



AUSTRALASIAN INSTITUTE
OF MARINE SURVEYORS

Shipshape

September 2024

**FAREWELL FROM AIMS
CHAIR JOHN HOLDEN**

Brisbane 2024 AIMS Conference



2024 AIMS Awards for Excellence

Stamford Plaza Brisbane, Friday 27 September

Shipshape

September 2024

2024 Brisbane AIMS CONFERENCE

Stamford Plaza Brisbane
Friday, 27 September

Embracing change and uncertainty

Experience dynamic industry and government presentations and discussions on topical issues affecting marine surveyors across the industry.

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Front Cover: Port Botany, in Sydney's south, handles around 1,600 ships a year carrying over 2.5 million containers, and also specialises in bulk liquid imports, such as petroleum and natural gas.



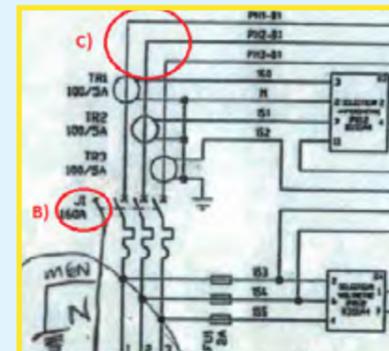
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ADVERTISING AVAILABLE

Advertising is now available in *Shipshape*, the official journal of the Australasian Institute of Marine Surveyors (AIMS). For all the information about advertising in our quarterly magazine, contact AIMS CEO Eric Perez at gm@aimsurveyors.com.au or on +61 492 881 737.



Full ahead

THIS will be my last submission to Shipshape as Chairman of the AIMS Board of Directors, so it seems fitting that I look back over my tenure as a member of the AIMS executive and peer into the future that will be entrusted to the new board.

My time with AIMS as Vice President under the previous association model and more recently as chair of the board under the current NFP Company has been enjoyable, challenging and generally very satisfying. Sure, it has not always been plain sailing and there have been stormy waters to navigate, but I firmly believe that the evolution of the institute over this time has been nothing short of amazing. From a like-minded group of ex-Master Mariners who banded together to promote and support their new profession, the AIMS has grown and matured into a truly world class industry body that has achieved a number of firsts along the way; first to deliver a government accredited training pathway for marine surveyors and the unique engagement with Australian Government (DAFF) as the accrediting body under the AGSA Scheme.

I am most grateful for support received from members, my fellows on the board and the dedicated business management team of Eric Perez and Sue Brown. It has been my great pleasure to serve the AIMS in an executive capacity over the past eleven years.

So, what have I learned over these years?

Firstly, and foremost, marine surveying is not for everyone. Okay, perhaps my role that predominately consisted of cargo surveying does demand a level of tolerance for long, uncertain hours, working nights, interrupted sleep, bad weather, communication challenges and cultural differences. Most of our brethren working within the small craft and DCV sectors work normal 5 days with weekends off – we cargo surveyors are so jealous! However, based upon my own journey as a surveyor, my observations and interactions along the way, I have drawn the following conclusions:

- Anyone with the right combination of intellect, curiosity, aptitude, commitment and desire can become a marine surveyor.
- There will always be a place for ex Masters and Chief Engineers in surveying areas that require their particular expertise, like navigation, ship handling and engineering.
- Customers need to reassess traditional



requirements for marine surveyors that preclude many trainees.

- Governments need to facilitate training pathways to ease the entry of new surveyors into our niche profession, with less reliance upon migrants to fill these roles.
- Life experiences, no matter what they are, will form a unique part of a new role, be that marine surveying or otherwise.
- Patience and respect for others should be demonstrated by all surveyors.
- People want the same things from life – improvement, happiness and family.
- We are lucky to live in Australia.

You will gather by now that I believe we can provide more personnel for the marine surveying profession through training local Australians. I am not advocating that we reject intake of migrant professionals, moreover we should embrace cultural diversity as part of the solution to ensuring sufficient suitable personnel and a sound future for the profession; however, this must not come at the expense of maintaining best practice principles. Australia has an established reputation for competent, ethical practice across the marine surveying profession and we must carefully manage culturally derived, undesirable practices that can dilute our highly regarded standards.

I firmly believe that the AIMS is well-positioned to safeguard the professional standards that clients, industry and government expect from our members and the marine surveying profession at large. Greater cooperation with government and industries that

utilise marine surveyors will reinforce the need to maintain consistently high standards to demonstrate that Australia is a safe, reliable, and ethical place to do business. The AIMS can encourage the use of its members to ensure quality standards and oversight that may not be typically available across the broader shipping industry.

Where to next for the AIMS?

I am encouraged by the progress made over the past years in bringing to fruition the AGSA (Accredited Grain Surveyor Assurance) Scheme where the AIMS has partnered with the Federal Department of Agriculture, Fisheries and Forestry as the accrediting body – this is, I believe, a first and an important step that demonstrates how a professional body can leverage its members' expertise in an area traditionally held by public servants. This is the culmination of a process that started more than five years ago. A shout out to Susan Hull, previous, long-serving CEO, and previous executive team member, Andy Graver, for making this possible and their ongoing efforts to improve the scheme, along with those on the grain committee who gave freely of their time.

It is also important to acknowledge the great strides made by our business management team in providing an ever-increasing knowledge base for members by way of podcasts, videocasts, a website overhaul (underway), member workshops and face to face meetings held across the country, in direct response by the board to the wishes of members and provides opportunities for CPD (continuing professional development). However, I note there are still members who remain unsure about what constitutes CPD, and I urge all members to look out for workshops over coming months that will highlight the numerous openings available to undertake CPD. Our CEO, Eric Perez has been

instrumental in facilitating these members focussed initiatives and I am sure he has much more planned over coming years – well done Eric.

As a mainstay for the AIMS that remains most important to CPD, member education and business income is the comprehensive training program that the AIMS embarked upon more than a decade ago. The many courses available to members and student members alike continue to evolve to maintain currency with changing times and the demands of our profession, with an ongoing commitment for review and revision by the AIMS training arm. I must say a big thankyou to Sue Brown for her dedication to improvement in this area.

Other areas of note that will see the AIMS grow to truly represent the Australasian region have seen the institute forge closer ties with New Zealand marine survey practitioners, marine industry bodies and Maritime New Zealand. This is an association that the AIMS has previously sought to explore, so it is great to see some positive movement with our neighbours across the ditch – thanks again to Eric Perez and big shout out to Greg Marsden, our New Zealand based board members for his efforts in developing this important relationship and expansion opportunity.

Not content with growing the AIMS profile outside of Australia, our CEO has also additionally forged new partnerships with the Boating Industry Association (BIA) and BIA of Victoria and ongoing discussions with BIA of Western Australia, through signing of memorandums of understanding (MOU) with all these bodies that represent and work alongside a vast number of suppliers, insurers, resellers, builders and statutory bodies Australia wide.

So as my tenure on the AIMS executive draws to

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a close, I believe the institute to be in good stead for future success and greater influence towards a safe, secure marine and maritime industry and, of course, our AIMS members and their own future success.

I cannot sign-off without thanking my fellow board members:

- ❑ Peter Murday for keeping it real, watching the pennies, calling it as he sees it and his leadership for the majority of the last decade that saw AIMS develop into what we enjoy today.
- ❑ Scott Aiton for his ongoing commitment to ensuring the AIMS maintains high standards and focus on member benefits.
- ❑ Andrew Graver (ex-board, long-standing executive member) for being a voice of reason and calm, careful consideration to bring the AIMS ship back on even keel.
- ❑ Razzak Syed for standing up for what is right and proper and always upholding ethics and honesty.
- ❑ Greg Marsden for bringing his carefully considered and innovative approach to a bigger and better AIMS.
- ❑ Eric McIlwain for dedicating time to be our secretary, pro-bono adviser on legal matters, and his readiness to jump in where needed.

I also acknowledge our membership for choosing to be part of this fundamentally important organisation, and I encourage all of you to get involved and make the most of the many resources on offer. A strong, well-supported institute will develop a strong profession. Additionally, I acknowledge those members who join the various sub-committees that have been pivotal in the development of resources from small craft insurance inspection templates to the AGSA scheme.

I look forward to remaining a part of the institute for some time to come, in some way or another. I am getting close to retiring from full-time surveying, but I cannot see my interest in marine surveying diminishing much for many years to come – it has become a large part of my life that I have thoroughly enjoyed. It has provided me with fond memories and enduring friendships. I wish our new board all the best for the coming years and hope to catch up with many of our members and others at the upcoming conference in Brisbane in September. I am proud of what we have achieved in building a world-class professional association.

John Holden
Chairman of the AIMS Board



AIMS Conference 2024

Friday 27 September
Stamford Plaza Brisbane

Theme:
Embracing Change and Uncertainty

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THE CEO'S DESK

An extremely busy year rolls on

A VERY busy year for the Institute and, in particular, the work in the lead-up to the 2024 AIMS Conference.

Registrations are still coming in and, if you haven't already booked a ticket to the event, please contact me at the office.

Member meetings

It was a privilege to meet my members in Newcastle, Adelaide and Fremantle in late July and early August.

At the core of my work is to provide my members value for their membership and part of building on the solid foundations we have at the Institute is meeting members face-to-face.

The feedback was well received, and I will progress the feedback and respond to members as soon as I am able.

I noted the following in a recent LinkedIn post, that while Zoom and similar technologies help facilitate meetings with members, face-to-face meetings with my members help to build connections and trust and offer networking opportunities that online meetings simply cannot.

BIA hosts forum on new vessels standards

Boating Industry Australia (BIA) joined the



Australian Recreational Boating Safety Committee (ARBSC) and Standards Australia in hosting a discussion on the potential development of a new recreational vessel standards program during the Sydney International Boat Show.

Over 60 BIA members, regulators, professional bodies and standards developers met at the show and online to consider the opportunities to enhance vessel standards, industry education, compliance and enforcement.



AUSTRALASIAN INSTITUTE OF MARINE SURVEYORS

**Member meetings
Newcastle
2 August 2024**



As Chair of ARBSC, Chris Mather of the WA Department of Transport led a review of the current Australian Builders Plate standard, international standards and regulatory programs, industry and product development, and consumer safety and environmental protection requirements.

Presenters from the ABP Working Group, Standards Australia, ICOMIA CEO Joe Lynch and the SA Small Craft Committee supported the discussion on options for an extended portfolio of standards, including adoption of ISO international standards, and an enhanced regulatory framework,

taking reference from the European and US regulatory systems.

Boat manufacturers and surveyors contributed with feedback on experiences of working with other regulatory systems and interest in there being scope for third parties to be involved with compliance management in support of manufacturers.

This was supported by an update on the new maritime regulators compliance management tool, which was being rolled out around jurisdictions to

support industry education and ensure vessels being delivered to customers meet required standards.

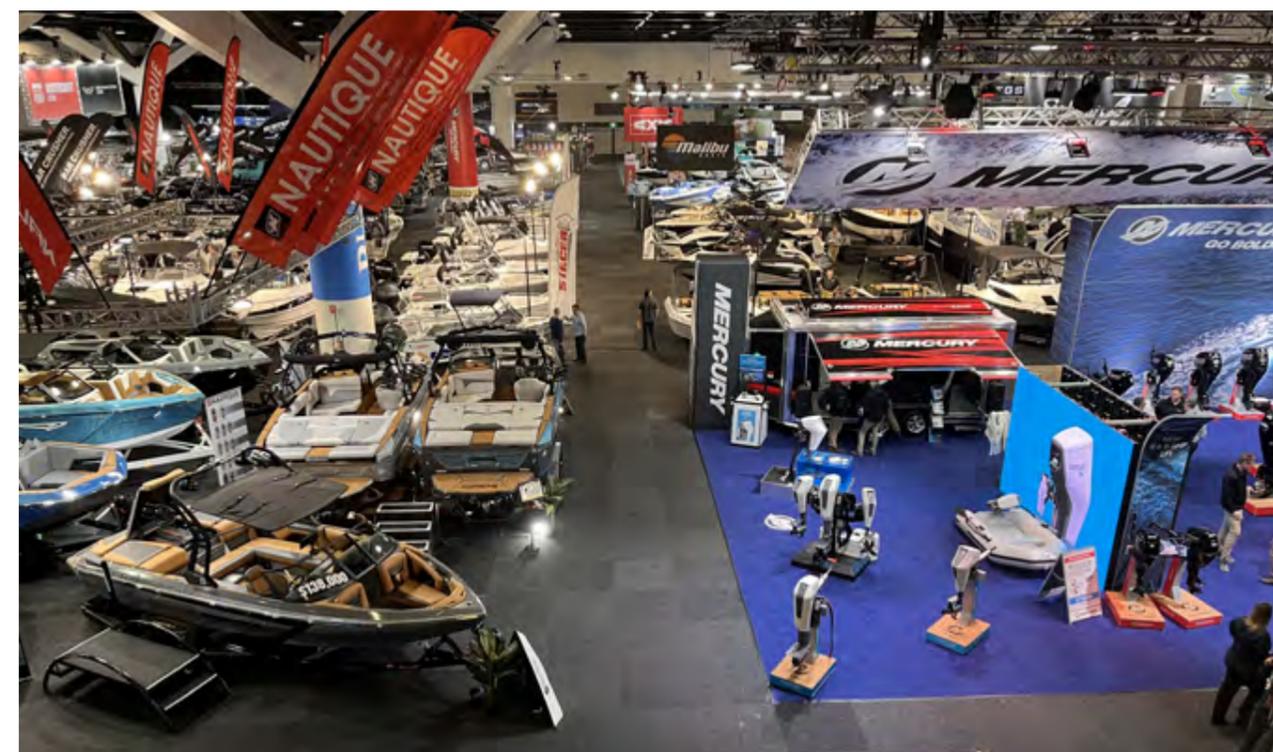
The ARBSC, Standards Australia and BIA committed to working together on a new program over the next few years, with future updates to industry to be provided in due course.

On behalf of the AIMS, I would like to thank the organisers of the meeting for extending an

invitation to me and Sue Brown, AIMS Professional Development & Training Coordinator, to attend on behalf of members.

It was great to see a strong attendance from AIMS members, including Mike Smith, Michael Fitzallen, Luke Koufos, Emmanuel Ezekiel-Hart and Aaron O'Donoghue.

It was also great to catch up with the BIA team



at the meeting: BIA CEO Andrew Scott, BIAV CEO Steve Walker and BIAWA CEO Sheryl Swarbrick.

The AIMS will keep members informed as work on the development of a new recreational vessel standards program.

I will also note an amazing Sydney International Boat Show and trade display areas. Presentations from the vessel standards forum are available via this link: <https://boatingindustryassociationltd.com/t/d-l-ehyilt-djiuylulu-n/>

Industry workshops

Our industry workshops and webinars can be accessed in the members-only section of the AIMS website.

Workshop: Vessel Building Quality – Nathan Clark – 4 June 2024

A version of the workshop was also published on the AIMS public YouTube channel and, on behalf of the Board, I thank Nathan for sharing his views on vessel-building quality.

Background

Nathan is a maritime industry expert with over 20 years of operational experience in a variety of divisions within the marine sector, with over 80,000 nautical miles at sea and many years as a ship's captain operating in some of the most isolated locations on the globe. Self-sufficiency, ingenuity and adaptability are the foundations and cornerstone attitude flowing through Seal Marine. A passion for education and safety developed early in his career, which carries through to each and every project embarked upon regardless of the size

and the nature, driven by an attention to detail and exceptionally high standards. Holding a degree in Nautical Science from the University of Tasmania, qualified marine surveyor and an active member of the Australasian Institute of Marine Surveyors keeping in informed with the latest changes in construction methods and technology.

Workshop: Creating an Insurance Pool – Greg Hansen – 11 June 2024

Background

Greg Hansen is a Director at Austbrokers

AUSTRALASIAN INSTITUTE OF MARINE SURVEYORS

Vessel Building Quality
4 June 2024

Nathan Clark
Director
Seal Marine - Management & Consultancy

The slide features a blue background with a boating scene. On the left, a photo shows Nathan Clark on a boat. The text is in white and yellow.

AUSTRALASIAN INSTITUTE OF MARINE SURVEYORS

Nicholas (Nick) Parkyn
Nick Parkyn Marine Surveying

Surveying HMPE Synthetic (Part 1)
Standing Rigging

The slide features a blue background with a boating scene. On the left, a photo shows Nicholas Parkyn on a boat. The text is in white and yellow.

AUSTRALASIAN INSTITUTE OF MARINE SURVEYORS

Creating an Insurance Pool

Greg Hansen
B.Ec (Econ & Bus Man), ANZIIF (Snr Assoc) CIP
Director - Professional Risks

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Countrywide
Insurance Brokers

The slide features a blue background with a boating scene. On the left, a photo shows Greg Hansen. The text is in white and yellow. The Austbrokers logo is at the bottom.

AUSTRALASIAN INSTITUTE OF MARINE SURVEYORS

AI and Cybersecurity Webinar

Alan Shimel
CEO, Founder
Techstrong Group

The slide features a blue background with a boating scene. On the left, a photo shows Alan Shimel. The text is in white and yellow.



Countrywide, an insurance broker who specialises in managing professional indemnity and public liability insurance facilities for professional associations. For over 25 years, Greg has focused on professional risks for clients, acting for both insurance companies and for insurance brokers. He regularly delivers talks to associations and company boards on professional and director liabilities. Austbrokers Countrywide manage several professional indemnity schemes for a number of national associations, including the Australasian Institute of Marine Surveyors. This offers great insight into the claim experience and often the contractual pitfalls which can be faced by marine surveyors. Workshop: Surveying HMPE Synthetic Rigging (Part 1), Standing Rigging – Nick Parkyn – 24 June 2024

Background

Nicholas (Nick) Parkyn has an extensive background in both the marine and information technology disciplines. Nick's work in the marine industry includes marine surveying, yacht and small craft design and marine software development. He is experienced in composite design and fabrication and has specified synthetic rigging on designs since 1994. He was one of the first to apply Spectra to marine applications. He is the author of the book What a marine surveyor needs to know about synthetic (composite) yacht rigging.

Workshop: AI and Cybersecurity - Alan Shimel - 9 July 2024

Background

For over nine years, Alan has been leading a team of experts and professionals who create and deliver high-quality content, insights and solutions across

various media, research and consulting brands, including DevOps.com, Security Boulevard, Cloud Native Now, Techstrong AI and Techstrong TV. With a JD degree and a background in venture-backed startups, cloud computing, and cyber security, Alan brings a unique perspective and expertise in the tech industry. He is passionate about helping tech professionals and organizations succeed in the digital age by providing them with the latest trends, best practices and resources. He is also committed to supporting the tech community and fostering collaboration and learning through various events, initiatives and partnerships.

Workshop: Surveying HMPE Synthetic Rigging (Part 2) [Running Rigging] – Nick Parkyn - 23 July 2024

Newsletter contributions

I encourage members to make a contribution on a marine survey issue to the newsletter or contact me if there is a particular issue you want covered. Thank you to the members that contributed to this edition of the newsletter. Remember, for members who do contribute, your article can be used as evidence of continuing professional development.

Your Institute

Please contact me on +61 2 6232 6555 or send me an email with feedback, and ideas at gm@aimsurveyors.com.au.

Dr Eric Perez
Chief Executive Officer

2024 AIMS Conference: Embracing Change and Uncertainty

AT the time of drafting this article, there was just under seven weeks until the 2024 AIMS Conference.

We have an amazing range of speakers across many areas of interest to members, including:

- ❑ Kim Gebers, Chief Operating Officer for Gladstone Ports Corporation for the Port of Gladstone, Port of Bundaberg and Port Alma.
- ❑ Dr Luke van der Laan, Professor Leadership and Foresight, University of Southern Queensland.
- ❑ Kenny Crawford, Deputy Chief Executive – Technical Advice and Support, Maritime New Zealand.
- ❑ Dianna Smith – Branch Manager, Domestic Maritime Safety and Data, Policy and Regulation, AMSA
- ❑ Dr Nirman Jayarathne, Lead Engineer – Innovation Group Navantia Australia Pty Ltd.
- ❑ James Neil, Director, Aus Ship – Lawyers and P&I Correspondents.
- ❑ Ingmar Kofler, K-ROV, Director, K-ROV.
- ❑ Curtis Florager, Damen.
- ❑ Nick Best, Fire Protection Industry (ODS & SGG) Board.
- ❑ Kell Dillon, General Manager, Maritime Safety Queensland.
- ❑ Eric McIlwain, Principal Surveyor, Hastings Marine and Engineering.
- ❑ Greg Hansen, Director, Professional Risks, Austbrokers Countrywide.
- ❑ Jonathan Mamaril, Director, NB Lawyers.
- ❑ Andrew Fielding, Business Development Manager, Boating Industry Association.
- ❑ Kerryn Woonings, Senior Marine Surveyor & Loss Adjuster – Global Technical Services, Crawford & Company.

❑ Nick Parkyn, Nick Parkyn Marine Surveying.

On behalf of the Board, I would like to thank our conference supporters:

- ❑ Australian Marine Surveys
- ❑ Austbrokers Countrywide
- ❑ The MCC Group
- ❑ AmSpec
- ❑ MIPEC Marine Consultants & Surveyors
- ❑ SEAWEIGH Pty Ltd
- ❑ Australian Maritime Safety Authority
- ❑ Maritime New Zealand
- ❑ Hunter Marine Surveyors
- ❑ Pacific Maritime Lawyers

❑ Hastings Marine and Engineering

- ❑ Propel Marine
- ❑ Seaworthy Inspections
- ❑ Cargo Care
- ❑ Oceania Marine Consultants Pty Ltd

I am looking forward to meeting members and supporters of this important industry sector.

