should be sent to Abigail Forbes and Klaudia Rogala-Haracz <marketing@rina.org.uk> at RINA HQ for uploading.

To find a recording of an Australian section presentation, click on Playlists in the menu bar. Branch and Section presentations are shown fourth from the left in the top line. Click on *View Full Playlist* to see the list which is in approximate date order, with the most-recent first. For an older presentation you may scroll down through the list; however, if you know the name of the presentation, then click in the search box at the top, type the title of the presentation you are looking for (or at least the first three words thereof) and press Enter.

No recordings of Australian section presentations appear to have been added since the November 2023 issue of *The ANA*.

Further recordings will be added to the RINA YouTube channel as they occur.

Phil Helmore



NAVAL ARCHITECTS ON THE MOVE

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

Martin Christensen has moved on from the APS and is working part-time as chaplain for the RAN and Anglican Church in Canberra while evaluating other opportunities.

Phil Christensen retired from Bentley Systems and software development/cloud services/VP reality in 2022 and now undertakes occasional advisory services in Perth.

Tobias Clarke has moved on from TC Work and, since 2019, has taken up the position of Managing Owner of Tobias Clarke Pty Ltd in Launceston, Tas.

Darren Collopy has moved on within the PMY Group and has taken up the position of Technical Director in Melbourne.

Stephen Cook has moved on from Arup and is now consulting as Stephen J. Cook in Queensland.

Andrew Cooper moved on from ThyssenKrupp Marine Systems Australia in 2017 and took up a position with Australian Maritime Technologies, where he is now Manager Naval Architecture Department in Melbourne.

Valerio Corniani has moved on within the Diab Group and has taken up the position of Vice President Asia Pacific and Managing Director ANZ in Sydney.

Patrick Couser has moved on within Bentley Systems and has taken up the position of Principal Software Engineer, Offshore Engineering Simulation, in Pau, France.

Simon Crook has moved on from Australian Maritime Technologies and, after some time at Navantia Australia, has taken up the position of SSI Solutions Specialist with SSI (ShipConstructor and Enterprise Platform) in Melbourne.

Peter Crosby has moved on within ASC and has taken up the position of Design and Integration Manager in Adelaide.

Dan Curtis has moved on from the Hydrographic Systems Support Office and has taken up the position of Principal Consultant with Bastion Defence Consulting in Tanby, Qld.

Billy Gosper has moved on from Sydney City Marine and has taken up the position of Project Engineer with engineering consultancy GHD, doing project management on major renewables projects, in Sydney.

Molly McManus has moved on within the Department of Defence and has taken up the position of Ship Structures Cell Lead which includes the Warrant Holder—Ship Structures role with Navy Engineering, Department of Defence, in Sydney.

Frank Ryan has retired from Navy Engineering, Department of Defence, in Canberra.