You can access more information on the Conference here: <https://www.aimsurveyors.com.au/AIMS-2024-Conference>

Dr Eric Perez
Chief Executive Officer

7:30-8:30am	Conference registration	Grand Ballroom Foyer
8:30-8:50am	Official Opening and Welcome Address Kim Gebers Chief Operating Officer for Gladstone Ports Corporation for Port of Gladstone, Port of Bundaberg and Port Alma	Grand Ballroom
8:50-9:15am	Acknowledgment of Country and Chairman's Review John Holden - AIMS Chairman	
9:15-9:45am	Keynote Address - Industry Futures Dr Luke van der Laan, Professor Leadership and Foresight, University of Southern Queensland	
5-minute break		

Break Out Sessions

Break Out 1 9:50-10:25am	Kenny Crawford Deputy Chief Executive - Technical Advice and Support, Maritime New Zealand Topic: Design, construction and equipment rules, New Technologies and Third Party Oversight	Grand Ballroom
Break Out 2 9:50-10:25am	Dianna Smith Branch Manager, Australian Maritime Safety Authority Topic: AMSA's Accredited Marine Surveyor Scheme	Raffles 1
Break Out 3 9:50-10:25am	Jonathan Mamaril Employment Lawyer Topic: Termination of employment - unfair dismissal and general protections	River Room
10:25-10:55am	Morning Tea	

Session 1 10:55-11:30am	James Neil Director, Aus Ship Topic: Developments in P&I	Grand Ballroom
5-minute break		

Break Out Sessions

Break Out 4 11:35-12:10pm	Ingmar Kofler Director, K-ROV Topic: Biofouling	Grand Ballroom
Break Out 5 11:35-12:10pm	Curtis Florager Project Manager Damen Topic: Impact of alternative fuels on ship design - A shipbuilders perspective	Raffles 1
Break Out 6 11:35-12:10pm	Nick Best, National Field Engagement Team Leader Fire Protection Industry (ODS & SGG) Board Topic: Fire suppression systems	River Room
5-minute break		

Session 2 12:15-12:50pm	Kell Dillon General Manager, Maritime Safety Queensland Topic: Resilience in MSQ's infrastructure taking into account climate uncertainty including storm and weather events	Grand Ballroom
5-minute break		

Break Out Sessions

Break Out 7 12:55-1:30pm	Eric McIlwain Principal Surveyor, Hastings Marine and Engineering Topic: Australian Builders Plate	Grand Ballroom
Break Out 8 12:55-1:30pm	Greg Hansen Director, Professional Risks, Austbrokers Countrywide Topic: The legal liability of a Marine Surveyor. What are the risks being faced by Marine Surveyors and how can these be minimised	Raffles 1
Break Out 9 12:55-1:30pm	Dr Nirman Jayarathne Lead Engineer - Navantia Australia Pty Ltd Topic: Australia's Autonomous Future: Uncrewed Surface Vessels Take the Helm	River Room
1:30-2:00pm	Lunch	

Session 3 2:00-2:35pm	Andrew Fielding Business Development Manager Boating Industry Association Topic: Marine Brokers	Grand Ballroom
Session 4 2:35-3:10pm	Kerryn Woonings Senior Marine Surveyor and Loss Adjuster - Global Technical Services Crawford & Company Topic: The future of shipping when it comes to shipping Lithium batteries, and a layman's guide to General Average	
Session 5 3:10-3:45pm	Nick Parkyn Nick Parkyn Marine Surveying / MarineML Topic: AI and Marine Surveying	
3:45-4:15pm	Afternoon Tea	

Session 5 4:15-4:45pm	AIMS Board members Q&A Forum and Conference Overview	Grand Ballroom
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The AIMS reserves the right to adjust the program if required.

Conference Speakers

Kim Gebers

Chief Operating Officer for Gladstone Ports Corporation for Port of Gladstone, Port of Bundaberg and Port Alma



Kim is the Chief Operating Officer for Gladstone Ports Corporation for Port of Gladstone, Port of Bundaberg and Port Alma. Kim has a diverse portfolio of executive experience delivering operational and safety improvements including engineering, operations, asset management, production, bulk handling, ports, planning, commercial and resources.

Previously the General Manager Terminal Operations for Pilbara Ports Authority, Australia's largest port, he has held senior roles across coal export, general cargo, project cargo, LNG export and other bulk commodity exports, including his time as CEO of Dalrymple Bay Coal Terminal. Kim has previously also served as Chairman for the International Coal Exporting Terminal Operators Association.

John Holden

Chairman
Australasian Institute of Marine Surveyors



John is the Managing Director of Seaweigh Pty Ltd, a marine survey and consultancy company with over 20 years' experience as a marine surveyor. John started his maritime career as a ship builder and holds an Advanced Diploma in Marine Surveying.

He became a member of the Australasian Institute of Marine Surveyors in 2009 and was elected as Vice President in 2013, becoming a vital contributor to the Executive, which led to his appointment as Chairman in 2021. As Chairman, John is responsible for the development and oversight of strategic direction, succession planning and sound business operations.

Dr Luke van der Laan

Professor
Leadership and Foresight
University of Southern Queensland



Luke van der Laan is a Professor of Foresight and Leadership at the University of Southern Queensland and describes himself as a 'pracademic', balancing practice and theory in real-world applications. He is a fellow and executive board member of the World Futures Studies Federation. Luke's research interest is in the area of strategic foresight, strategic risk and strategic thinking of organisational leaders.

His research spans the education, not-for-profit and private sectors. In particular, his research is concerned with leadership enabled social, educational and business transformation through foresight and strategy.

Luke previously served as the Chief Executive of a national not-for-profit organisation and continues to serve as a board member, advisor to UNESCO and trustee of numerous organisations. Luke holds a PhD (Leadership, Foresight and Strategic Thinking) and has published widely. His book "Strategy and Foresight in the Asia Pacific Region" (Springer) sets out Luke's unique view of the interplay between foresight, risk and strategy in the 21st Century.

Kenny Crawford

Deputy Chief Executive
Technical Advice and Support
Maritime New Zealand



Kenny Crawford is the Deputy Chief Executive of the Technical Advice and Support Group at Maritime New Zealand. With a background as a Chief Engineer and Manager/Director for Germanischer Lloyd, including Country Manager for Ireland, Kenny has a deep understanding of technical and regulatory aspects in the maritime industry.

His career also includes serving as a Senior Marine Surveyor and current Chair of the Port State Control Committee for the Tokyo MOU. Kenny is a certified ISM and ISPS Lead Auditor, as well as being trained in Coordinated Incident Management Systems (CIMS) and incident control. He also holds a NZ certificate in Regulatory Compliance.

In his current role, Kenny leads the Technical Advice and Support Group, providing high quality technical advice and support to key internal stakeholders and external delegated and authorised persons regarding international, domestic, maritime, environmental, and port and flag state control matters.

Dianna Smith

Branch Manager
Domestic Maritime Safety
and Data, Policy and
Regulation

Australian Maritime Safety
Authority



Dianna Smith joined the Australian Maritime Safety Authority (AMSA) in November 2021 and is currently the Branch Manager Domestic Maritime Safety and Data. She is leading AMSA's delivery of fit for purpose, risk-based, and data-driven regulations and standards for domestic commercial vessels operating in Australian waters.

Dianna is an experienced leader in strategic policy development, legislative reform, stakeholder engagement and project management. She has led policy and regulatory reform across multiple Commonwealth agencies.

Prior to joining AMSA, She has worked on national security policy, particularly in the context of people smuggling and transport security.

Dianna has also held senior leadership positions in the Department of Home Affairs, Department of Infrastructure and Regional Development, Department of the Prime Minister and Cabinet, Australian Customs and Border Protection Service and the Australian National Audit Office.

Dr Nirman Jayarathne

Lead Engineer - Innovation
Group
Navantia Australia Pty Ltd



Nirman Jayarathne is a Chartered Naval Architect and AMSA Accredited Surveyor with over 18 years of experience in the maritime industry. He is passionate about innovations in naval ship design and integrating rapidly evolving technologies.

Currently as the Innovation Lead at Navantia Australia, he is responsible for driving the development of new and innovative technologies and solutions for the naval defence sector.

His research areas focus on autonomous naval vessel design and ship hydrodynamics. He has led teams that developed a novel Uncrewed Landing Craft concept and Uncrewed-RHIB projects at Navantia Australia. He has co-authored several conference and journal papers on machine learning and autonomous vessel and system design.

James Neil
 Director
 Aus Ship



James has 25 years of experience in transport. He has degrees in Economics and Law. He qualified as a Solicitor in Australia in 1989 and in England in 1991.

James managed a transport company for 5 years before joining a Sydney law firm in 1989. He worked as a claims executive for a P&I Club in the UK from 1990 to 1993 and then as a Shipping Solicitor for a law firm in Sydney until he founded Aus Ship P&I in 1995.

James has been involved with many high-profile shipping matters in Australia including "The Pasha Bulker", "The Tampa", "The Kiukiang Career" and "The Laura D'Amato".

Ingmar Kofler
 Director
 K-ROV



Ingmar started his career with a bachelor's and master's degree in marine science and environmental science respectively before going into commercial diving. Spending 10 years working in Australia, Asia, and the North Sea as a diver he then switched his focus to the ever faster developing field of subsea robotics.

By now he has spent over 20 years working in various aspects of marine projects with a focus on offshore and OPL operations. By now the focus is shifting towards developing new and improved ROVs and AUVs inhouse to further improve safety and productivity in the respective fields.

The strange combination of skills has allowed him to navigate the at times complicated issues around biosecurity and environmental laws related to marine operations in Australia.

This helped to shape the very specific capacities provided by the company. As a result, he focuses on ensuring similar compliance with various governing bodies for all our extended dive operations.

Curtis Florager
 Project Manager
 DAMEN



Curtis Florager is a chartered naval architect with a bachelor degree in ocean engineering from the Australian Maritime College. He has more than 10 years of experience in the marine industry, working on various projects involving ship design, construction, and maintenance.

For the past 7 years, he has been working for Damen Shipyards group, a leading international shipbuilding company. He is currently the project manager and lead engineer for Damen Australia, where he oversees the delivery of high-quality vessel refits and services to their clients in the region.

He is passionate about marine engineering and innovation, and he enjoys collaborating with other professionals in the field. He is always eager to learn new skills and take on new challenges in his career.

Nick Best
 National Field Engagement Team
 Leader
 Fire Protection Industry (ODS &
 SGG) Board



Nick Best is a seasoned professional with 8 years of dedicated service in the fire protection industry in Australia. With a strong background in face-to-face training and engagement, he ardently advocates for industry education and collaboration towards shared objectives.

For the past 5 years, Nick has led the development and roll-out of the Field Engagement Program at the Fire Protection Industry (ODS & SGG) Board, fostering daily interactions with permit holders to ensure optimal industry compliance and safety standards.

Kell Dillon
 General Manager
 Maritime Safety Queensland



Kell Dillon was appointed as the General Manager, Maritime Safety Queensland (MSQ) in February 2022. As General Manager, Kell has led the MSQ and successfully managed MSQ's emergency response to the Brisbane flood emergency in 2022. He is a highly experienced Senior Executive, mariner, port manager and Harbour Master who has a wealth of knowledge and experience having held senior roles at Ports Victoria, Port Authority of NSW, Port Kembla Port Corporation, NSW Maritime Authority, and the Royal Australian Navy (RAN).

Kell joins MSQ from Ports Victoria, where he held the position of Executive General Manager, Marine and Navigation/ Harbour Master - Melbourne. Previous roles include significant experience in port business management, marine public transport and State based port and marine regulatory functions. As a Commissioned Officer in the RAN, Kell was a specialist Navigator (N+), Surface Warfare Officer, Unrestricted Naval Marine Pilot and held Sea Command. Kell served in a variety of active and operational roles during his Naval career. Kell is a member of the International Harbour.

Eric McIlwain
 Principal Surveyor
 Hastings Marine and Engineering



Eric commenced his surveying career in 2014. He became an accredited surveyor with Maritime Safety Queensland in 2014 which then transferred to AMSA in 2015.

As an AMSA accredited surveyor, he is accredited for extra low voltage initial surveys and periodical surveys, initial surveys for construction and alterations for hull, deck and superstructure, machinery, equipment, and commissioning; periodical surveys, periodic surveys for loadline and safety equipment.

Greg Hansen

Director, Professional Risks
Austbrokers Countrywide



Greg Hansen is a Director at Austbrokers Countrywide, an Insurance Broker who specialises in managing Professional Indemnity and Public Liability insurance facilities for professional associations. For over 25 years Greg has focused on professional risks for clients, acting for both Insurance Companies and for Insurance Brokers.

He regularly delivers talks to Associations and Company Boards on Professional and Director Liabilities. Austbrokers Countrywide manage several Professional Indemnity schemes for a number of national associations including the Australasian Institute of Marine Surveyors

This experience offers great insight into the claim experience and often the contractual pitfalls which can be faced by Marine Surveyors.

Jonathan Mamaril

Employment Lawyer



Jonathan Mamaril is an Employment Lawyer focusing on providing practical value to clients. He advises on all aspects of workplace law, including employee management, employment contracts and contractor agreements and interpretation of modern awards. Jonathan has represented clients in unfair dismissal, general protections, and discrimination matters, from conciliation conferences to arbitration in the Fair Work Commission.

With over 16 years legal experience as well as extensive Management and Leadership experience, the recognition in the market goes beyond a traditional senior lawyer experience as he is regularly asked to present at seminars, conferences, workshops, and summits for industry associations, business owners, human resources, boards, and executives.

He is frequently consulted by media outlets, such as the Sydney Morning Herald, IntheBlack, ABC News, ABC Radio, Courier mail, Brisbane Times and News.com.au, for his expert commentary on legislation changes and significant cases.

Andrew Fielding

Business Development Manager
Boating Industry Association



Andrew is a marine industry professional and has been employed in the industry for over 30 years with experience in yacht brokerage, marine retail, wholesale, boat building and government advocacy. For 23 years, Andrew worked with his father in their well-known family-owned boat sales business, Anchorline (which was established at the Gold Coast in 1975). During his career Andrew has built a reputation for being honest, knowledgeable and professional at all times which has led to him being recognised as a leader in his field. In 2023 he handed his role in the family business over to his eldest son, Curtis.

His role at the BIA also includes the development and delivery of programs to improve industry standards.

Having served as the President the Boating Industry Association (BIA) Ltd, as Chairman of the Queensland Recreational Boating Council (QRBC) and currently holding a position on the board of the Gold Coast Waterways Authority (GCWA), Andrew uses his connections within the marine industry, government departments and marine agencies to build a collaborative approach toward securing the future success of all things marine related in Australia.

Kerryn Woonings

Senior Marine Surveyor and
Loss Adjuster – Global Technical
Services
Crawford & Company



Kerryn is a Senior Marine Surveyor at Crawford & Company, the world's largest publicly listed independent provider of global claims management solutions. Kerryn specialises predominantly in Marine Cargo and Liability investigations and is a qualified lawyer. Kerryn started with Crawford in Sydney in 2014 and relocated to her home in Western Australia (WA) at the end of 2020 to expand Crawford's Marine offering into WA. Prior to that Kerryn worked for a leading global transport insurer after discovering that a life of legal practice was not that fulfilling.

Kerryn has been heavily involved in the Women's International Shipping & Trading Association (WISTA) since 2019, served as the Australian Vice-President in 2020 and 2021, and is currently on the WA board. Kerryn loves the opportunities her roles at Crawford and WISTA present to advocate for women in the maritime industry, and to empower them to make their mark in a very male dominated field.

Kerryn loves to read books and finds any opportunity she can to head to the south coastal port of Albany WA, to watch the ships go by and spend quality time with family.

Nick Parkyn

Nick Parkyn Marine Surveying



Nick has an extensive background in both the marine and information technology (IT) disciplines. His work in the marine industry includes marine surveying, yacht and small craft design and marine software development. Through his company MarineML he is evangelising and applying Artificial Intelligence (AI) and Machine Learning (ML) concepts and techniques to the Marine Surveying discipline. Nick has studied computer science, yacht and small craft marine surveying and yacht design. He holds several patents, has presented papers at numerous international marine and IT conferences, and has written numerous articles published in marine and IT journals and magazines.

Artificial Intelligence (AI) and Machine Learning areas of particular interest include: (1) current and future application of AI and ML to Marine Surveying, (2) AI fluency for Marine Surveyors, (3) Ethical use of AI in Marine Surveying and (4) The role of AI and ML in succession planning and realisation in Marine Surveying. He is a member of the International Institute of Marine Surveyors (IIMS) and Society of Naval Architects and Marine Engineers (SNAME).

Vessel safety a priority

ON 4 July, the Australasian Institute of Marine Surveyors (AIMS) and the Boating Industry Association of Victoria (BIAV) shared a media release was launched focussing on vessel safety.

The AIMS and BIAV are working together to support the Victorian public in the search of safe second-hand vessels.

The AIMS CEO, Dr Eric Perez, noted that the partnership will improve awareness of and access to trusted marine surveyors to support both the recreational boating and light commercial vessel sectors.

The CEO of BIAV, Steve Walker, supports the partnership

acknowledging the need for better awareness and options, when it comes to the sale and purchasing of second-hand vessels.

“Our marine surveyors sign up to a Code of Conduct and continuing professional development,” Eric said.

Established in 1986, the AIMS is the peak industry body for marine surveyors in Australasia, and the largest marine surveyor association in the Southern Hemisphere. The AIMS has members in all States and Territories of Australia as well as New Zealand, the Asia South Pacific region and beyond.

Marine surveyors undertake surveys of recreational vessels on behalf of owners, insurers or the potential purchaser with the purpose of assessing the condition or value of vessels.

“AIMS supports the need for

safe and responsible boating in Victoria and a way to ensure vessel safety is engaging recreational marine surveyors,” Eric said.

BIAV has a significant track record relating to boating safety through initiatives, such as its work with Safe Transport Victoria, the Australian Builders Plate reviews and the Welcome to Boating Hub at each Melbourne Boat Show.

“Consumer awareness, and resulting confidence when they acquire that first boat, is of great importance. We will be delighted to direct them to AIMS members to gain this confidence and set them off in the right direction,” Steve said.

The partnership between BIAV and the AIMS is a win for recreational vessel owners in Victoria. At the heart of the work undertaken by marine surveyors is vessel safety.

Steve Walker
CEO, BIAV
Dr Eric Perez
CEO, AIMS



State-of-the-industry data report

ON August 1, the Boating Industry Association (BIA) released its state-of-the-industry data report, revealing national turnover at \$10.12 billion for 2023-24, a 5 per cent increase on the previous year.

BIA President Adam Smith said the report, launched on day one of the Sydney International Boat Show, demonstrated continued growth for the sector despite economic challenges over the past 12 months.

“There are now 27,500 people directly employed in the boating industry, as well as 8,250 more in contractor roles supporting more than 2,000 businesses across the nation,” said Smith.

“Seventy-five per cent are in small, family businesses, employing local workers and supporting local communities. Many are based in regional areas, and help deliver much-

needed support for jobs and economies, including enhanced tourism-related spend of boating activities.”

The boating industry includes designers, manufacturers, importers, brokers, insurers, retailers, charters, yacht and boat clubs, marinas, tourism, surveyors and trades from boat builders to riggers, representing a wide range of local and global brands and providing services to a growing boating community.

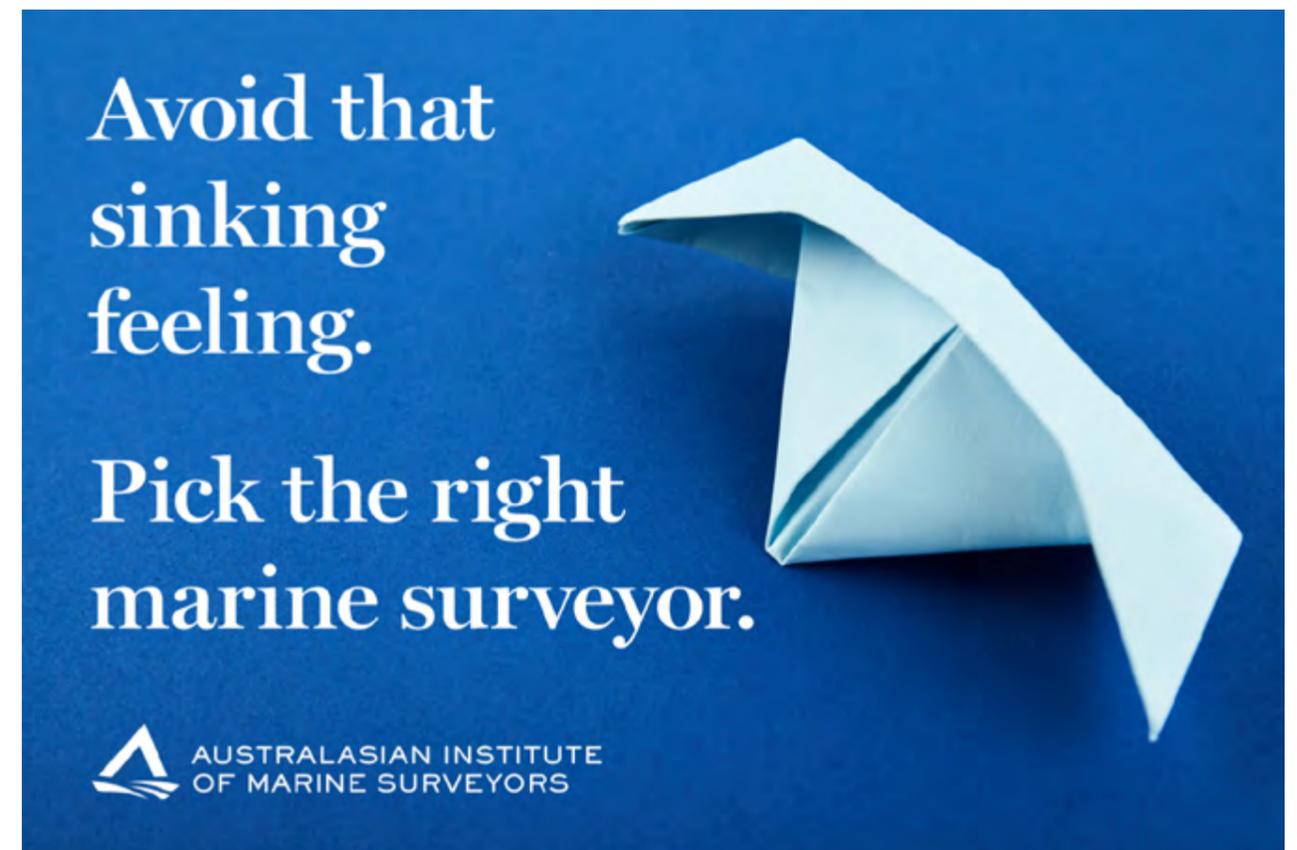
Australia has more than 2.5 million people with a licence to drive a powerboat, with close to one million registered vessels and a countless number of non-motorised craft (such as small paddle and sail craft), which do not require registration or licensing.

Key statistics from the data report card are as follows:

- ❑ 1 in 10 Australians has a boat licence;
- ❑ 970,000+ registered boats;
- ❑ 10 per cent of registered vessels are personal watercraft, fastest growing segment;
- ❑ 67 per cent of boats are under six metres; and
- ❑ 60 per cent of boating trips are up to four hours' duration.

The boating industry data report card includes data intelligence from BIA Boating Data powered by DECKEE. BIA Boating Data provides insights about where, when and how people move around the waterways. By analysing over six billion real-time and historical data points, businesses and organisations are able to unlock intelligence that assists achieve economic, safety and environmental outcomes.

Boating Industry Australia News



The marine industry in Australia by the numbers

2024 Industry data



Turnover in 2023-24

\$10.12bn



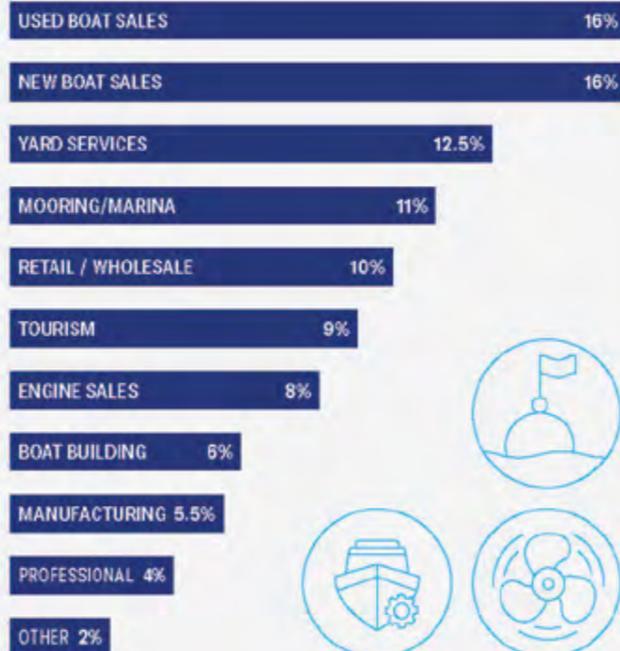
27,500

People employed directly by the industry + more than **8250 contractors** engaged.



Industry profile by sector

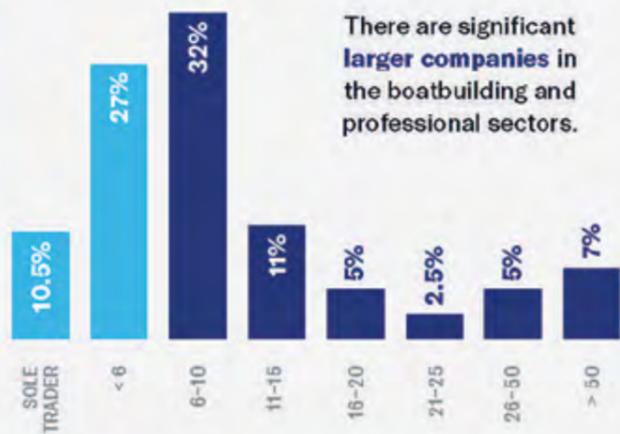
The marine industry covers a broad range of sectors, with yard services, new boat sales, storage and charter operators leading the way.



Operating in the recreational and leisure marine sectors in Australia.

Industry profile by employment

Companies in the marine industry are predominantly smaller businesses, typically employing **less than 10 people**.

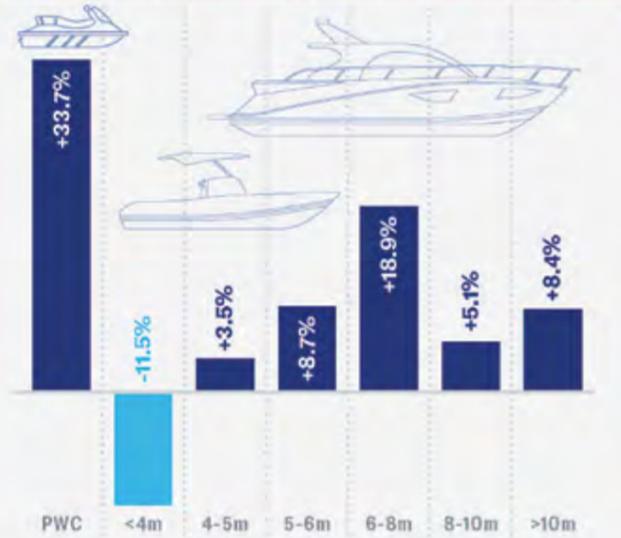


Boating activities

Preferred boating activities



Change in length over 5 years

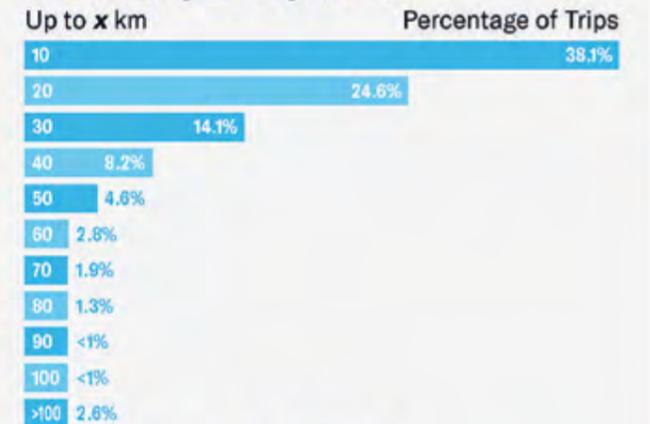


BIA Boating Data

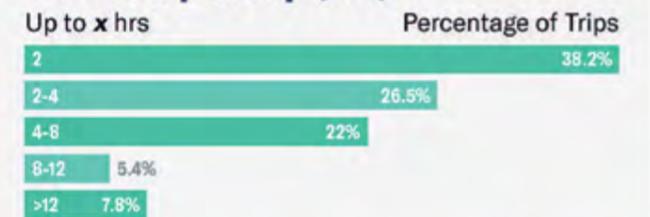
Make data-driven decisions for everyday waterway challenges.

BIA Boating Data powered by DECKEE provides insights about where, when, and how people move around the waterways. By analysing over 6 billion real-time and historical data points, unlock intelligence that can help you achieve economic, safety and environmental outcomes.

Distance per Trip (kms)



Duration per Trip (hrs)



A nation of boaters

2.5m

Boating is one of the leading pastimes in Australia
1 in 10 Aussies have a boat licence



Licences in 1000s
Registered Boats in 1000s
Perpetual licences in QLD, SA & WA

biadata.org.au

Helping you make data-driven decisions for everyday waterway challenges

Marine surveying across two jurisdictions – New Zealand and Australia

BEING an accredited marine surveyor across the two differing jurisdictions of New Zealand and Australia presents quite a few problems for sole traders or members of small surveying companies.

As surveyors, we must be accredited by the two national bodies, who both have differing levels of accreditation and basic requirements. There is the matter of cost in maintaining both accreditations, in itself not an insignificant cost. However, in my opinion, the primary difference is the level of risk the surveyor wishes to assume.

Australia requires the surveyor carries P&I insurance, whereas New Zealand (NZ) does not mandate insurance, so a surveyor in NZ can operate with a high level of risk and still have no insurance whatsoever.

Another very significant difference between Australia and NZ is that, while the surveyor carries out the same (or near equivalently) surveys, reporting the survey is very different. NZ uses templates which the surveyor modifies to suit, while Australia has rigid forms (including a matrix of which forms you must submit) after completing a survey.

In NZ, the surveyor submits the report, plus a survey plan which the vessel owner is supposed to follow, and the actual Certificate of Survey (CoS) for the vessel in question. So, in effect, the owner is certified to go from that point unless there are significant defects, in which case the surveyor would not have issued a CoS.

In the case of Australia, the surveyor submits his report and forms as necessary to AMSA and they issue the certificate to the



owner. In the case of the surveyor overlooking some item, AMSA will not issue the certificate.

The way a surveyor keeps a handle on this progress is through the Survey Codes issued to the owner and passed to the surveyor appointed. If the owner doesn't follow up on the codes, and the surveyor thinks all OK and doesn't review historical codes, then the surveyor is largely in the dark on whether all is in order.

There are many obvious differences between the various standards in play. I won't dwell on them but Australia is blending what were individual State requirements into a national standard for commercial vessels and, in general, the survey requirements are more reflective of modern vessels. Some of the requirements become arbitrary by length and-or operating areas.

This is reflected in both jurisdictions but the break points are different and something to be aware of. For example, in the NSCV, extra low-voltage bilge pumps must have a secondary system in Australia for relatively small vessels (over 13 metres), for example, whereas NZ's rules vary by length and by passenger or commercial duties.

Electrical systems is an area where both administrations

are playing catch up. Battery technology is evolving quickly and a joint NZ/AS standard is helping clarify what is required for new builds but, sadly, existing vessels can and do slip between the cracks.

A vessel coming into NZ from another administration is treated as a new vessel and must comply with all requirements from design, stability systems and, of course, electrically.

This has caused problems for NZ owners bringing in older Australian vessels, which still have old electrical systems and wiring, resulting in a redesign electrically and more probably a full rewire. Lithium battery-powered vessels are uniformly being designed around DNV requirements in both countries.

Stability requirements also differ. AMSA has more prescriptive rules, whereas NZ simply adopted Solas for larger vessels. In my opinion, the stability of the vessel is determined during the design phase and the surveyor merely verifies it complies by testing. So, for a surveyor, while the standards do differ, it is more of an issue for the designer.

Registration issues for vessels being built offshore can be problematic. There was a recent case of a builder completing a

vessel for an Australian owner where there was considerable acrimony between the owner and builder, resulting in an 18-month delay for handover.

AMSA deleted the application, resulting in the Australian registration lapsing. Meantime, after vessel completion, the design approver and surveyor had completed all the surveys, including sea trials, and submitted all the documentation to AMSA. Sadly, due to the delay, and the registration lapsing, AMSA advised the owner that a

certificate would not be issued as the vessel was not in Australia.

The owner failed to advise the designer and surveyor of this fact, also resulting in threats of legal action from all parties. The original survey codes had also been deleted due to the delay, and the survey and design drawings ended up being re-submitted three times before a certificate was issued.

My concluding thought is that operating in NZ as a remote AMSA surveyor, we need a direct

point of contact within AMSA. It is difficult to build relationships with the administration with infrequent seminars or web meetings and a relationship contact would have resolved the above issue.

Sadly, because the owner had behaved badly throughout the build process with the builder, and then subsequently with AMSA, a total communication breakdown resulted.

Peter Clarke
Marine Surveyor

Have your say about major changes to vessel design, construction and equipment rules in NZ

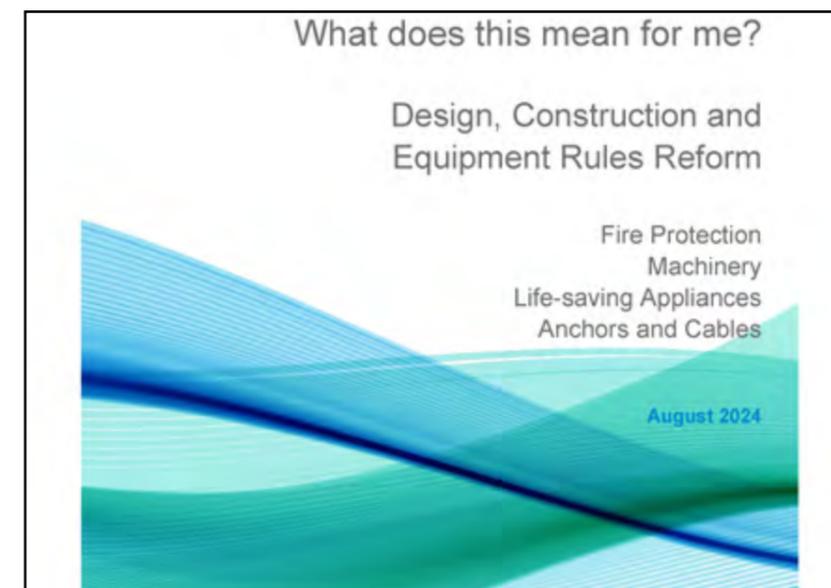
MARITIME NZ is proposing major changes to the rules for New Zealand's domestic commercial vessel design, construction and equipment. These rules (sometimes known as the "40 Series") are well over 20 years old and in real need of reform.

We are trying a new approach to make it easier to have your say. A guide, called "What does this mean for me?", describes 14 typical fishing, passenger, charter and work vessels of different sizes and operating limits. The idea is that you find an example that is similar to your vessel.

A table with the example explains the proposed changes and what would be required for a boat like yours to meet the new rules.

"We want to hear from vessel designers, builders, operators, surveyors and anyone else who has an interest in the rules for how vessels are designed and built" says Peter Brunt, Deputy Chief Executive Regulatory Frameworks at Maritime NZ. "This is your chance to tell us what you think and help to influence the new rules."

Maritime NZ will be consulting



on rule changes in three stages, with the first consultation being the draft rules for:

- Fire Protection;
- Life-saving Appliances;
- Machinery and Ancillary Equipment; and
- Anchors and Cables.

The drafts have been developed with extensive input from people working in the sector and now everyone will be able to see what they look like.

"What does this mean for me?" sits alongside the "Invitation to Comment" (which includes

a snapshot summary of the changes) and drafts of the new rules.

These are all available on the Maritime NZ website at: www.maritimenz.govt.nz/public/consultation/DCE-40-series-package-1/

You can use this information to help you to comment on the proposals. Consultation closes at 5pm on Friday, 18 October 2024.

If you have questions or need help, please email 40.series@maritimenz.govt.nz

Maritime NZ

Improving survey practice and process

THE world is powered by increasingly intricate systems working behind the scenes to integrate countless moving pieces into a meaningful whole,” according to Professor Edward Crawley at MIT Open Learning.

“One of the characteristics of the 21st Century is that we’re investing more in complexity, and things are just getting damn complicated,” says Prof. Crawley, from Ford Department of Engineering, Department of Aeronautics and Astronautics, MIT.

“There’s so much talk about the system. And so little understanding” is the view of Robert Pirsig, in the book *Zen and the Art of Motorcycle Maintenance*.

“While the duties of a marine surveyor are broad in nature, the essential function is to assess the entire marine venture to determine the potential risks”: Merrimac Marine Insurance LLC.

A marine survey can uncover potential safety hazards, mechanical problems or other issues that may not be visible to the untrained eye. By identifying these issues early on, boat owners can take the necessary steps to address them and ensure the safety and seaworthiness of their vessels”: SeaWorthy Inspections™

System thinking

Most marine craft represent Systems of Systems (SoS) and are an ensemble of complex systems, which have the potential for an extraordinary amount of structural complexity.

Because of this, SoS can be vulnerable to sudden catastrophic collapse because of small and insignificant partial functionality losses in one of the constituent systems.

“System thinking is simply thinking about something as a system: the existence of entities – the parts, the chunks, the pieces-and the relationships between them,“ says Prof. Crawley.

Unanticipated failures find more potential and more pathways to their occurrence when interventions in SoS operations, standards or processes are conducted without enough insight or understanding and without consideration of the fundamental nature of the complexity of the System of Systems (SoS).

1. **Avoidance:** is the prevention of a disruption. Avoidance goes beyond traditional system safety considerations (Madni and Jackson, 2009) in that it encompasses the anticipation of a mishap based on the ability to detect “drift” towards system brittleness, a harbinger of potential accidents.
2. **Survival:** is the ability of a system to resist destruction or incapacitation in the face of a disruption.
3. **Recovery:** is the ability of a system to survive a major disturbance even with degraded performance.

Given these definitions, one can argue that, if avoidance is achieved, then the need for survival and recovery are indeed reduced. However, avoidance is achieved through intervention, namely detection and isolation of threats / errors / failures, so as to avoid their propagation.

The marine surveyor is a key enabler of avoidance; by applying systems thinking, a marine surveyor would be better equipped to contribute to avoidance by understanding critical systems, and seeking out critical faults ahead of time and

ensure resolution preventing cascading failure of systems in the System of Systems.

Improving practice and process

Typically, there can be two main modes of operation for marine surveyors, depending on whether their primary objectives are proactive or reactive.

Proactive role

In this role they aim to identify problems before they occur. They are generally responsible for assessing vessels before purchase or during routine checks. In case any flaw or damage is located, a potential mishap is averted. Hence, these surveyors are considered to be proactive as they attempt to avert problems or mishaps.

Reactive role

In this role they are called in after some incident has occurred and assess the problem or damage to the vessel.

- ❑ Are called in after some incident has occurred.
- ❑ They assess the problem or damage to the vessel.

Since they assess the vessel as reacting to some occurrence, they are referred to as reactive surveyors.

The survey process

To carry out a survey on a vessel, a marine surveyor:

- ❑ Follows a standardised practice that they have developed.
- ❑ Follows a standardised process that they have developed.
- ❑ Uses checklists to ensure coverage of all items to be inspected.

How good are your processes and checklists?

The Theory of Active and Latent Failures was proposed

by James Reason in his book, *Human Error*. [1] According to Reason, accidents within most complex systems are caused by a breakdown or absence of safety barriers.

The checks in our checklists create these safety barriers.

The Swiss Cheese model (Figure 1) describes the chain of an accident opportunity as many little deviances or omitted checks that, by themselves, are small but, if all those little “holes” in the “Swiss Cheese” line up, then an unforeseen problem or accident can occur.

The holes in the cheese slices represent individual weaknesses in individual parts of the system or process and are continually varying in size and position in all slices. The process fails when

This Swiss Cheese Model is directly applicable to marine surveying in particular:

- ❑ the process and associated checklists used in marine surveying; and
- ❑ errors by the practitioner that can occur;

In the diagram (Figure 2), as part of the survey process, we are carrying out inspections or checks which could alert us to the potential for a possible problem / accident.

From the diagram (Figure 2), it is clear that Oversight / Accident Opportunity 1 would not be seen

(caught) by our process and checklists.

It is also errors in the execution of the process and violations that could create the potential for a possible problem / accident, which in the marine surveying discipline could include the following.

Errors which include:

- ❑ **Decision errors:** Goal-directed behaviour that proceed as intended, yet the plan proves inadequate or inappropriate for the situation. These errors typically result from a lack of information, knowledge or experience.
- ❑ **Skill-based errors:** These “doing” errors occur frequently during highly practised activities and appear as attention failures, memory

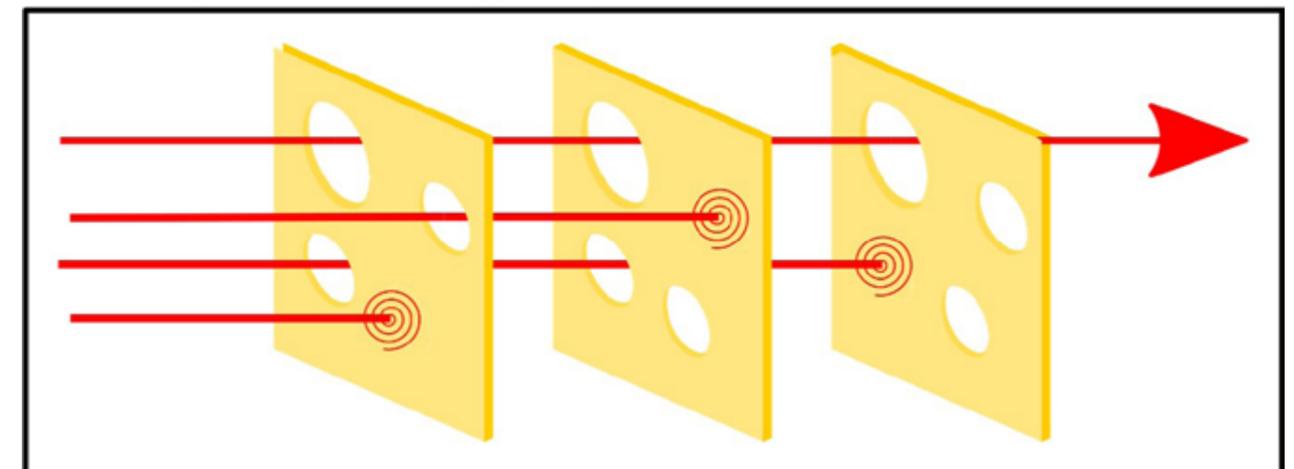


Figure 1: *Swiss Cheese Model* (Used under the Creative Commons Attribution-Share Alike 4.0 International license.)