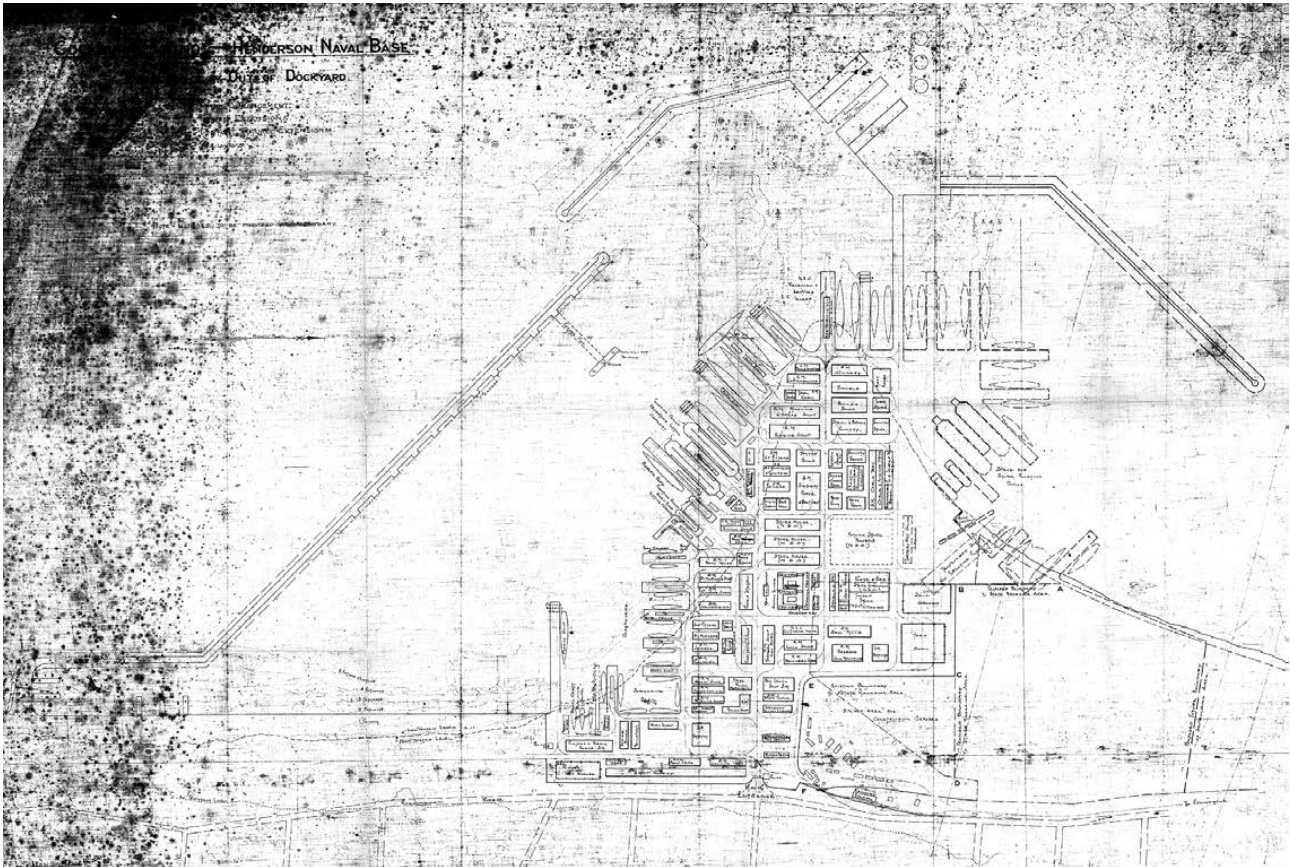
This column is intended to keep everyone (and, in particular, the friends you only see occasionally) updated on where you have moved to. It consequently relies on input from everyone. Please advise the editors when you up-anchor and move on to bigger, better or brighter things, or if you know of a move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

Phil Helmore



The start of the first race on day 2 of SailGP on Sydney Harbour on 25 February
(Photo John Jeremy)