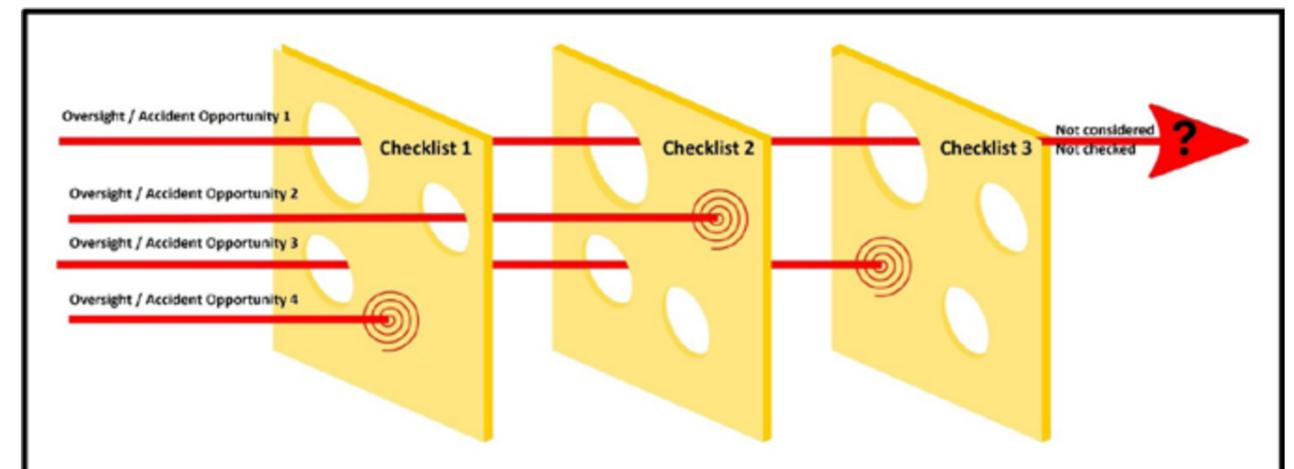


Figure 2: *Swiss Cheese Model applied to checklists* (Used under the Creative Commons Attribution-Share Alike 4.0 International license annotated by the author.)

failures or errors associated with the technique with which one performs a task.

❑ **Perceptual errors:** Errors that occur during tasks that rely heavily on sensory information, which is obscured, ambiguous or degraded due to impoverished environmental conditions or diminished sensory system.

Violations which include:

❑ **Routine violations:** Often referred to as “bending the rules”, this type of violation tends to be habitual by nature, engaged in by others, and tolerated by supervisor and management.

❑ **Exceptional violations:** Isolated departures from authority, neither typical of the individual nor condoned by management.

Does a marine surveyor evaluate all his checklists in terms of coverage to ensure that the alignment of holes is the “Swiss Cheese” model is less likely to occur?

Have industry standards bodies encouraged comparison

of checklists and validation of coverage?

Skill-based errors can occur as marine surveying is a broad field and not all surveyors have all the necessary skills or depth of skills.

Routine violations and exceptional Violations: How many marine surveyors are guilty of skipping what they consider some less important checks because they are in a hurry to get the job done?

How many less experienced surveyors make isolated departures from authority, which are not typical nor condoned by management?

Deviations from the process or checklist.

Skill-based errors, routine violations and exceptional violations can cause deviation from the required practice which introduces us to the deviation spiral.

Normalisation of deviance is the gradual process through which unacceptable standards or practice become acceptable.

The process of normalisation of deviance can be seen in the “Deviation Spiral” (Figure 3), where you can see a deviation from the original normal causes a new normal which, again, can be deviated from, causing another normal.

Each of these deviances need only be small but the gradual acceptance of each, and subsequent “getting away with it”, teaches us that the deviance is acceptable – until a problem / accident occurs.

The marine surveying discipline should increasingly apply a systems-thinking lens that allows us to:

- ❑ hone our abilities to understand parts;
- ❑ see interconnections, ask “what-if” questions about possible future behaviours; and
- ❑ be creative and courageous about process and practice redesign.

The techniques covered in this article are actively and successfully used in other disciplines and I believe are just as applicable to our own discipline.

“I like to encourage people to realise that any action is a good action if it’s proactive and there is positive intent behind it”: Michael J. Fox

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1. Reason JT (1990). Human error. Cambridge, England: Cambridge University Press. [Google Scholar].
2. Wikipedia 3. Thinking in Systems - Donella H. Meadows: First published by Earthscan in the UK in 2009.
3. MIT Open Learning [Ask an MIT Professor: What Is System Thinking and Why Is It Important? | Open Learning](#)

Nick Parkyn, Marine Surveyor / Director. Nick Parkyn Consulting & Design Pty Ltd

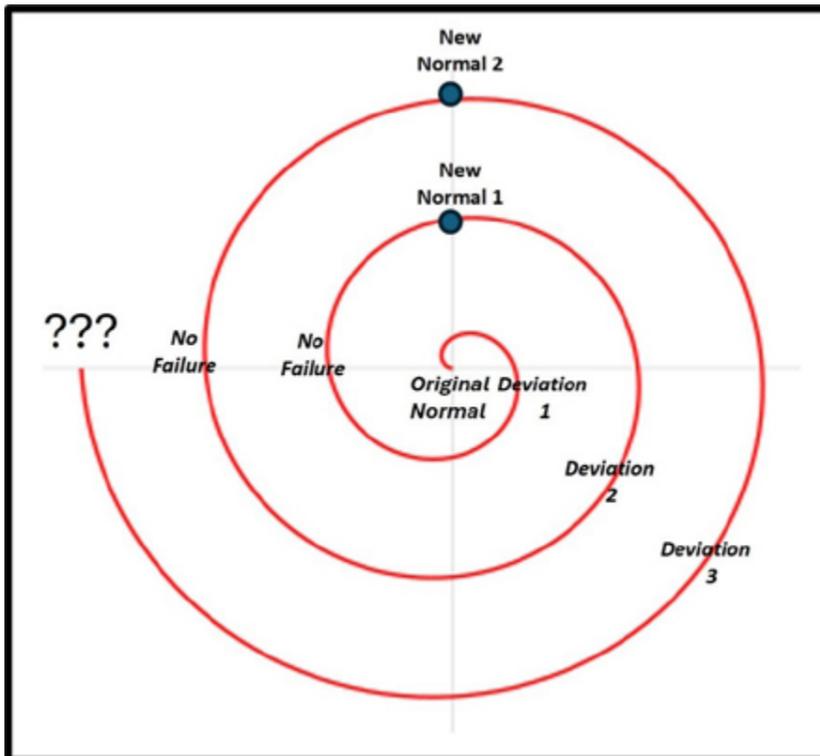


Figure 3: Deviation Spiral.

Volunteer Recruitment Drive



The Maritime Museum Maintenance Team seeks **Volunteers** with the following skills:

- Carpentry**
- Plumbing**
- Welding**
- Painting**
- Gardening/Ground Maintenance**
- Mechanical Engineering**
- Electrical Work**
- General Handy-Person**

Maintenance Team works Tuesdays and Thursdays

Grounds Team works Wednesdays and Fridays

Pearling Lugger Restoration (Penguin) Team works Tuesdays, Thursdays & Fridays

Times are from **8am to 3pm** with morning tea and lunch breaks

Days and Times are flexible.

Volunteers with Trade Certificates, Forklift & Scissor Lift Licenses are needed but not essential. We accommodate a wide range of skill levels.

For an introductory visit please contact:

John Imrie – john.imrie@maritimemuseum.com.au

Graham Tappenden – graham.tappenden@maritimemuseum.com.au

Russell Cobine – russell.cobine@maritimemuseum.com.au (Penguin)

We look forward to welcoming you onboard.

Enhancing navigational safety through data-driven decision-making

1. Abstract

WITH the continuously increasing maritime traffic, overwhelming regulatory requirements, reduced manpower, commercial pressure on the seafarers and catastrophes observed due to navigational incidents, it is crucial to assist marine navigators with the proper decision-making process after assessing all the data from the navigation aids and machinery.

This article mainly focuses on how to develop software for augmenting a vessel's safe navigation, increasing efficiency and transparency provided by digital transformation, data integration from the bridge equipment and engine machinery, and, thereafter data collection, process, analysis and decision prompting. However, the ultimate decision will remain to the navigators for the best judgment in the prevailing situations.

2. Introduction

In the maritime sector, decisions must frequently be made swiftly and under duress. Effective decision-making is essential, since these choices can have a big impact on the safety, environment and economy concomitantly. In the shipping business, the tides are turning fast.

The practice of “datafication”, or converting every facet of shipping into digital data, along with the swift uptake of digital technologies, is revolutionising global cargo transportation and ship navigation. The opportunity for increased efficiency, transparency and secure vessel navigation is provided by this digital transformation.

3. Background

When Costa Concordia grounded and capsized in 2012, it caused us to rethink the way bridge resource management was being practised on the navigational bridges.

In 2018, MT Sanchi and bulk carrier CF Crystal collided in the East China Sea. There were 32 casualties onboard the Sanchi, three of which were confirmed dead and 29 declared missing. The incident was declared a “very serious marine casualty”. Both the watchkeepers failed to act as required by the COLREGs.

In 2020, MV Wakashio grounded in the pristine waters of Mauritius, causing unprecedented damage to the marine environment and loss of the ship.

The underlying causes are as follows.

❑ Overwhelming Data

The electronic navigation equipment has advanced but they also provide huge amounts of data that should be properly analysed for correct decision-making.

❑ Increase in traffic density.

Traffic density has increased dramatically over the last few years, which has escalated the

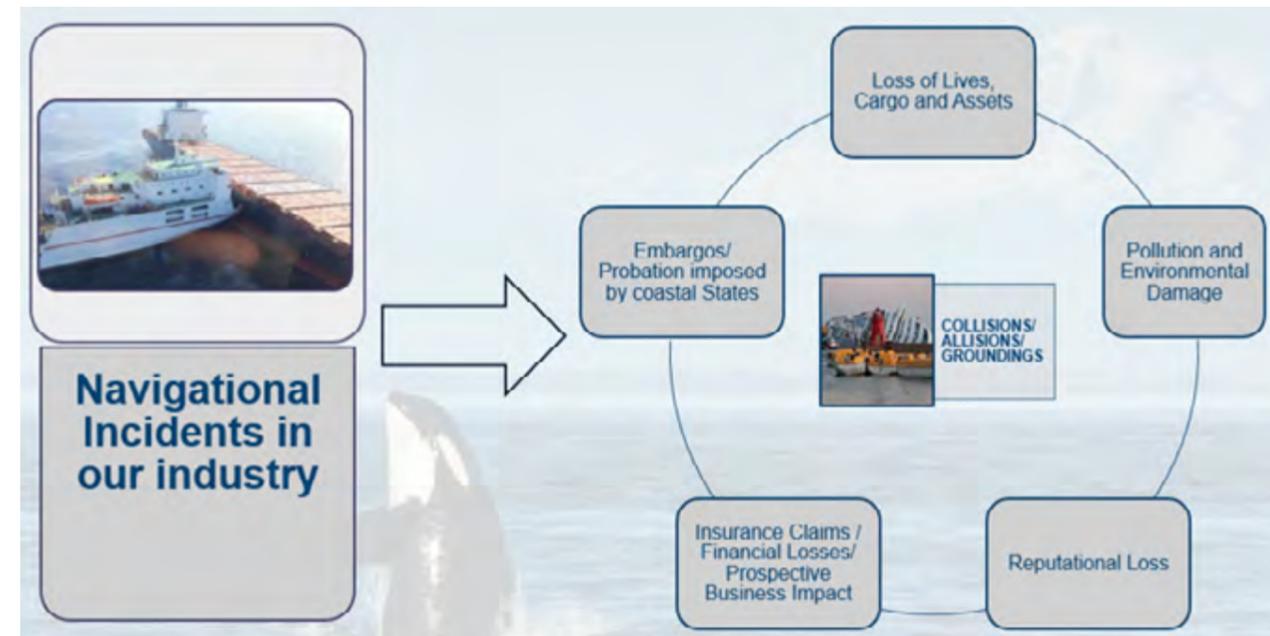


Figure 1. Impact of navigational incident (Image source: Capt. Samar.)



Figure 2. (Source: ORCA AI Camera.)

burden on the bridge teams, particularly in the bottleneck areas such as the Singapore Straits, Dover Straits, etcetera.

❑ Improper decision-making.

Increased traffic and the overwhelming data provided by the electronic navigational equipment are affecting the proper decision-making of the bridge teams.

3.1. Know-how of data-driven decision-making process

3.1.1. Digitisation of the company SMS and checklists

First, the company navigation manual and checklists are to be digitised to facilitate integration to the central system and assist navigators in ensuring no mistakes are being made.

For example, company policy and master's standing order to call the master when visibility is restricted to 3 nautical miles. Therefore, the restricted visibility checklist would automatically pop up once the thermal image AI camera detects the visibility is three nautical miles and alerts the navigation officer to call the master. With the human eye, different officers may predict different ranges of visibility but with the thermal image AI camera there would not be any confusion.

3.1.2. AI-oriented thermal image camera installation

Targets that could endanger the vessel or breach the company's SMS are identified, tracked and classified by the thermal image

camera. These targets are then prioritised, and the necessary information is presented through an easy-to-use interface that includes CPA, TCPA, SOG and speed metrics.

Every marine object, even tiny ones, may be found using machine vision and artificial intelligence (AI) at any distance. This includes non-AIS targets like fishing boats, floating containers and marine mammals.

3.2. CCTV camera installation

The CCTV camera must be mounted on the bridge, steering gear flat. It must be positioned to provide a clear and unobstructed view of the bridge. On the bridge, a CCTV camera monitor needs to be mounted. Real-time video must be shown on the monitor.

3.3. Software development

Global navigation satellite systems (GNSS), electronic navigation charts (ENCs), real-time data feeds and sophisticated algorithms are just a few of the technologies that make up marine navigation software.

These technologies assist users with precise positioning, route planning, collision avoidance, and other crucial tasks for safe and effective maritime navigation.

Based on the data input from the navigation equipment, marine navigation software must include a few essential elements to ensure safe and effective high-seas travel. A few of the

crucial elements that this marine navigation software has to take into account are as follows.

❑ Accurate electronic charts.

The accurate electronic charts provide mariners with a trustworthy guide, showing everything from shorelines and depths to buoys and wrecks.

❑ Look out features.

An AI-based thermal imaging camera to get the traffic location in all weather conditions is an important feature to be added.

❑ Weather insights.

Having real-time weather updates integrated into the software keeps mariners informed about upcoming storms, calm seas and everything in between.

❑ Under keel clearance monitoring.

Echo sounder data is to be integrated to provide an alarm to deter the grounding.

❑ Real-time traffic monitoring.

With real-time traffic monitoring, navigators can make informed decisions about altering routes to avoid dense traffic areas.

❑ Smart route planning.

Plotting a course isn't just about finding the shortest distance. A smart route planning feature considers various factors like weather, currents, and even fuel efficiency to help mariners chart the most efficient, safe and timely path.

❑ AIS tracking and collision alerts.

AIS tracking lets you see where nearby ships are and collision alerts can be a lifesaver by giving you ample time to steer clear of potential danger.

❑ Engine parameters monitoring.

All major machinery data input is to be married to the system.

❑ Emergency response integration.

Having an emergency response feature directly integrated allows mariners to quickly access distress calls, relay information, and seek help.

❑ Voyage data recording.

A feature that records voyage data helps mariners analyse past voyages, refine their navigation strategies and continually improve their skills.

❑ Regulatory compliance alerts.

Having this feature will alert mariners about relevant maritime regulations and will keep users on the right side of the law.

❑ Offline mode.

Adding an offline mode to this navigation software will ensure that even in remote areas where connectivity might be limited, the software remains functional.

❑ Continuous updates.

Maritime environments are constantly changing. Regular updates ensure that the software evolves with the times, staying relevant and useful.

❑ Support for varying devices.

The software should seamlessly adapt to different devices, ensuring information is accessible where and when needed.

❑ Autonomous navigation assistance.

The future is steering towards autonomous navigation. Incorporating features that offer automated assistance can ease the burden on mariners, allowing them to focus on higher-level decisions.

❑ Benefits:

The software will reduce the risk of future incidents that navigators might face and offer improved efficiency and lower emissions.

❑ Safer sailing routes for sailors.

Navigators can make more precise routes and arrival-time plans.

4. Conclusion

With the aid of data-driven software-based decision-making in marine navigation is now the demand of the situation to avoid navigation incidents. This article provided a brief idea for

generating such a data-driven decision-making navigation system to enhance navigation safety. However, the success is contingent on the attitude of the OOW and the learning curve at the end.

5. Biography: Captain Ranakul Islam

Captain Ranakul Islam is the Marine and Vetting Manager of PACC Tanker Management Pte Ltd, Singapore. He is from the 36th batch of BMA and passed out in the year of 2001.

He received a scholarship from the Seaman Employment Centre of Japan to accomplish his cadet training in the Japanese Training Ship TS Seiun Maru and Merchant vessel MV Amver Halo after passing out from the Academy. He obtained his Master Mariner CoC from MPA, Singapore and his MBA degree from Royal Roads University, Canada in the year of 2013.

Capt. Ranakul got command in the year of 2014. Currently, he is pursuing his M. Phil degree in UMT, Malaysia. His five articles on seafarer fatigue and ship stability are published in internationally recognised journals.

He is an active member of the Singapore Nautical Institute, Marine Surveyors Association of Bangladesh and the Australian Institute of Marine Surveyors.

He held the position of Organizing Secretary of the Bangladesh Merchant Marine Officers Association from 2019 to 2022, and he is the treasurer of the current BMCS Management Committee.

Captain Ranakul Islam
Marine and Vetting Manager
PACC Tanker Management Pty
Ltd
AIMS Member



Figure 3. The display (Sample) of Autonomous Navigation Assistance (Source: Padang.)



International Diploma of Marine Surveying (Working Boats)™

This qualification is most suited to people who want to become a Certified Commercial Marine Surveyor™ in the Australian Domestic Commercial Vessel Sector and who want to become AIMS Certified and apply for AMSA accreditation. It is open to persons who are already working in or hold qualifications in a related maritime industry profession.

DURATION:

It is expected that you will complete the course within 8–12 months

PRICE:

AU\$3,950.00 +GST



Industry Diploma of Recreational Vessel Survey™

This qualification is most suited to people who want to become an AIMS Certified Commercial Marine Surveyor™ for recreational vessels under 25 metres. The qualification does not cover the requirements for Super Yachts.

DURATION:

It is expected that you will complete the course within 3–6 months

PRICE:

AU\$3,000.00 +GST



Advanced Diploma of Commercial Marine Surveying™

This qualification is most suited to people who want to become a Certified Commercial Marine Surveyor™ or those who are already working as a marine surveyor and have experience in any sector of the marine survey industry.

DURATION:

It is expected that you will complete the course within 8–12 months

PRICE:

AU\$6,000.00 +GST



METHOD OF STUDY

Units delivered by distance learning. Online study, including prescheduled tutorial webinars, and 1:1 sessions with assessors and industry experts. You may also be required to undertake practical survey tasks as part of the assessment process. If you are working in the industry, we can tailor practical tasks to suit your workplace environment however you must organise your own access to a vessel.

ENROLMENT

You can enrol online at any time, the whole process only takes few minutes.

Scan the QR or visit www.aimsurveyors.com.au/Diploma-Courses
Email us on training@aimsurveyors.com.au
or call us on + 61 2 6232 6555

Draft survey theory

I HAVE trained many people in maritime and related industries over the years. The key to good training is understanding that every individual learns differently. The VARK model categorises how different people learn and which style of teaching will best work for them.

Ask yourself which type of learner you are?

Visual, Auditory, Reading / Writing or Kinesthetic. I am very much a Visual and Kinesthetic learner. Give me too much to read and I will fall asleep. Listening to a monotonous lecture also bores me to tears. I have found that most seafarers are the same, practical people that like “doing stuff”.

In high school, we were given a task. Roll a ball down an inclined ramp, off the edge of the lab table and place a cup on the floor for the ball to land in. We knew the formulae from our physics classes but that meant very little to us at that point. After all, we knew lots of formulae as just letters and numbers to remember for tests.

In teams of three, we set out to do our calculations and placed the cup on the floor. Much debate, discussion, scribbling, rubbing out and tapping on our calculators followed, with various assumptions and formulae used. Finally, we all agreed on the distance and were ready to place our cup on the floor.

We precisely measured the distance and placed the centre of the cup as per our calculations, and even double-checked the distance by measuring back from the cup.

After meticulously lining up the ramp so that it aimed exactly at the cup, we held our breath and gently let the ball go at the top of the ramp. We were careful

not to push it but let it roll under the force of gravity alone.

Time seemed to slow down as we all focused on the rolling ball building speed along the ramp. As the ball reached the edge of the table, we felt excited with anticipation of what we hoped was about to happen. We were all willing the ball into the cup, although there was no formula for that combined force.

The ball took flight and gravity produced a beautiful parabolic trajectory (as it always does). The slowing of time ended with our cheers and laughter as the ball made a satisfying thud into the cup. As you can see, I am very much a Visual and Kinesthetic learner.

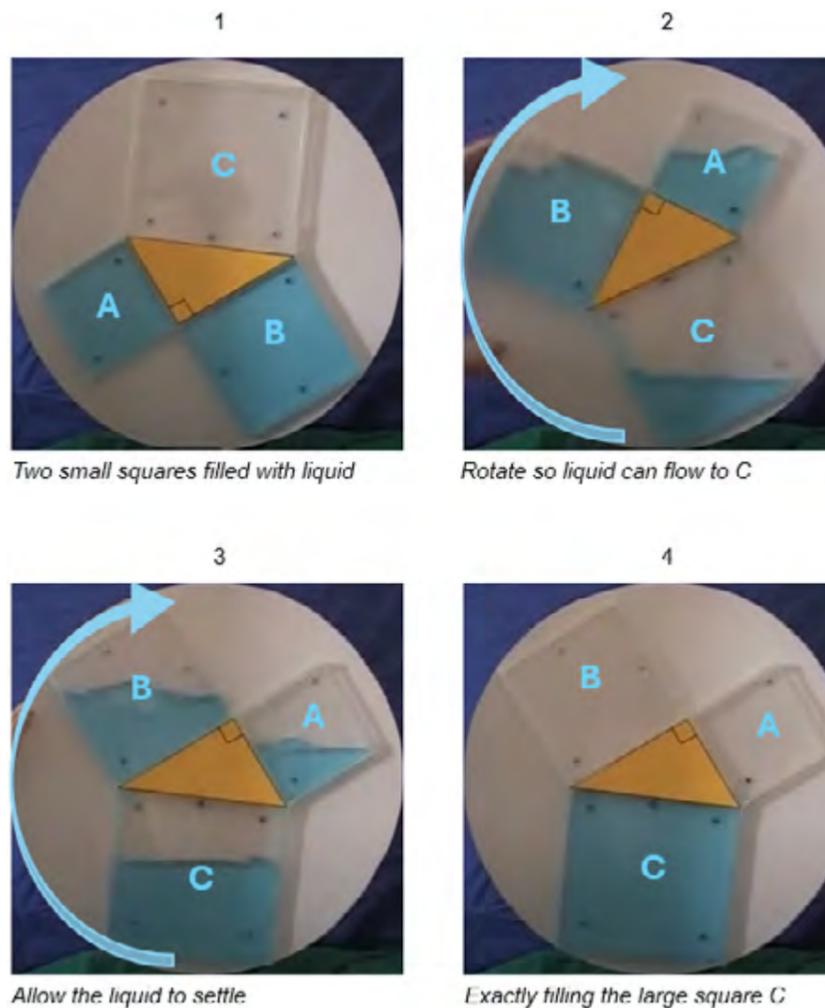


Image 1.

A simpler formula that you all may remember is Pythagoras' Theorem: $a^2 + b^2 = c^2$

Ask yourself if that was just a formula etched into your brain to use in a test.

Now look at the images below (1, 2, 3, 4), imagine that $a^2 = A$, which is a square (pardon the pun). The area of square A is of course a^2 and so on for B and C.

Two small squares filled with liquid — Rotate so liquid can flow to C

Allow the liquid to settle — Exactly filling the large square C

Seeing is believing!

Credit to Pythagorean theorem water demo - YouTube for a brilliant experiment.

So why is the title of this article “Draft Survey Theory”? Well, I’m glad you asked. Thank-you to Deane from the Curiosity Show.

Draft surveys work on Archimedes’ Principle, which states that “The weight of a floating object equals the weight of the liquid it displaces.”

Warning – if you read the Wikipedia page on this you will probably be bored to tears and fall asleep: Archimedes’ principle - Wikipedia.

Image 2

Here is a ship model, made by one of our surveyors, all fast in our float tank.

Image 3

And here is her cargo. 500 grams of valuable bulk material.

Image 4

We load her cargo carefully and, as she gets deeper, we capture the water displaced which exits from the spout on the right into our container.

Image 5

The water displaced is 500 millilitres, weighing 500 grams as it is fresh water.

In the real world, we can’t capture the water displaced in the harbour but we can use the ship’s hydrostatic tables and some maths to calculate our draft surveys with a high degree of accuracy.

If you are a visual or kinesthetic learner like me, then I suggest you create your own training experiments to help your employees better understand some of the marine concepts you deal with day to day. Help the future generation of marine professionals understand the how and why of the job.

Capt Louis Koutelas
Director and Senior Marine Surveyor
Hunter Marine Surveyors
AIMS Member



Image 2.



Image 3.



Image 4.



Image 5.

Understanding IT networks

(It is not about Information Technology)

UNDERSTANDING the distinction between an AC electrical network isolated from the earth, which is an IT (Insulated Terre), and the commonly used TN-S (Terre Neutral - Separated) network, which is generally used on DCV vessels, is crucial. (See Figure 1.)

This knowledge will enable you to make informed decisions and ensure the fundamental safety of the electrical installation is met when working on, designing or approving a drawing.

The use of IT installation is acceptable within Australia and is detailed within the following Standards:

- ❑ AS/NZS 3004.2 - Electrical installations Part 2: Boat installations.
- ❑ AS/NZS 3007 - Electrical equipment in mines and quarries, surface installations, and associated processing plant.

This type of electrical installation is common for ships, as it allows equipment to operate with an earth fault to increase continuity of service. The best example of why this is so important is for steering gear, as tripping due to an earth fault is

to be avoided, particularly when manoeuvring is restricted.

Another significant advantage of IT installations is their practical and economical nature. By eliminating the need for a neutral wire (three-wire network), they reduce associated costs, making them a practical and economical choice for ship electrical systems. It's important to note that a four-wire network can also be an IT installation.

Dealing with an IT network requires a level of exposure and experience that only comes with time. This understanding is crucial when dealing with an above-earth network, as it's easy to fall into the mindset of a TN-S, also referred to as a Multiple Earth Neutral (MEN) Network. While the fundamentals are the same, there are specific safety requirements that must be understood and met for an IT network to ensure safe operation.

However, over the past six weeks, I noticed some serious misunderstandings of how an IT network is meant to operate safely. This happened because a couple of vessel owners engaged me regarding their electrical installation, and both provided DCV-approved electrical plans for reference.

In both cases, a common theme was present: the principles of a TN-S network were applied instead of those required for an IT network.

What has been missed was the consideration of the fundamental principle of IT networks, which is that of a First Fault Condition and safety requirements that shall be available:

- ❑ Permanent monitoring of the insulation to detect a First Fault to Earth occurrence and alarm.
- ❑ For a four-wire system, a device limiting the voltage the neutral can supply and reach the Earth.
- ❑ In a Second Fault to Earth occurrence, the appropriate circuit breakers shall trip.

Unlike a TN-S network that trips protective devices on a First Fault, an IT network will alarm on a First Fault, and it is important to have a process for identifying the fault location and rectifying it before a Second Fault occurs.

It is to be understood that one system is no safer than the other, as both can cause fire, electrocution or death. Both require specific safety devices and monitoring to manage the risk

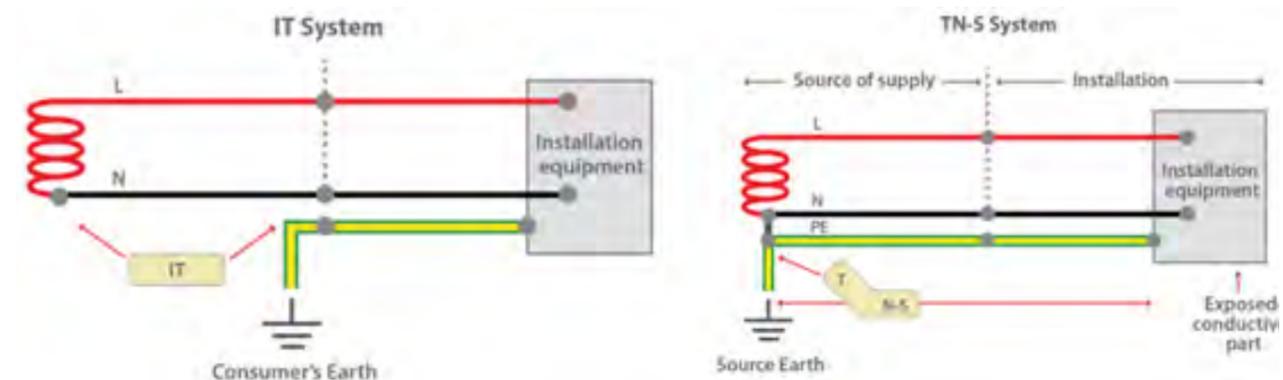


Figure 1: IT and TN-S Network Installations

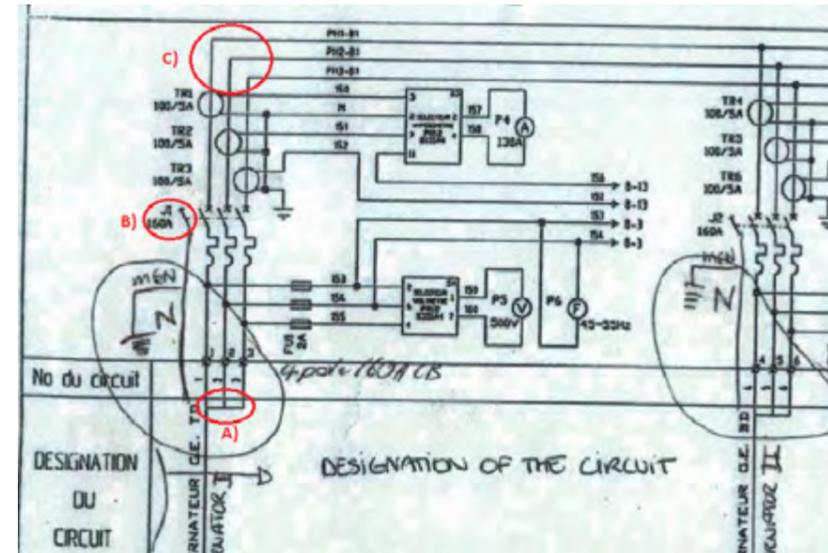


Figure 2: Genset wiring to the MSB.



Figure 3: Genset windings - Delta configuration.



Figure 4: MSB incoming power supplies to three-pole contactors

when designing and approving installation schematics.

With this article, I hope to pass on some knowledge of the identified safety issues associated with both these cases, and provide a summary of safety issues caused by applying the wrong fundamental principles to an IT network about the design of these installations and works conducted.

Case 1. Ex-French (South Pacific) fishing trawler

The vessel electrical installation is an IT three-wire network of 380-volt, and the step-down transformer into a three-wire 220-volt distribution. The owner also has a copy of a sister ship's DCV-approved electrical schematics, and was looking to sign this vessel off under the NSCV clause for sister ships and would need only some simple modifications.

The initial review of these drawings found that the marked-up changes to convert the original network from an IT to a TN-S installation. These changes, if implemented, would have introduced a significant electrical risk to the crew and the vessel if the sister ship drawings had been approved.

This paper highlights these serious misunderstandings when identifying the functionality of the IT network and the modification required to change to a TN-S network.

Sister ship electrical schematics

The primary requirement to convert the network to a TN-S is that a neutral will need to be installed from the gensets, and the main switch board (MSB) will need a neutral busbar installed and run to all distribution boards.

The modification design shown in Figure 2 for the incoming generators to the MSB details the design change of installing a

neutral to the four-pole contactor shown in the drawing and making the MEN at this point.

There are three issues with this modification of the IT that have not been considered:

a. The gensets windings are connected in Delta for a three-wire network, and no neutral is fitted (Fig. 3). The windings

can be changed to a Star configuration, and a neutral conductor can then be installed and run to the MSB.

b. With a genset neutral conductor installed, this will need to be connected to the fourth pole of the MCCB, as shown in Figure 2. Unfortunately, there are a series of blunders made that have not been recognised and these are:

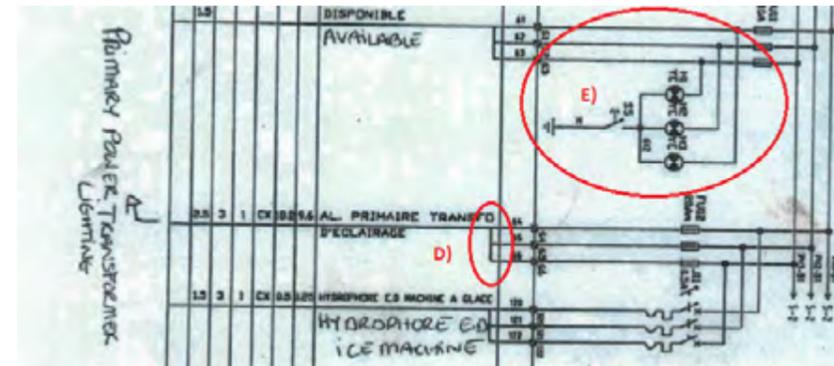


Figure 5: MSB 380-volt Distribution.

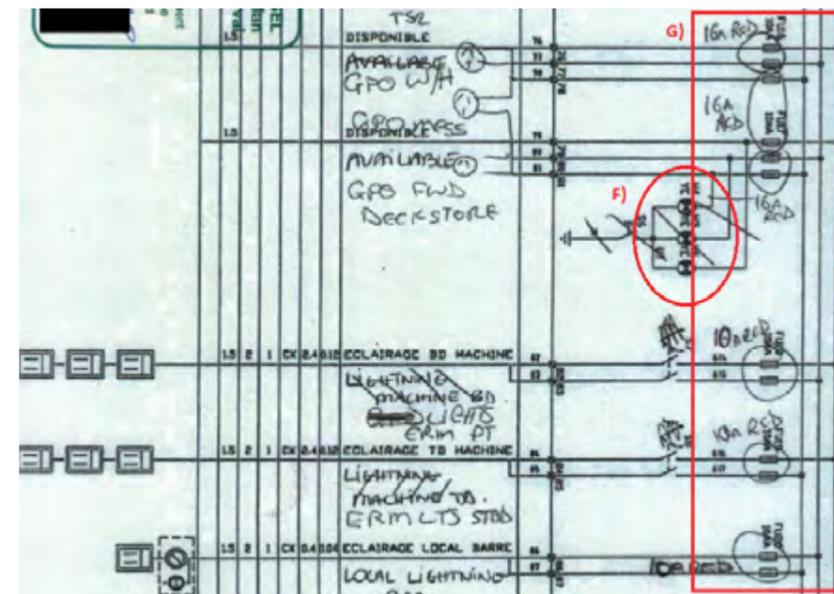


Figure 6: MSB 220-volt Distribution

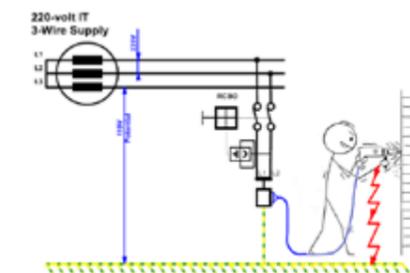


Figure 7: First Fault

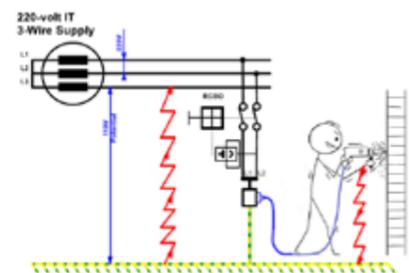


Figure 8: Second Fault

i. The drawing (Fig. 2) shows that the incoming neutral looks like a spare contact on the MCCB. This is an axillary contact only and is used for the interlocking system to prevent a second supply from being placed in the non-synchronised MSB.

ii. The contactor is only three-pole and would require the contactor to be changed out for a four-pole model (Fig. 4).

Figure 4: MSB incoming power supplies to three-pole contactors

c. The MSB is not fitted with a neutral busbar for the distribution network and would require significant modification to fit this into the existing MSB.

d. The 220-volt supply is transformed from the 380-volt network, and there has been no design consideration of decommissioning the 380/220-volt transformer and how to establish a neutral conductor in the 220-volt network (Fig. 5).

e. The earth lamp testing circuit should have been removed if the 380-volt network was modified to a TN-S network (by adding a neutral). Leaving this test arrangement in the circuit would create a circuit fault and trip RCDs whenever the test button is depressed (Fig. 5).

f. The earth lamp testing circuit should not have been removed if the 220-volt network, as identified in point E), the step-down transformer is a three-wire arrangement to the primary and secondary windings.

The 220-volt distribution is an IT network with no neutral fitted, and a first fault indication warning is required (Fig. 6:). From the drawing, it appears that this circuit is to be removed.

g. This installation of RCDs (or RCBOs) to a three-wire will

never trip because an imbalance between the active and neutral needs to be energised in the RCD's trip coil. There is no neutral in a three-wire as all conductors are energised are 110-volts.

RCD / RCBO

Understanding why RCD/RCBO devices will not trip on a delta-wired 220vac transformer requires some explanation. This circuit distribution is still a three-phase network; voltages between phases are 220V, with the potential to earth of 110V.

Figure 7 shows the first fault; the person is isolated, so there is no circuit. However, the earth monitoring alarm (see the section "Insulation Monitoring Device" below) will go into alarm, warning of an earth fault. If there is a second fault (Fig. 8), this will create a circuit that will conduct through the person. The RCD will not trip in a three-wire IT network, as there will be no imbalance between the two active conductors. But conductors will continue to supply 110 volts.

This is a critical oversight by the AMS, who undertook the review and circuit changes and approved the design.

Insulation monitoring device

The OEM of these devices requires the device to be fitted directly to the 380V three-wire delta distribution system busbar, but the electrician did not read the installation instructions and chose to place a four-amp MCB between the device and the phases. (Refer to Fig. 9.)

The issue with this arrangement is that the four-amp MSB could trip with a First Fault, and monitoring will be lost.

The electrical schematics also detailed a second insulation monitoring device to be installed on the 220V network. Again, it was decided that it was not required and considered that

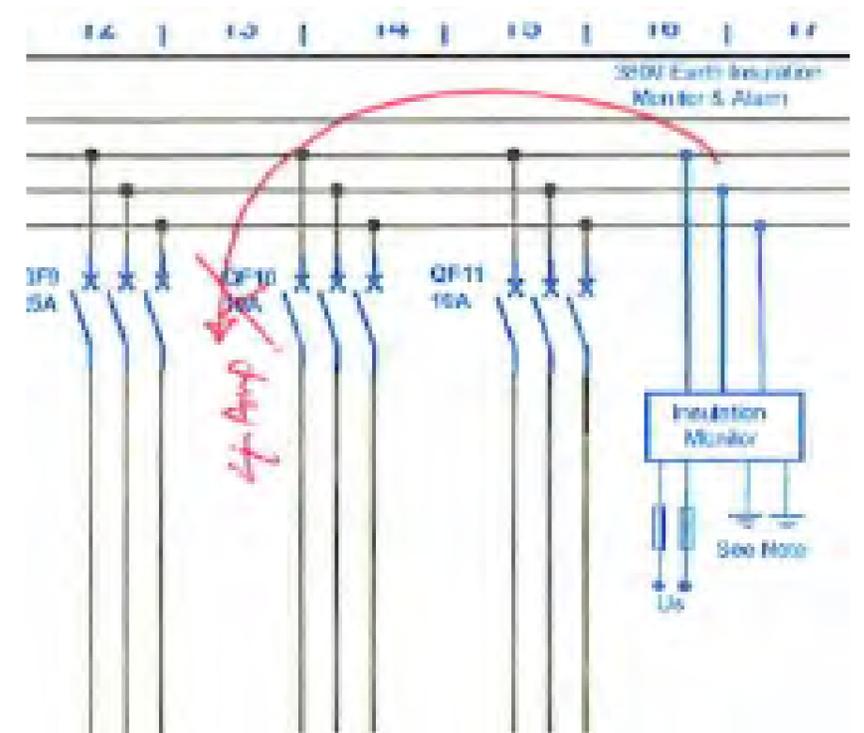


Figure 9: Insulation Monitoring Device Installation.

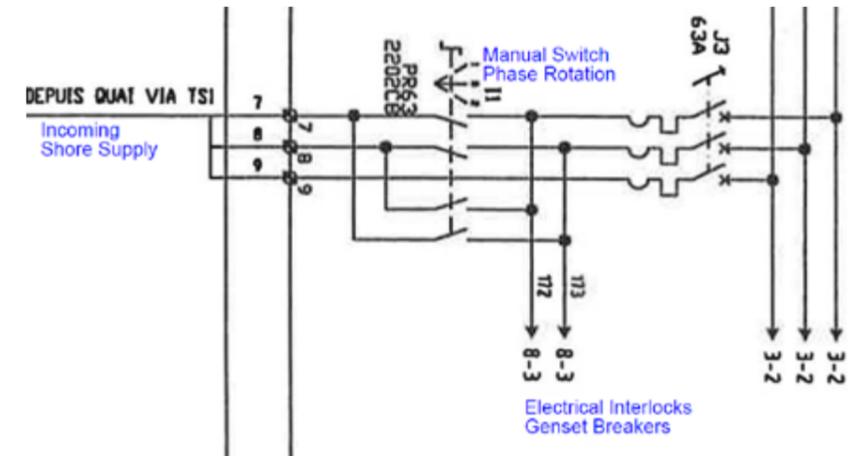


Figure 10: Shore Supply.

the network was a four-wire star (with a neutral) distribution system, not realising that the 220V network was a three-phase distribution supplied by a step-down transformer from the 380V busbar.

Shore connection arrangement

The shore connection circuit arrangement shown in Figure 10 is a simple installation. It comprises a manual phase rotation switch (note that there is no indication device for phase

rotation) and manually selected electrical interlocks for the shore power and the gensets.

The incoming shore supply was wired to the vessel's power distribution, with the three active and earthing of the vessel's electrical installations. The neutral was not connected and was terminated. At some point, it was discovered that the Insulation Monitoring Device was reading 0Ω.

Once again, the electrician failed to understand that the

vessel was an IT network system, connected the three-phase (no neutral), and energised the system.

Case 2. 12-metre fibreglass fishing boat

Recently, this boat owner contacted me concerning galvanic corrosion on his three-month-old vessel. As part of the review, AMS-approved schematics were provided to help in tracking down the cause. In the end, it was found that the galvanic isolator had been fitted incorrectly.

However, during the review, some serious faults were found in the schematics (Fig. 11), particularly in the protective earthing network.

The first safety feature noted was that the fibreglass boat hull had no earthing plate. I informed the electrical contractor of the need for this plate, as detailed in the AS/NZS 3004.2, an earth plate complying with Clause 7.1.2 in such a manner that it will always ensure an immediate discharge of electrical energy without danger. The installation had all the protective earth running back to the casing of the inverter, which was isolated from the sea (with no earthing plate).

The contractors responded that the installation was an above-earth system and did not require this plate.

The contractor's dearth of

knowledge about the differences in circuit design between an IT network and a TN-S network was plain to be seen. What is also noteworthy was that the AMS, who had undertaken the review and approval of the installation circuit arrangement, has not noticed the serious failure in the design of not having an earthing plate.

There were also issues with lithium battery installation not making the minimum requirements as detailed in AS/NZS 3004.2.

I will not go into detail of the safety issues of the battery installation in this paper and will save this for my next article. However, one important point is that the inverter casing earth cable is to be connected directly to the earthing plate. This PE cable will be the same size (or the next size down), as that of the positive and negative DC cables and was not fitted.