FROM THE ARCHIVES



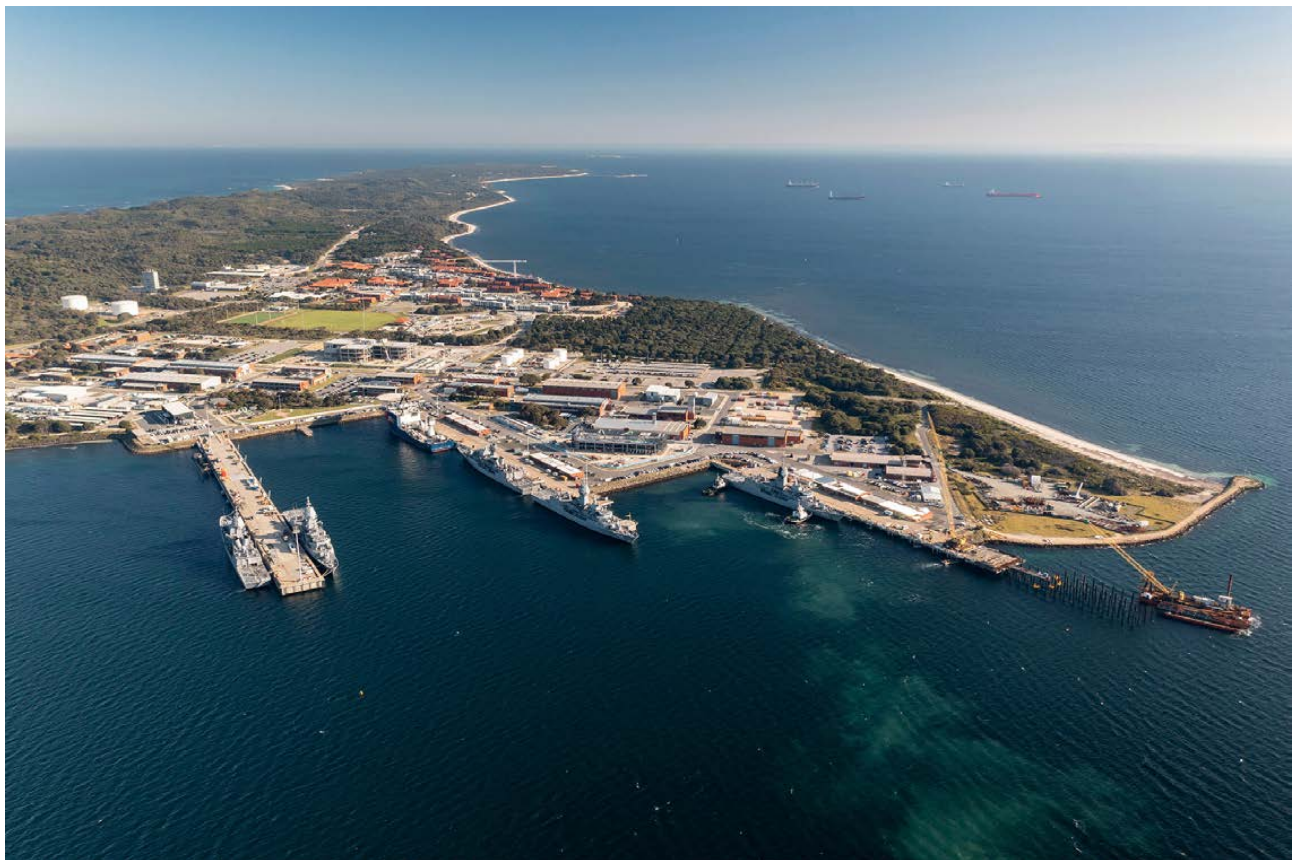
In May 1913, when construction of the Henderson Naval Base began at Woodman Point on the shore of Cockburn Sound in Western Australia, plans for the dockyard were rather less ambitious than these proposed by the General Manager of the Commonwealth Naval Dockyard, Cockatoo Island, Sydney (NAA: C3456, 380A)



After the war to end all wars, plans for the Henderson Naval Base were abandoned, and it was not until the 1960s that planning began again for a west coast base for the RAN. The site chosen was at the southern end of Cockburn Sound on the shores of Careening Bay on Garden Island. This photograph, taken soon after World War II, shows RAN ships laid up in reserve in Careening Bay (RAN Historical Collection)



Construction of wharves and workshops for the new naval base began in early 1973. Work was well advanced by the time this view of the site was taken in August 1974. The base was commissioned as HMAS *Stirling* on 28 July 1978
(Photo John Jeremy)



HMAS *Stirling* today. Now a major national asset, HMAS *Stirling* is home to some 12 major fleet units including the RAN's submarines. Major expansion of the facilities will occur in coming years to support the basing at HMAS *Stirling* of nuclear submarines
(RAN photograph)

HMAS *Stalwart* conducts a dual replenishment at sea with HMA Ships *Brisbane* and *Toowoomba* during a transit as part of a regional presence deployment (RAN photograph)