Summary

The knowledge shown in the above two cases demonstrate there is a lack of understanding of the functional safety requirements for an above-earth electrical installation.

The basics are:

- ❑ Insulation Monitoring Device needs to be fitted.
- i. 2 Devices required for a three-

wire network installation (transformed 220V)

- ii. 1 Device required for a four-wire network installation (400/220V)

Note a device must be fitted to limit the voltage the neutral can supply and reach the Earth for a four-wire network.

- ❑ The insulation monitoring device are to alarm at the first earth fault
- ❑ RCDs will not trip in a three-wire IT network
- ❑ RCDs will trip in a four-wire IT network (but only after the second earth fault).
- ❑ Use of electrical hand tools and appliances in IT networks: An insulation transformer is recommended to provide additional protection.

I hope to instil in readers the importance of being aware of the type of electrical system installed. This would be most relevant to transitional vessels, as there may not be any drawings or modifications that have been undertaken that no longer reflect the vessel installation.

Generally, I recommend an inspection before approving electrical installation drawings as AMS for supplied schematics for a transitional vessel.

Finally, with relation to the second case study of the fibreglass-hull vessel with no earthing plate and the network set up as TN-S and thinking that this was suitable as an IT network, as the protective earth conductor was above earth. This can be seen as a complete failure of the electrical safety in the design, approval, installation, and the initial survey.

Mark Smith
SET Maritime & Electrical
AIMS Member

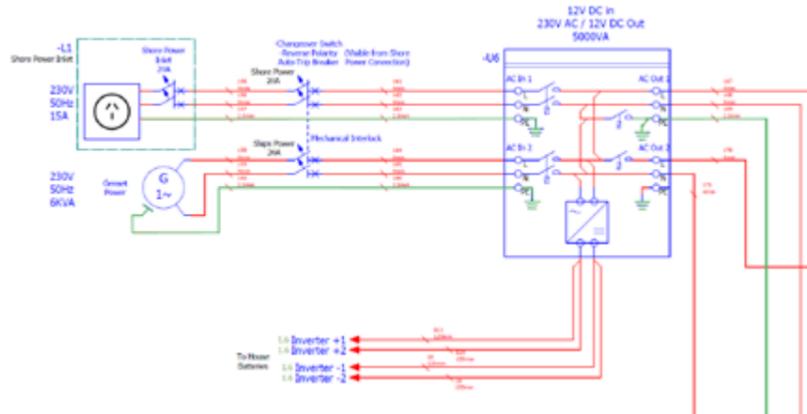


Figure 11: AC Circuit Diagram.

Synthetic / Composite Rigging Part 2: Synthetic Running Rigging for Yachts

RUNNING rigging is the rigging of a sailing vessel that is used for raising, lowering, shaping and controlling the sails on a sailing vessel – as opposed to the standing rigging, which supports the mast and bowsprit.

Running rigging is the cordage used to control the shape and position of the sails.

The rigging of sailing vessels, including running rigging, has always evolved to take advantage of the best materials available at the time. In 1957, Samson engineer Kenneth L. Fogden invented the first synthetic double-braided rope.

This invention revolutionised the use of rope for almost every application, including running rigging for yachts.

Synthetic running rigging

The evolution of running rigging has been a progression from natural fibre ropes (hemp and cotton) through various man-made fibres to high performance man-made fibres (Figure 1).

High performance fibres

Many new types of synthetic fibres have been discovered in recent years. Typically, they are initially used in aerospace applications and later become

available for other application where high performance is required. Most recently, man-made HMPE fibres have revolutionised running rigging for yachts.

There are many man-made fibres that are used in ropes in running rigging of yachts. However, this article will focus on ropes using HMPE fibre “core” in both covered and uncovered forms.

HMPE

Dyneema™ / Spectra™ fibres were first introduced into the marketplace in 1985, after a decade of intensive research, engineering and development by the Allied Fibres division of Allied Signal Technologies.

Spun from a solution of Ultra High Molecular Weight Polyethylene (UHMWPE), HMPE fibres combine a very high degree of molecular orientation with a very low density, which results in fibres with unique and

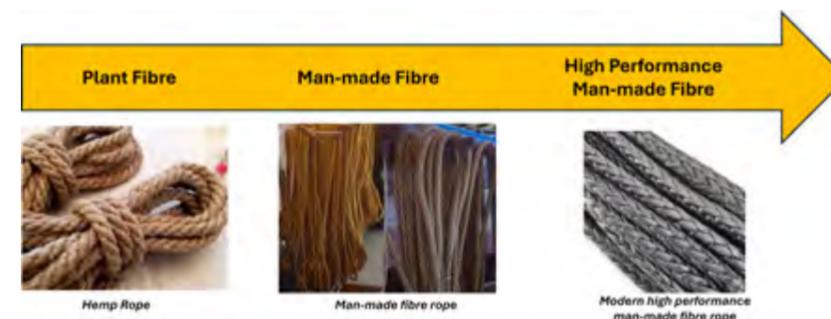


Figure 1: Evolution of rope for running rigging.

Grade	Description	Typical Usage	Vendors include but are not limited to:
SK75	For many years the strongest Dyneema grade and the standard material that everybody understands.	<ul style="list-style-type: none"> • Standing Rigging • Running Rigging • Lifelines 	Hampidjan: Dynice Dux™ (heatset and stretched) New England Ropes: STS™ (Stronger than Steel) Fineline: FX™ Liros Armare: Dyneforce
SK78	SK78 has the same strength as SK75 but offers significantly improved elongation and creep characteristics	Running Rigging	New England Ropes: HTS™ Hampidjan: Dynice 78™, Dynice 78 Ultrabend™ Liros Armare: Dyneforce™
SK90	10% - 15% strength improvement over SK75 and SK78. Elongation and creep characteristics same as SK75. Superseded by SK99	Running Rigging	Donaghys: SK90 Single Braid Ocean™ Liros
SK99	SK99 has an unmatched strength to weight ratio and has carved a niche for itself as the ultimate performance core material. SK99 has 20% strength advantage over SK78 and retains the same elongation and creep characteristics as SK78	Running Rigging	Dynice SK99 Dux™ Liros Armare: Dyneforce™
DM 20	DM 20 is the newest ultra-low creep fibre from Dyneema. This fibre is designed for use in applications where the rope is under constant load for long periods.	<ul style="list-style-type: none"> • Standing Rigging • Lifelines • Core of rope used for halvyards 	English Braids: Dynastay™ Marlow Ropes: M-Rig Max™ Hampidjan: Dynice Perma™ Armare: Dyneforce™ DM20

Table 1: Dyneema Grades and Usage.

quite extraordinary performance profile.

Even among the so-called high-performance fibres, the unique physical properties of HMPE place it in a class of its own. It is marketed under the trade names of Spectra and Dyneema. The most common HMPE is that sold under the Dyneema™ trade name.

There are three properties of HMPE (Dyneema™) fibres



Figure 2: 12 Strand Braided Rope Construction. Diagram adapted from Rui Pedro Faria (Lankhorst Euronete)

that have driven new capability in running rigging design and usage:

- ❑ Strength;
- ❑ Strength to weight ratio; and
- ❑ Low friction (slippery nature) of the surface of the fibres.

Usage of synthetic (Dyneema™) fibres for running rigging is “disruptive technology” that has introduced new innovative concepts and equipment, which

in time will replace many of the current approaches and practices.

Synthetic HMPE braid rope

Synthetic HMPE single braid rope is a very different material to other types of rope made from other fibres, and has a set of mandatory design requirements that must be used for design, sizing and termination.

Running rigging is not as critical to the safety of the craft and its crew as standing rigging is, but the application and adherence to best practices is strongly advised.

With HMPE (Dyneema™) running rigging applications, there is some tolerance for the

use of, sizing, attachment and termination of HMPE line.

The marine surveyor must highlight to the client non-adherence to best practice and incorrect application.

12 Strand braided rope

Twelve-strand braided rope is constructed from two groups of six separate twisted strands that go in different directions.

- ❑ Is a hollow braid, as there is an empty space in the middle, making it easy to splice and inspect for damage.
- ❑ Is a light, flexible and easy to handle rope, with a round and smooth surface, which makes it resistant to abrasion.
- ❑ Is based on its construction a

non-rotating torque balanced rope which can be used in either static or dynamic rope applications.

- ❑ The braided rope is available in a covered and uncovered form (Figure 3).
- ❑ The braided rope is coated to reduce chafe and to reduce degradation from UV light (sunlight).

Dyneema Grades / Variants and Usage for Running Rigging

Materials Properties and Considerations

A rope is made up of twisted yarns and each yarn contains hundreds of filaments. Every time a rope is flexed, the fibres slide across one another, causing the filaments to abrade and,

eventually, to break – thus reducing the strength of the rope.

This fatigue is a cumulative process and, if unchecked, this will result in the rope eventually having a strength less than the working load, resulting in an in-service failure.

One of the challenges with running rigging is that the number of fatigue cycles to which it has been or will be exposed is not easy to determine. Assuming no damage, service life duration is established to ensure that rigging is removed from service before fatigue becomes a factor.

Terminating running rigging

Terminating high-modulus fibre ropes is a challenge due to the fibre’s unique sensitivity. When loaded in tension, the rope will only be as strong as its end termination fitting.

If a high modulus fibre rope is terminated with a knot, it will experience a loss in breaking strength of 80 per cent or more. The breaking strength at the knotted termination will further degrade over time as the fibres weaken fatigue under concentrated compressive stresses.

Traditional and standard rope terminations provide limited connectivity; however, specialised terminators have been developed

HMPE (Dyneema™) Fibre Property	Considerations for Running Rigging
Constructional Stretch	<i>Not an issue.</i> Running rigging is frequently re-tensioned. Do not use heat set rope
Conventional Stretch	<i>Not an issue.</i> <ul style="list-style-type: none"> • Sizing is based on Minimum Breaking Load (MBL) for application.
Creep	Typically, not an issue. <ul style="list-style-type: none"> • Use high strength fibre variant. • Running rigging is frequently re-tensioned.
Fatigue	Addressed by appropriate service life
Working Load % of MBL	Limit to 20% of MBL (spliced)
Preload (induces creep)	<i>Typically, not an issue</i> except for halyards, running backstays and running backstay tensioners. <ul style="list-style-type: none"> • Use rope with polyester cover and Dyneema™ DM20 Core • Limit pre-load - (WLL of 20% MBL for spliced rope) will also limit creep.
Working Load relative to Maximum Breaking Load (MBL)	20% of MBL for spliced rope.

Table 2: Dyneema™ Fibre Properties Considerations..

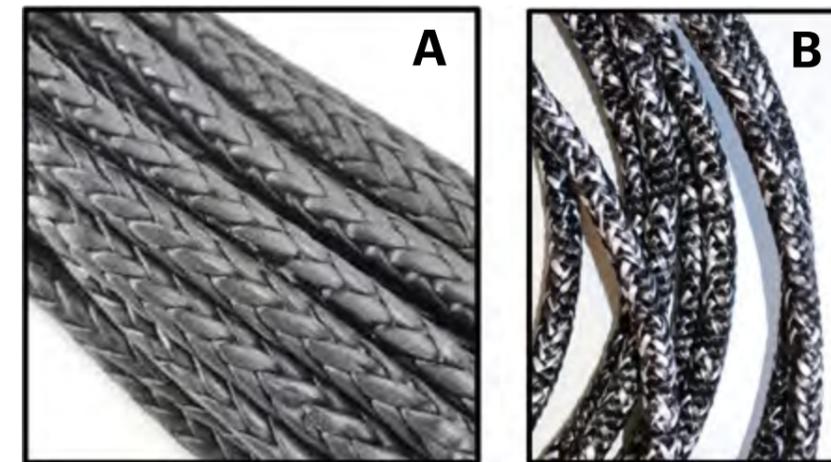


Figure 3: 12 Strand braided Dyneema rope of a 12-strand braided construction uncovered (A) and covered (B) Pictures by the author.

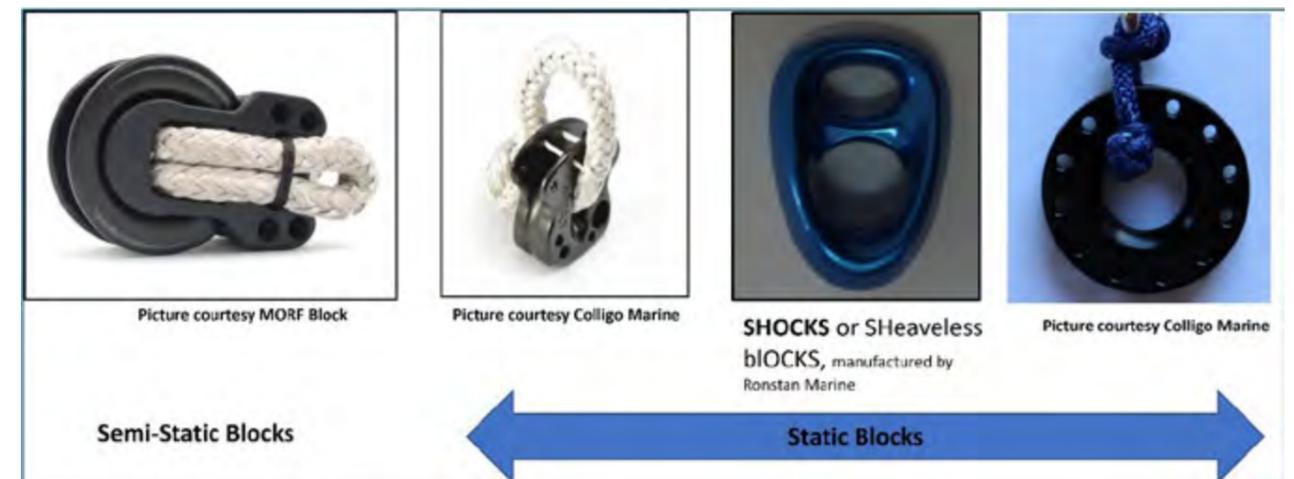


Figure 4: Semi-static & Static Blocks



Figure 5: Ronstan Block with soft attachment

to terminate synthetic braided rope rigging.

Braided Dyneema™ rope is spliced using a Locked Brummel splice around special terminators or sailmakers' thimbles. Splicing reduces the breaking strength by about 20 per cent.

“Historically, rope terminations have been the primary hurdle to overcome to take full advantage of the benefits of high modulus synthetic rope.” - Applied Fibre

The low friction coefficient of HMPE (Dyneema™) fibres may be a disadvantage for some applications, such as winching and cleating, however it has been

advantageous to the development new running rigging equipment:

- ❑ new types of blocks; and
- ❑ a new type (textile) rope clutch.

The new types of blocks (figure 4) that have been developed include:

- ❑ conventional blocks evolved to use synthetic attachment / fastening;
- ❑ semi-static blocks; and
- ❑ static blocks.

Conventional blocks with synthetic attachment

Synthetic line attachment of traditional blocks has been available for some time from the traditional manufacturers, such as Harken, Ronstan, Holt Marine and others (figure 5). These variants of the traditional blocks typically use HMPE (Dyneema) links or loops (loupes) at the head for attachment.

This replaces the stainless-steel head post and shackle arrangement of traditional blocks and yields a reduction in weight of 15 to 20 per cent when compared with the same block with stainless steel head post and shackle.

Conventional blocks with synthetic attachment have the following advantages:

- ❑ no hard (stainless steel) shackle is required;
- ❑ attachment can rotate to better align with load path;
- ❑ reduced weight; and
- ❑ “sailor friendly”.

Static and semi-static blocks

A static block is a block with a fixed (non-rotating) sheave, typically manufactured from low-friction plastic or aluminium with a hard anodised surface. Instead of rolling on a pulley sheave, the active line simply slides on the inside smooth surface of the ring or curved profile.

Static blocks provide outstanding strength to weight

ratio where the absolute minimum friction of a ball bearing block is not required.

Static blocks take advantage of the low-friction nature of the synthetic HMPE (Dyneema) line, which allows it to slide over the (fixed) sheave. It is simple, lightweight and effective, with no moving parts. Static blocks require HMPE Dyneema core or line with a low friction Dyneema® fibre and polypropylene blended cover.

The low-friction ring and Ronstan SHOCKS™ (Figure 6) are the simplest form of static block and many “styles” are available from numerous suppliers, including, but not limited to, Colligo Marine, Morfrac, Antal, Nodus Factory, Ropeye, Tye Tec and Ronstan.

Semi-static blocks

A semi-static block (figure 7) has a sheave which is similar to the low friction ring, which rotates on a low friction synthetic Dyneema™ rope bearing surface (not ball bearings or needle bearings).

Semi-static blocks take advantage of the low-friction nature of the synthetic HMPE (Dyneema) line, which forms an axle round which the sheave

rotates to slide over the sheave. It is simple, lightweight and effective, with no moving parts.

In static and semi-static block applications, the contact is between a low-friction static ring or sheave and the HMPE fibre rope. The contact between these two components creates a complex mechanical loading: both tension and compression are present, together with temperature increases due to friction.

Experience with semi-static and static applications has revealed an interesting polishing phenomenon on the contact surface of the HMPE (Dyneema™), known as “lustering”. The lustering phenomenon is the result of compaction of the filaments of the HMPE rope loop.

Lustering results in a decrease in the friction of the HMPE fibres, which enables static and semi-static block applications, and can also be observed in the contact region between the eye splices of tensile rope samples and terminators of standing rigging.

Many “styles” of semi-static blocks are available from numerous suppliers, including,

but not limited to, Colligo Marine, Morfrac, Nodus Factory and Ropeye.

Static block, low-friction rings and sheaveless blocks start having frictional heating and wear problems when there is significant line movement, so they are not a suitable replacement in all applications.

Semi-static blocks have rotating sheaves and bearings and are suitable for halyard blocks and similar applications with moderate irregular line movement.

Conventional blocks (pulleys) are still better for applications such as mainsheet blocks where there is significant and frequent line movement which would cause heating from friction and wear problems on static or semi-static blocks.

Cleating

Uncovered HMPE line has a slippery surface and cannot be easily handled or cleated.

The tail of running rigging must be held for adjustment and be cleated so a cover is required on the part being handled and cleated.

Only certain types of cleats are suitable for modern synthetic ropes.

Types of cleats that should not be used include (Figure 8):

- ❑ conventional cleats [A] (unless the diameter of the part around which the rope is lead is twice the diameter of the rope or greater);
- ❑ jam cleat [B]; and
- ❑ rope jammers [C].

Types of cleats that can be used include (Figure 9):

- ❑ cam cleats [D];
- ❑ clutches [E];
- ❑ clam or valley cleats [F]; and
- ❑ textile clutches (Constrictors®).



Figure 6: Low friction ring (left) and Ronstan SHOCKS™ (right)



Figure 7: Semi-static blocks. (Picture courtesy MORF Blocks - Morfrac)



Figure 8: Cleats not suitable for modern synthetic ropes.



Figure 9: Cleats suitable for modern synthetic ropes.



Figure 10: Constrictor® Clutches. Picture courtesy SailTek Ltd / Ronstan UK.

Constrictors®

Constrictors® are a new type of rope clutch (Figure 10).

Unlike conventional clutches, the Constrictor® system does not crush the rope between two metal surfaces. The loaded rope is held securely in a textile sleeve, itself attached to a base unit.

When the clutch is enabled, the rope runs freely through the sleeve in one direction but is gripped instantly when running out in the opposite direction. This patented “constrictor effect” provides greater holding power as the load increases.

Usage and maintenance

With synthetic rope rigging, there are additional services that can be provided by the marine surveyor, as this rigging is easily inspectable in service. Detailed surveying is prudent, as some forms of synthetic rope rigging can and will be done by yacht owners as DIY projects.

Composite / synthetic running rigging is gaining acceptance and widespread use on sailing craft

of all forms, from monohull to multihull, racer and cruiser.

Further articles in this series will cover synthetic attachments and synthetic lifelines. This will enable a good understanding of the usage of HMPE for rigging and its inspection.

This series of articles with present both composite and synthetic rigging but will focus more on synthetic rope rigging, which is emerging as the area where a marine surveyor can expand their service offerings and add additional value.

Resources

- ❑ The IIMS Marine Surveying Reference Guidebook “What a marine surveyor needs to know about synthetic (composite) yacht rigging” - <https://www.iims.org.uk/product/what-a-marine-surveyor-needs-to-know-about-synthetic-yacht-rigging/>
- ❑ Colligo Marine <https://www.colligomarine.com/>
- ❑ Online Ropes <https://onlinerores.com/history-of-rope.html>
- ❑ Locked Brummel splice

- Polman, Jan-Willem (2016). Splicing Modern Ropes. London, New York: Bloomsbury. p. 39. ISBN 978-1-4729-2320-2

- ❑ New England Ropes https://www.neropes.com/fileadmin/user_upload/NERopes/Downloads/Catalog/Pleasure-Marine-Catalog-2017-WEB.pdf
- ❑ Harken - <https://www.harken.com/en/>
- ❑ Nodus Factory - <https://www.nodusfactory.com/fr/>
- ❑ Tye Tec - <https://www.tyetecl-loop-products.com/>
- ❑ Antal - <https://www.antal.it/eng/>
- ❑ Selden - <https://support.seldenmast.com/en/home.html>
- ❑ Ronstan - <https://www.ronstan.com/us/product-categories>
- ❑ Morfrac - <https://www.morfrac.com/morfracblock/>
- ❑ SailTek / Ronstan UK - <https://ronstan.co.uk/>
- ❑ Ropeye - <https://www.ropeye.com/>

Trademarks

- ❑ Dyneema™ tradename which is a trademark of Royal DSM N.V. <https://www.dsm.com/dyneema>
- ❑ Spectra™ is a tradename of Allied Signal Inc USA now Honeywell International Inc.
- ❑ Dynice Dux is a trademark of Hampidjan.
- ❑ Finesline 2.0 – Finesline New Zealand.
- ❑ Constrictor – Is a trademark of Ronstan.

Nick Parkyn
Marine Surveyor / Director
Nick Parkyn Consulting &
Design Pty Ltd

Cyber insurance

TECHNOLOGY has been a transformative force at an exponential rate over the last decade, becoming increasingly innovative, efficient and effective with every passing year. As businesses embrace these advancements, it has become the backbone of daily operations, enhancing clients experience with the best possible service and products.

However, while we admire how traditional business practices have evolved from paper records and filing cabinets to digital documents and laptops, we often overlook the new vulnerabilities this shift creates, which cyber criminals are increasingly exploiting.

Marine surveyors are on the frontline of the maritime industry, assessing the condition and safety of vessels. Like many other professions, marine surveyors are increasingly relying on digital tools like specialised software to take measurements, record observations and generate reports.

Communication channels such as emails, file sharing and remote work became increasingly popular thanks to historical COVID-related restrictions. All these forms of communications leave sensitive data shared and discussed via virtual means a real risk.

Meanwhile, cyber criminals are becoming more sophisticated, targeting businesses of all sizes



and industries. A cyber-criminal can cripple your operations, preventing you from completing your work and serving your clients using the following tactics:

- ❑ ransomware attacks, using malicious software to encrypt your files and demand payment for their release;
- ❑ phishing and social engineering, using deceptive emails to infiltrate your computers and networks, and impersonation tactics to steal funds; and
- ❑ data breaches because of malicious software allowing unauthorised access to sensitive data, leading to reputational harm and potential legal liabilities.

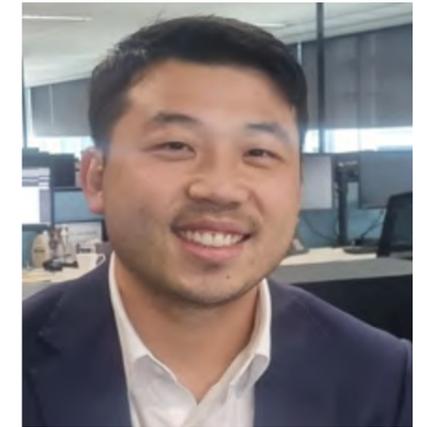
While robust IT security is essential, no system is impenetrable. Cyber insurance provides a crucial safety net when data breaches or attacks inevitably occur, minimising the stress and financial burden of the unknown.

A comprehensive cyber insurance policy is specifically designed to help businesses recover from the financial and operational impact of a cyber-attack.

It can cover a wide range of expenses, including the following.

- ❑ 24/7 incident response.

Immediate access to specialised cyber security professionals trained to isolate and mitigate damage.



Roy Chen.

- ❑ Data recovery. Restoring lost or corrupt files.
- ❑ Business Interruption. Covering lost income and expenses during recovery.
- ❑ Cyber-related crime. This covers stolen funds.
- ❑ Legal and regulatory costs. Defending against lawsuits and regulatory investigations.

Cyber insurance acts as a crucial safety net and should not be seen as a substitute for robust cyber-security practices.

For any business, the following measures are just as important:

- ❑ Commercial-grade anti-virus software;
- ❑ strong passwords and multi-factor authentication;
- ❑ regular software updates;
- ❑ employee training and awareness; and
- ❑ regular backup of data.

A cyber-attack can be devastating to your business – but it doesn’t have to be. By taking proactive steps to secure your systems and investing in cyber insurance, you can protect your livelihood and continue to provide the valuable services that the maritime industry relies on.

Roy Chen
Account Manager, Professional
and Cyber Risks
Austbrokers Countrywide

A novel approach to correcting a magnetic compass “stuck” on one heading through a 360° swing

1. Introduction

A WELL-MAINTAINED magnetic compass will, under normal circumstances, align with the Earth’s magnetic field, being a natural phenomenon (Figure 1), and point to magnetic North.

Total compass error (T/E) is the numerical sum of variation and deviation. Variation is a natural observable value that varies with location.

Deviation, on the other hand, is that component caused by magnetised iron (hard or soft) within the ship or an electromagnetic field created by electronic devices close to the compass position.

If a deviation causing magnetic field or electromagnetic field is stronger than the Earth’s magnetic field, then the compass needle will align itself to this new field (Figure 2).

On occasion, a vessel’s magnetic compass may become “stuck” on any one heading when the vessel is swung through 360°.

This is usually due to the compass being affected by an overpowering magnetic field or electromagnetic field within the vessel.

This, of course, may create a challenge to resolve, particularly when the cause is due to an electromagnetic field emitted from navigational electronic devices that the ship-owner is reluctant to move away from the preferred compass position.

2. Case Study

After embarking a new build (Figure 3) it became evident the magnetic steering compass heading was “stuck” on East when swung through 360°.

The vessel was fitted with

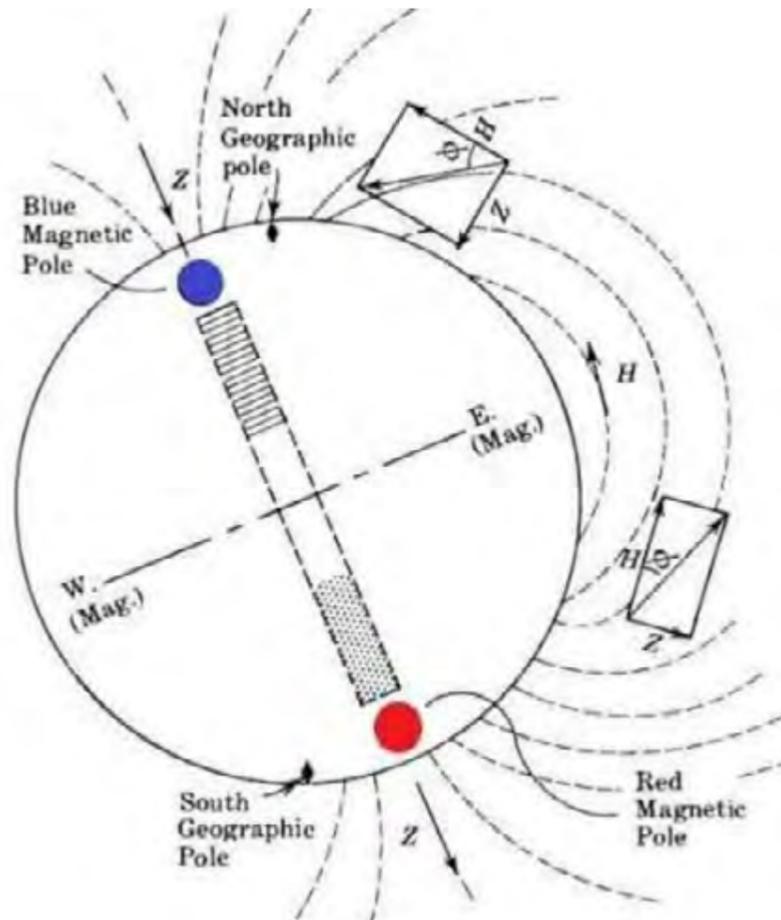


Figure 1. Earth’s magnetic field.

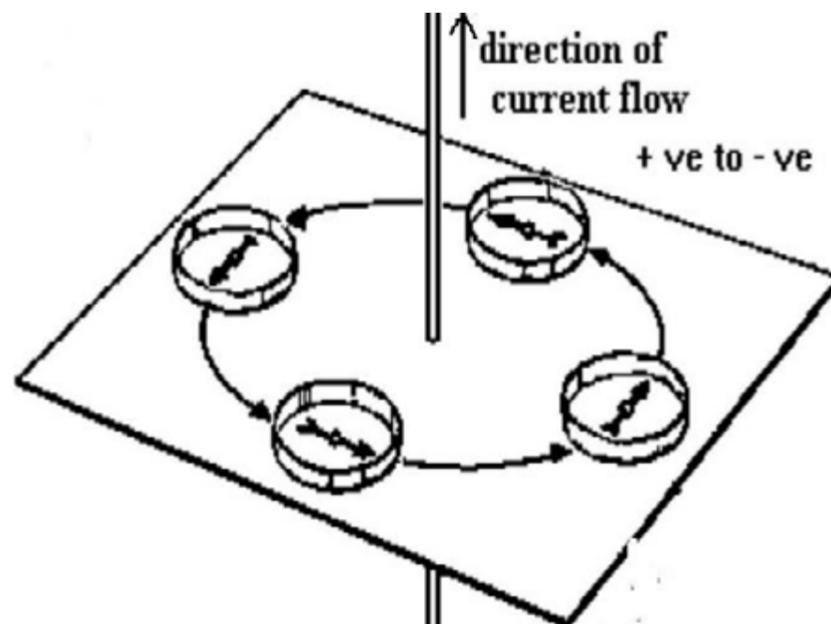


Figure 2. Current flowing through a wire will create an invisible magnetic field at right angles to the direction of the wire. This is validated by observing the deflection of a compass needle about the wire.



Figure 3. A new build 15-metre LOA foam-collared aluminium monohull.

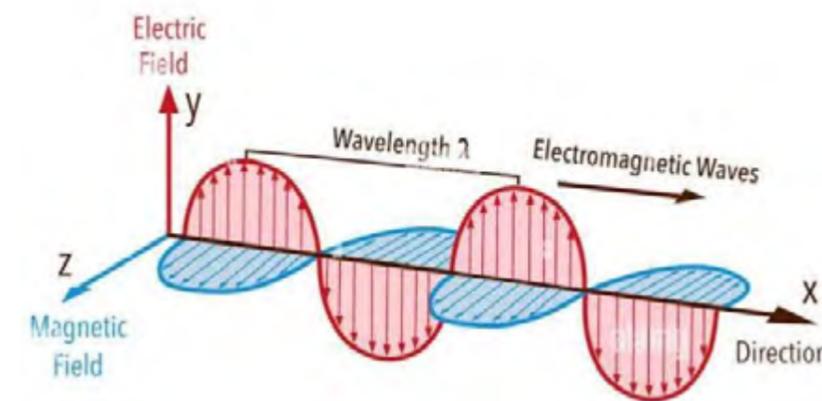


Figure 4. Electromagnetic waves.



Figure 5. The magnetic steering compass was removed from a circular hole cut in the console and a pocket (“cage”) was fashioned inside the hole using a sheet of aluminium foil and the compass reinstalled.

numerous electronic devices in close proximity to the compass position.

The compass was removed from its intended place and found to work and behave as a normal compass. However, the builder was reluctant to move the compass away from the electronic devices deemed to be causing the “locked” compass.

It seemed rational to conclude the compass was aligned with a very strong resultant electromagnetic field (Figure 4) directed athwartship, from starboard to portside.

Strategic positioning of powerful rare-earth magnets in the traditional manner had no effect and it was elected to try shielding the compass from the imagined, invisible electromagnetic field using a sheet of aluminium foil to create a quick, impromptu Faraday Cage (Figure 5).

Once completed, the compass was found to function normally and, following analysis, was corrected in the conventional way.

The following coefficients were determined:

- Coeff A +0.375
- Coeff B Nil
- Coeff C +1.5
- Coeff D +1.0
- Coeff E +0.75

3. Conclusion

In light of the aforementioned, it would appear the application of a Faraday Cage to be a useful tool in some instances where a magnetic compass is “stuck” on one heading due to an adverse electromagnetic field at the compass position.

Capt Peter Kerkenezov
BM and AIMS member
Mr Heyden Griffin

In detail: chasing shadows



ARE “dark fleet” ships painted black, or do they turn their lights off at night? It doesn’t work quite like that, but they certainly go to a lot of trouble to sail undetected.

The recent war between Russia and Ukraine has seen a large increase in the number of “dark fleet” or “shadow fleet” ships that are used to circumvent sanctions imposed by many countries on the sale of crude oil and LNG from Russia, as well as trying to avoid other sanctions.

Ships are usually identified by their IMO (International Maritime Organization) number. This is a unique number assigned to all sea-going merchant ships of at least 100 gross tonnage at the time of construction, generally upon the laying of the keel.

This measure aims to enhance maritime safety, prevent pollution and facilitate the prevention of maritime fraud. The number is assigned to each ship for identification purposes and remains unchanged even if the ship were to be renamed,

have a change of ownership or changes its flag of registration.

Another IMO requirement is that an automatic identification system (AIS) transponder is fitted on board ships of over 300 gross tonnage engaged on international voyages.

The transponder transmits the ship’s IMO number, the type and size of the ship, and its position, course and speed. The AIS is not supposed to be switched off and doing so might be to conceal illegal activities, which is exactly what happens with ships that are part of the dark fleet.

1) Flagging concerns

Lloyd’s List Intelligence estimates that the shadow fleet has grown to around 630 tankers, accounting for more than 14.5 per cent of the overall global tanker fleet. The industry estimates that the number is even higher, at more than 800 tankers.

The numbers mark a rapid expansion following the invasion of Ukraine in 2022 and western

restrictions on Russian energy exports, which has led to ships being hit with sanctions. There is now also evidence that, since the European pipeline gas trade has been cut off, Russia is boosting its LNG gas carrier fleet, including some ice-class vessels which are able to navigate the Northern Sea Route through the Arctic.

The shadow fleet uses “flag of convenience” shipping registry services, which means that vessels’ safety and inspection regimes are less stringent than those of more bona fide shipping registers. For instance, the shipping register of Gabon, a small Central African nation, recently doubled its number of ships on the register due to the reflagging of the Russian oil tanker fleet from the more reputable Liberian flag to avoid sanctions.

One of the ships on the Gabon register, a 1997-built oil tanker, exploded in Malaysian waters, killing three crew members last year. The ship was a write-off, uninsured and had a history of transporting Iranian oil.

Other less reputable flag nations, such as Laos and Eswatini (formerly Swaziland), Mongolia and Bolivia, all of which are landlocked, are following suit to assist the shadow fleet in transporting Venezuelan, Iranian, North Korean and Russian oil around the world. Unfortunately, many of these vessels are old, rusty and past their use-by date.

Global insurer Allianz recently issued its annual shipping report, in which it noted: “Much of the shadow fleet is likely poorly maintained and may not have undergone appropriate inspections. The average age of the tanker fleet is now 12 years, according to data from Clarkson. Almost a third of vessels are older than 15 years, and the ranks of aging vessels is forecast to expand rapidly in coming years.”

2) Dangerous transfers

Shadow tankers also participate in the dangerous practice of ship-to-ship (STS) transfers in protected waters, also turning off their AIS transponders to obscure their identity. “Such vessels have been involved in at least 50 incidents to date, including fires, engine failures, collisions, loss of steerage, and oil spills,” according to Allianz.

The IMO recently called on flag states to crack down on the illicit activities of shadow tankers and enforce regulations on STS operations. The IMO has also asked port states to subject potential shadow vessels to enhanced inspections.

To avoid some of the sanctions, “dark ship-to-ship” meetings take place in protected waters. North Korean-affiliated vessels were spotted conducting unofficial STS operations in the Sea of Japan, off the coast of North Korea, to transfer oil which originated in Russia.

Moving Russian oil through European waters has come under

greater scrutiny recently. An area in the Mediterranean off the south-east coast of Greece has seen Russian-linked tankers involved in STS transfers over the past couple of years.

In the north of Europe, countries are proposing a greater crackdown on Russia’s shadow fleet passing through the region, concerned about the potential for an environmental catastrophe with a number of near-disasters reported among the ageing fleet of tankers over the past year.

Two large oil tankers were recently involved in a collision in Malaysian waters resulting in fires on board both vessels. One of the vessels, the Ceres 1, a very large crude carrier, has been known to be involved in the transfer of Iranian oil, contrary to US sanctions, and has been observed frequently turning off its AIS transponder.

The vessel has Chinese owners and is registered in Sao Tome, a flag-of-convenience registry.

Crew members of both vessels were reported to be safe as of late July. Iranian officials denied that any Iranian oil was on board the vessel.

The big concern is that some older vessels – the global fleet is now the oldest in almost two decades – may not be properly inspected and maintained, leading to a catastrophic accident at sea.

“They’re an environmental disaster waiting to happen,” according to Lars Barstad, chief executive officer of the management unit of Frontline Plc, one of the largest owners of super-tankers. Let’s hope the shipping industry works collectively to avoid this happening.

Peter van Duyn
Director
ICHCA Australia

Note: This article was first published in the Daily Cargo News.

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Generative AI in commercial marine surveying: a transformative approach

THE integration of artificial intelligence AI into the maritime industry is progressing rapidly. A study by Zhao et al. (2021) in the Marine Technology Society Journal highlights the increasing adoption of AI, particularly in maritime logistics, where it significantly improves operational efficiency and safety.

This growing trend underscores the potential of generative AI to revolutionise marine surveying, making it a critical focus for the industry's future.

This comprehensive analysis seeks to explore the role of generative AI in commercial marine surveying, examining its opportunities, challenges and implications for the future. By leveraging the capabilities of generative AI, the maritime industry can transform its surveying practices, enhancing accuracy, efficiency and safety while preparing for future technological advancements.

Role of AI in marine surveying

Current Applications of AI in Marine Surveying

AI has begun to make a significant impact on marine surveying, particularly by enhancing data analysis

and predictive maintenance capabilities. Modern AI systems process vast amounts of data from various sources – such as satellite imagery, sensor readings and historical records – to deliver more accurate and timely insights (Li et al., 2020).

For instance, AI algorithms are used to assess hull integrity, predict equipment failures and optimise route planning, improving the accuracy of surveys and contributing to safer and more efficient maritime operations. This adoption marks a departure from traditional methods, which, while effective, often involve labour-intensive processes and are prone to human error (Tao et al., 2019).

Traditional methods vs AI-enhanced approaches

Traditional marine surveying relies heavily on manual processes like visual inspections, measurements and subjective assessments. These methods, although well-established, can be time-consuming and may vary in accuracy depending on the surveyor's expertise (Bai et al., 2018).

In contrast, AI-enhanced approaches offer distinct advantages: they can process extensive datasets quickly; and

provide consistent results and identify patterns to predict potential issues before they escalate (Xu et al., 2020). Additionally, AI systems offer continuous, real-time assessments rather than relying solely on periodic inspections.

The transition from traditional methods to AI-enhanced approaches is already evidenced by real-world applications. For instance, Wärtsilä's SmartPredict uses AI to analyse a ship's movement and predict its future trajectory, enhancing navigational safety (Wärtsilä, 2021).

Similarly, DNV GL's machine learning model predicts the degradation of offshore pipelines, improving maintenance planning and reducing operational risks (DNV GL, 2020). These examples demonstrate the tangible benefits AI brings to marine surveying.

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AI's integration into marine surveying offers numerous benefits, including improved accuracy, enhanced predictive maintenance and increased operational efficiency and safety.

However, these advancements come with limitations. The effectiveness of AI systems depends heavily on data quality and availability (Chen et al., 2021). Implementing these technologies requires significant upfront investment in both technology and training. Moreover, there is a risk of over-reliance on AI, which could lead to a degradation of human expertise. Interpreting AI decisions in complex scenarios can also be challenging, raising concerns about accountability and transparency (Johnson & Wright, 2020).

Despite these challenges, the potential benefits of AI in marine surveying are substantial. As the industry continues to evolve, addressing these limitations will be crucial while exploring the advanced capabilities that generative AI can offer.

Generative AI represents a significant advancement in artificial intelligence. Unlike traditional AI systems, which primarily analyse existing data, generative AI can create

new, original content based on patterns and structures learned from training data (Goodfellow et al., 2014).

This technology often utilises advanced machine learning models, such as Generative Adversarial Networks (GANs) or Variational Autoencoders (VAEs), to produce novel outputs. In the context of marine surveying, generative AI can extend beyond data analysis to generate predictive models, create detailed reports and suggest innovative solutions to complex problems. Its application could revolutionise the industry, offering unprecedented opportunities for innovation (Kingma & Welling, 2013).

Potential applications in marine surveying

Generative AI has the potential to transform several key areas within marine surveying. For example, it can enhance the accuracy of survey reports by analysing vast amounts of historical data, including past reports, sensor readings and imagery, to produce

comprehensive, accurate and standardised reports.

These AI-generated reports can provide detailed descriptions of vessel conditions, predictive maintenance schedules, risk assessments and customised recommendations for repairs or upgrades, significantly reducing human error and bias (Radford et al., 2019).

Generative AI can also improve operational efficiency by optimising various aspects of marine operations. For instance, it can generate and evaluate multiple route scenarios based on weather patterns, ocean currents and vessel characteristics, suggesting optimal routes that minimise fuel consumption and maximise safety (Reed et al., 2020). Additionally, AI can optimise crew schedules and resource allocation, improving the use of human and material resources across fleets.

In terms of risk management, generative AI excels at identifying patterns and anomalies, making it a powerful tool for this critical



Figure 1. Predicting an autonomous future

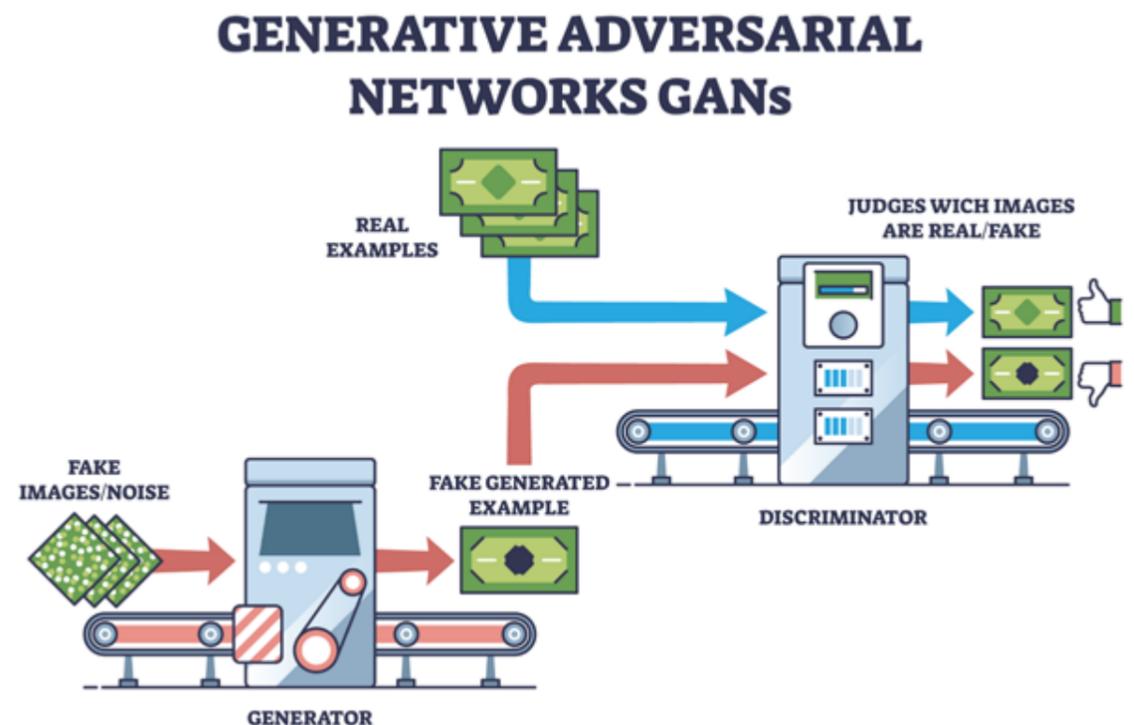


Figure 2. Generative Adversarial Networks

aspect of marine surveying. It can create and analyse thousands of potential risk scenarios, helping surveyors and operators prepare for a wide range of contingencies (Brown et al., 2020).

Furthermore, AI systems can continuously generate and update risk models based on current conditions, providing real-time alerts and recommendations to mitigate emerging risks.

Real-world examples and pilot projects

Though generative AI is still emerging in marine surveying, several pilot projects and early adoptions illustrate its potential. The Port of Rotterdam, for instance, uses AI, including generative models, to create a digital replica of its operations. This digital twin allows for advanced simulations and predictive modelling of port activities, enhancing efficiency and safety (Port of Rotterdam, 2021).

Maersk's Vessel Performance System is another example, where generative AI optimises vessel performance by generating predictive models for fuel

consumption and emissions, helping reduce environmental impact and operational costs (Maersk, 2021). Similarly, ClassNK's Digital Twin Ship project uses generative AI to create detailed digital models of ships, allowing for advanced simulations of structural integrity and performance under various conditions (ClassNK, 2020).

These examples demonstrate the transformative potential of generative AI in marine surveying, offering a glimpse into a future where AI-driven insights lead to safer, more efficient maritime operations.

Comparative analysis: generative AI vs traditional AI in marine surveying

While traditional AI has already proven valuable in marine surveying, generative AI offers distinct advantages. It can propose novel solutions to complex problems, potentially leading to innovative surveying techniques or vessel designs.

Moreover, generative AI excels at creating and analysing multiple scenarios, providing

a more comprehensive risk assessment than traditional AI (Zhou et al., 2021). It is also more adaptive to new data and changing conditions, making it more flexible and resilient in the dynamic maritime environment.

Generative AI can produce detailed reports, 3D models and design suggestions, offering outputs that go beyond the analytical capabilities of traditional AI. Furthermore, generative models are often better equipped to handle incomplete or uncertain data, a common challenge in marine environments (Chen et al., 2021).

However, generative AI also presents new challenges, such as increased computational requirements, more complex model training and the need for careful validation of generated outputs (Karras et al., 2019). Addressing these challenges will be critical to fully realising the potential of generative AI in marine surveying.

Methodology for implementing generative AI in marine surveying

The first step in implementing

generative AI is to assess existing marine surveying processes thoroughly. This involves analysing current workflows, identifying bottlenecks, evaluating the accuracy and efficiency of existing methods and gathering feedback from surveyors, operators and other stakeholders. This assessment will help identify areas where generative AI can provide the most significant improvements, ensuring that the technology addresses the industry's most pressing needs (Zhao et al., 2021). The success of generative AI in marine surveying depends heavily on the availability of high-quality, diverse data.

Relevant data sources include historical survey reports, maintenance records, real-time sensor data from vessels and port equipment, weather and oceanographic data, satellite imagery and regulatory compliance records. Data cleaning and preprocessing are essential steps, involving the removal of duplicates, correction of errors, standardisation of data formats and anonymisation of sensitive information (Chen et al., 2021).

To maintain the integrity of the generative AI system, robust data quality assurance processes must be established. These processes should include automated data validation checks, clear data governance policies and regular audits of data sources and preprocessing pipelines (Goodfellow et al., 2014).

Choosing the appropriate generative AI model will depend on the specific requirements of each application within marine surveying. Potential models include GANs for creating synthetic data or images, VAEs for dimensionality reduction and feature learning and Transformer-based models like GPT for natural language generation in reports.

Each model will need to be

customised to the specific needs of marine surveying, which may involve adapting model architectures to handle maritime-specific data types, fine-tuning pre-trained models on domain-specific datasets and developing custom loss functions that reflect the priorities of marine surveying (Kingma & Welling, 2013).

Training generative AI models for marine surveying involves splitting data into appropriate training, validation and test sets, implementing iterative training processes with regular evaluation and using techniques like transfer learning to leverage pre-existing knowledge. Strategies to prevent overfitting, such as regularisation and early stopping, must be employed and models should be continuously fine-tuned as new data becomes available (Zhou et al., 2021).

To ensure smooth adoption, the generative AI system must be seamlessly integrated into existing marine surveying processes. This involves developing APIs for easy data exchange between AI systems and existing software, creating user-friendly interfaces for surveyors and other stakeholders, establishing clear protocols for using AI-generated insights and providing comprehensive training for staff on how to work alongside AI systems (Li et al., 2020). Rigorous testing is crucial to ensure the reliability and safety of generative AI in marine surveying.

Extensive simulations should be conducted to test AI performance in various scenarios, along with A/B testing to compare AI-enhanced processes with traditional methods. Clear criteria for evaluating the accuracy and reliability of AI outputs must be established and regular audits of AI decisions and recommendations are necessary to identify potential biases or errors (Goodfellow et al., 2014).

To measure the success of the

generative AI implementation, key performance indicators (KPIs) such as survey accuracy, reduction in survey time, predictive maintenance effectiveness and cost savings from optimised operations must be established. These KPIs should be regularly monitored and reported to ensure that the generative AI system delivers tangible benefits to the marine surveying process (Chen et al., 2021).

Stakeholder analysis and impact assessment

Implementing generative AI in marine surveying will impact various stakeholders, including marine surveyors, ship owners and operators, port authorities, maritime regulators, insurance companies, classification societies, shipbuilders, crew members and environmental agencies. Each of these groups will experience the effects of generative AI differently (Tao et al., 2019).

For marine surveyors, generative AI will enhance their capabilities, enabling more accurate and efficient analysis and reporting. However, it may also shift their roles towards oversight and complex decision-making, necessitating upskilling to work effectively with AI systems (Zhao et al., 2021). Ship owners and operators will benefit from improved operational efficiency, reduced downtime, cost savings and enhanced safety and regulatory compliance.

Regulators and classification societies will find that AI facilitates more consistent and data-driven compliance assessments, though they may face challenges in adapting regulations to AI-driven processes (Chen et al., 2021).

Concerns among stakeholders may include fears about job security, trust issues regarding AI-generated recommendations, data privacy and security



Figure 3. Port of Rotterdam: Port of Rotterdam developing into major digital platform.



concerns and questions about liability in case of AI-related errors. These concerns can be addressed through transparent communication about AI's role and limitations, comprehensive training and upskilling programs, clear data handling policies and collaborative development of AI systems with input from all stakeholder groups (Li et al., 2020).

Strategies for stakeholder engagement and buy-in

Successful adoption of generative AI requires active engagement from stakeholders. This can be achieved through regular workshops and feedback sessions, a phased implementation plan with clear milestones and the establishment of a change management team. Additionally, a governance structure that includes representation from all key stakeholder groups should be established to ensure that the implementation process is inclusive and transparent (Zhao et al., 2021).

Data quality and availability pose significant challenges in implementing generative AI. The maritime industry often faces inconsistent data formats and standards, limited historical data for certain vessels or operations and potential biases in existing datasets. These challenges require the development of industry-

wide data standards, data-sharing initiatives and the use of advanced data augmentation techniques (Chen et al., 2021).

The regulatory landscape for AI in marine surveying is still evolving, with potential gaps and conflicts in existing regulations. Ethical implications, such as the accountability of AI decision-making in safety-critical applications, must also be considered. Developing ethical guidelines, establishing clear accountability frameworks and ensuring transparency and explainability of AI systems are essential steps in addressing these concerns (Johnson & Wright, 2020).

Skills gap and implementation challenges

The skills gap among marine surveying professionals is a significant challenge. Comprehensive training programs and the development of specialised curricula are necessary to equip the workforce with the knowledge and skills needed to work with AI (Li et al., 2020).

A detailed financial analysis is crucial to understanding the costs and benefits of adoption. While the initial investment in technology and training is substantial, the long-term savings through reduced downtime, lower fuel consumption and

decreased maintenance costs will be significant.

Furthermore, the intangible benefits, such as enhanced safety, improved environmental compliance and a stronger industry reputation, should also be considered in the analysis (Zhou et al., 2021).

Implementation involves inherent risks, particularly around data security, system failures and the potential for AI-related errors. Effective risk mitigation strategies include robust cybersecurity protocols, manual override procedures and the establishment of redundant systems and backup procedures to ensure that critical operations can continue even if AI systems fail.

Regular audits and system checks are essential to ensure that AI systems continue to operate effectively and safely (Goodfellow et al., 2014).

Environmental and economic impact

Generative AI can contribute significantly to environmental sustainability in the maritime industry. By optimising route planning, AI can reduce fuel consumption, leading to lower greenhouse gas emissions (Brown et al., 2020). For example, AI-based route optimisation has been shown to reduce fuel consumption by up to 12 per cent across a fleet of container ships (Reed et al., 2020). Additionally, AI-powered surveying tools can more accurately detect environmental hazards, such as oil spills or harmful algal blooms, allowing for quicker and more effective response measures (Maersk, 2021).

The economic benefits of generative AI in marine surveying include projected cost savings, increased efficiency and potential job market shifts. By reducing downtime through predictive maintenance and optimising operations, AI could

lead to a 15-20 per cent reduction in operational costs for early adopters (Zhao et al., 2021).

While AI may disrupt some traditional surveying roles, it will also create new opportunities in areas like AI systems management and data science. Long-term economic implications include increased competitiveness for AI-enabled shipping companies and ports, as well as new business models based on data-driven insights (Chen et al., 2021).

Training and education initiatives

As AI becomes more integral to marine surveying, professionals will need to develop new skills (Zhou et al., 2021). To bridge the skills gap, a range of training programs should be offered, including modular online courses, hands-on workshops, certification programs and mentorship opportunities. These initiatives will help existing professionals gain the knowledge and skills needed to work with AI systems effectively (Li et al., 2020).

Maritime education must evolve to prepare the next generation of professionals for a future where AI plays a central role. This includes integrating AI and data science courses into core curricula, developing specialised postgraduate programs and collaborating with technology companies to provide students with real-world project experience (Zhao et al., 2021).

Collaboration between the maritime industry, tech companies and education providers is crucial for advancing AI in marine surveying. This could include establishing joint research labs, sponsoring PhD programs and creating secondment opportunities for professionals to gain experience in both sectors (Chen et al., 2021).

Future prospects of AI in marine surveying

The future of AI in marine surveying is closely tied to the development of emerging technologies such as quantum computing, advanced sensors and augmented reality. These technologies could significantly enhance the capabilities of AI systems, leading to more efficient and accurate surveying processes (Karras et al., 2019).

The evolution is gradually leading towards greater autonomy, with the development of AI-driven autonomous underwater vehicles (AUVs), drone technology and remote and autonomous systems in survey vessels representing the next frontier in maritime operations (Bai et al., 2018).

To fully harness the potential of AI, the maritime industry must proactively prepare by establishing industry-wide standards, conducting regular foresight exercises and developing agile regulatory frameworks that can adapt to technological advancements (Li et al., 2020). Global collaboration is essential for advancing AI in marine surveying.

About SeaBot Maritime

SeaBot Maritime is a specialist consultancy and learning solutions provider for the maritime industry. Our organisation is dedicated to advancing the sector through innovative technology integration and comprehensive training programs.

We create and deliver inventive learning experiences, utilising both digital and experiential methods, to equip maritime professionals with the knowledge and skills necessary for success in a rapidly evolving industry.

Conclusion

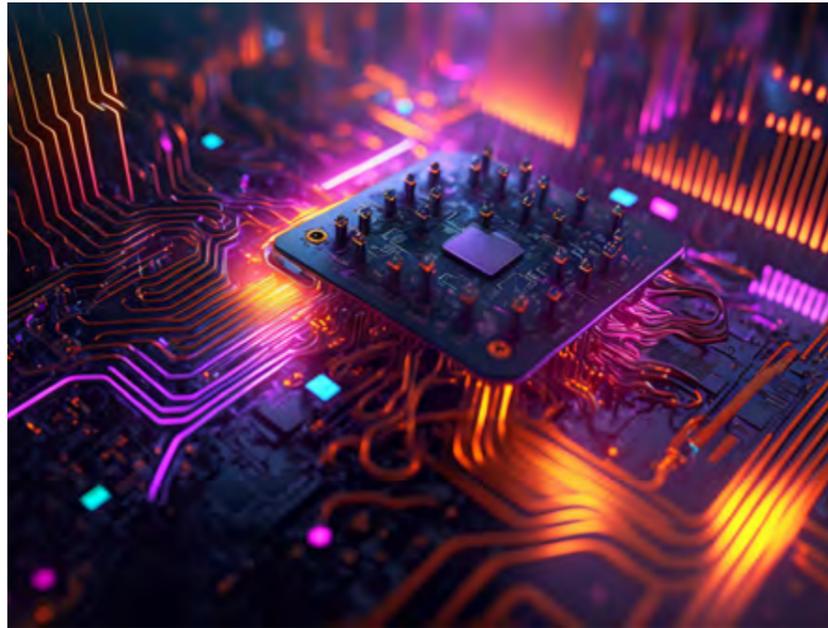
The implementation of generative AI in marine surveying offers transformative potential, from improving efficiency and accuracy to enhancing safety and sustainability. However, it also presents significant challenges, including data quality issues, regulatory concerns and the need for upskilling the workforce. Addressing these challenges requires a comprehensive and collaborative approach, involving all stakeholders in the process.

To fully realise the potential of generative AI, industry stakeholders must work together to develop and adopt AI technologies. This includes collaborating on research and development, establishing industry-wide standards and engaging with regulatory bodies to ensure that AI is implemented safely and ethically.

Looking to the future, generative AI has the potential to revolutionise marine surveying, leading to a safer, more efficient and sustainable maritime industry. Continuous innovation and adaptation will be key to realising this vision and industry stakeholders must be prepared to embrace change and drive the future of maritime operations.

Our offerings include tailored training courses, curriculum design and online learning development, all aimed at supporting the effective adoption of new technologies while maintaining a strong emphasis on the human component of maritime operations. SeaBot Maritime is also involved in the development of standards and best practices for Maritime Autonomous Surface Ships (MASS), playing a crucial role in shaping the future of maritime operations.

For more information, you can visit our official website at www.seabotmaritime.com



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Gordon Meadow
|CEO

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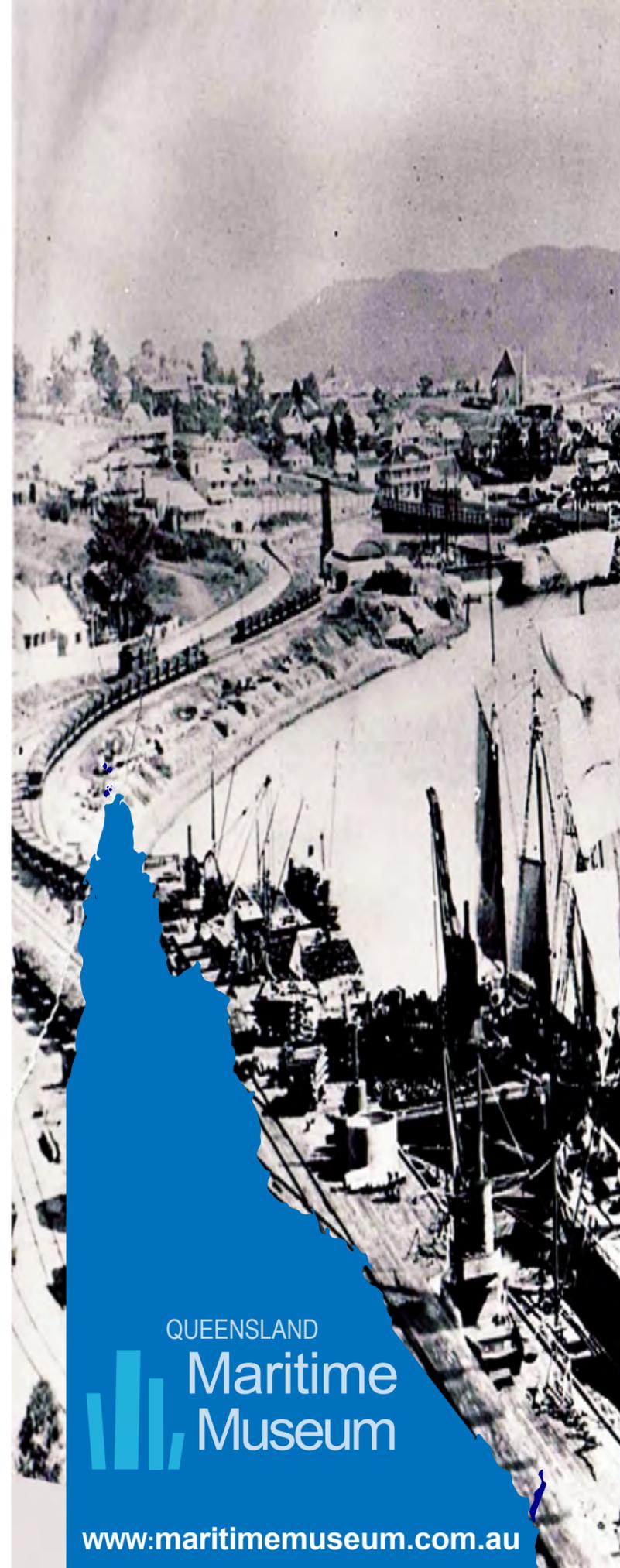
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Pioneering EV boat brings revolutionary technology to Australia at Sydney International Boat Show

ON Tuesday 23 July, FibreTM posted a media release regarding the Fibre F5.

A revolutionary new electric boat will be unveiled at the Sydney International Boat Show from August 1 – 4, 2024.

The Fibre F5 introduces pioneering hydrofoil technology to Australia and it is Australia's leading electric hydrofoil crafted by an Australian company.

“It’s the first fast cruising boat in designed and made in Australia that is using fully automated and integrated hydrofoils to lift the boat out of the water, significantly reducing the energy needed to push the boat through the water,” says Fibre co-founder Brent McTigue.

“By bringing recreational boating into the electric vehicle age, the Fibre F5 will do on the water what electric vehicles are doing on our roads. The



Brent McTigue

hydrofoils are the key to this transformation.

“Hydrofoils reduce the energy needed to push the boat through the water by up to 70 per cent. With the reduced energy demand, there is no need for the huge engines that are typically used, resulting in fewer batteries, less weight, and much smaller engines. This makes the boat super-efficient,” says Brent.



Fiona Sutherland

The F5 is engineered for efficiency and sustainability featuring twin torpedo pod engines and direct-drive electric motors to work with the hydrofoils to lift the boat above the water.

The F5 is 5.5 metres length has a cruising speed of 22 knots (40 km/h) and can travel up to 76 km on a single charge.



“The F5 is a game changer for the recreational boating world,” says Fibre. “It offers a real alternative to fossil-fuelled boats. Currently, less than one per cent of recreational boats in the 5.5-metre range are electric, and we aim to increase this to match the uptake of electric vehicles, which is around 9 per cent of all new cars sold.

“We’re offering a strong sustainable alternative. The F5 boasts zero emissions, zero noise, zero vibrations and zero range anxiety.

“It protects the environment for future generations. Its silent engines can be used in environmentally-sensitive areas and the boat causes negligible wash or waves, minimising environmental issues.

“It’s a comfortable ride for passengers. Being above the waves eliminates pounding,

providing a smoother, silent ride,” says Fiona.

Founded in 2023 in Newcastle, Australia, Fibre is at the forefront of sustainable boating. The F5 is custom-built to suit individual preferences.

“You really are flying above the waves with the F5,” explains Brent McTigue. “Our hydrofoils are fully submerged, which is the most efficient arrangement. It’s literally flying a boat because the hydrofoils are underwater wings.

“The science behind the hydrofoils is the same science behind aeroplane wings. As the boat picks up speed, it reaches liftoff at around 17 knots. Because the hydrofoils are so efficient, there is no longer any range anxiety. It’s going to revolutionise how people view boating.

“There is significant movement, led by the International Maritime Organisation, to decarbonise

the world’s fleet. This is our contribution to that effort. Essentially, what’s being done to electric vehicles on the road is what we’re doing to boats on the water,” says Brent.

Fibre is committed to revolutionising both recreational and commercial boating. With work boats and passenger ferries on the drawing board, the company aims to make a significant impact in Australia, APAC and beyond.”

Specifications:

- Length (LOA) – 5.5 m
- Beam – 2.3 m
- Battery bank – 60 kWh
- Cruising speed – 22 knots
- Maximum speed – 35 knots
- Crew – 5 (including skipper)
- Range – 76 km (at cruising speed).

**Brent McTigue and
Fiona Sutherland**
Fibre co-founders



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