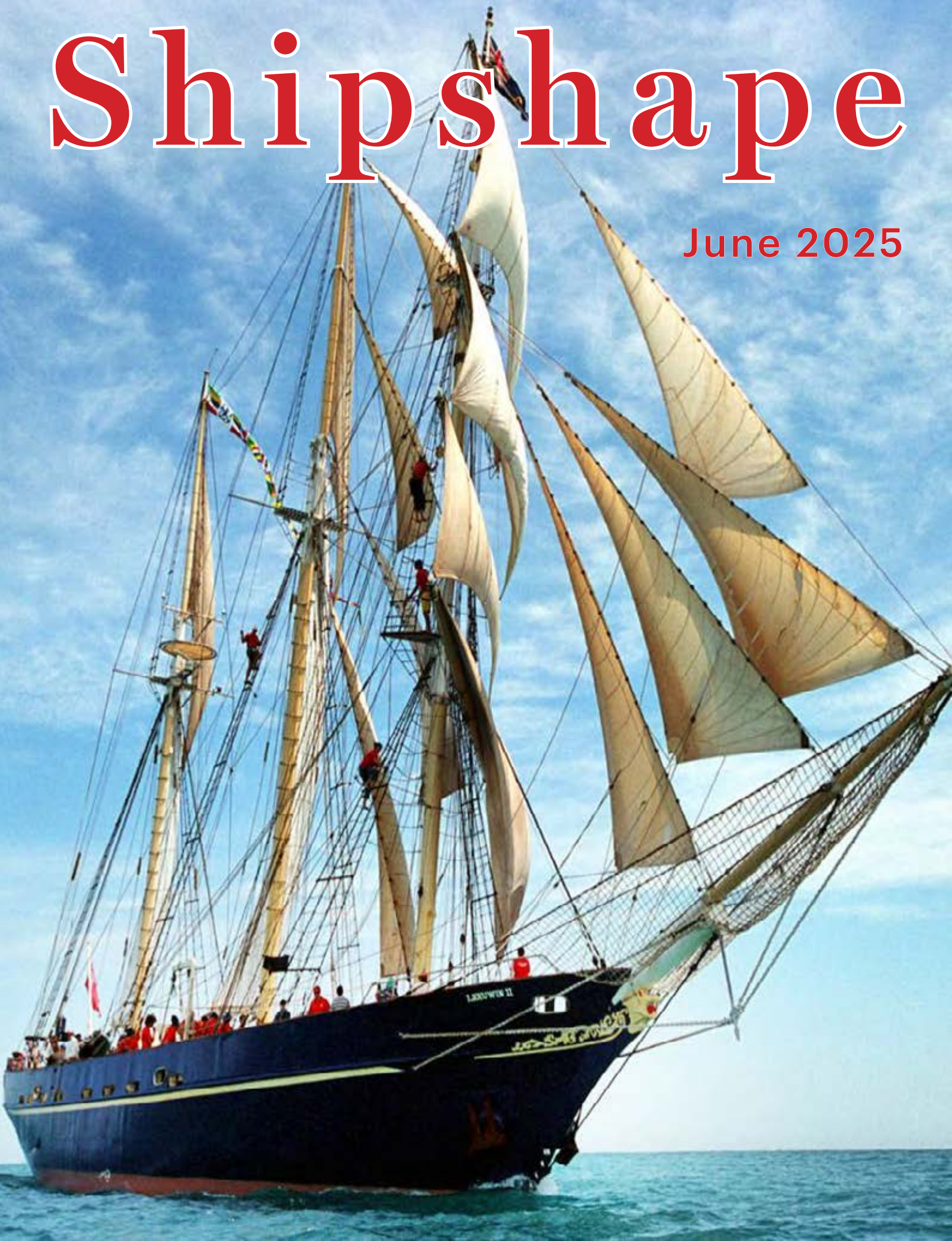
AUSTRALASIAN INSTITUTE
OF MARINE SURVEYORS

Shipshape

June 2025



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AUSTRALASIAN INSTITUTE OF MARINE SURVEYORS

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June 2025

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Front cover: The WA-based tall ship *Leeuwin II*, before an accident in Fremantle Harbour. (See article, page 28.)

From the Bridge. (Page 5.)

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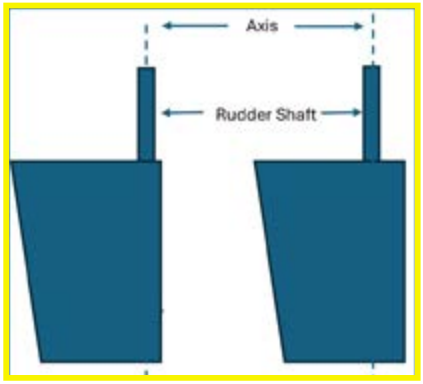

Rudders explained. (Page 22.)

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AMSA Marine Surveyor Accreditation Framework Review

AIMS' pre-eminent position within the commercial marine sector of the maritime industry has been endorsed by the appointment of two of our senior members, Zac Howells (DCV Subcommittee Chair) and Greg Marsden (AIMS Vice-Chairman) to the Industry Reference Group for the AMSA Marine Surveyor Accreditation Framework Review.

The accreditation scheme has been in place since 2015 as part of the introduction of the National DCV scheme.

This group has been established following the final Independent Review of DCV Safety Legislation and Cost and Charging Arrangements in 2022-23.

That review found that there were opportunities for AMSA to improve the marine surveyor accreditation scheme and recommended that it should be updated to ensure that it is up-to-date, fit for purpose and flexible.

Some of the recommendations to be discussed are:

- ❏ pathways for new surveyors to enter the scheme;
- ❏ flexibility and future-proofing the accreditation framework, including consideration of new vessel types and changes in technology;
- ❏ the standards for accreditation, including conditions on accreditation; and
- ❏ the requirement for continuing professional development.

Zac and Greg bring a wealth of experience and knowledge of DCV surveying to this group.

Their valuable input will ensure that the professionalism of AIMS members is maintained and that the accreditation scheme will work to provide our members with a secure footing within the DCV survey field.

Managing risk

Clients use marine surveyors to manage the risk in conducting their businesses or their commercial activities.

Clients also use marine surveyors to manage their financial risk, particularly where asset acquisition and management is concerned.

As surveyors, we assist this process by providing information that is objective in its content. In being objective, we are reporting facts that are observed and measurable, capable of being viewed without the personal interpretation the observer.

We, as surveyors, increase the risk to our clients where the reporting of what has been observed slips into the subjective.

Subjective reporting lacks specific data or measurable evidence. Subjective reporting also does not provide our clients with any meaningful data on which they can base their financial or fiduciary decisions.

As surveyors, we owe a duty to our clients, as professionals, to provide the facts, raw and unfiltered. Our clients can use our reports to arrange finance for their assets or in litigation involving those assets.

These other professionals rely on fact-based reporting to achieve the best results for our clients. Hence, fact-based, objective reporting is the best means for marine surveyors to enable their clients to manage their risk and to achieve their required outcomes.

Eric McIlwain
Chair of the AIMS Board

An extremely busy year rolls on

ANOTHER busy year with the Board, Sue Brown and I focused on delivering against the Institute's strategic plan.

Partnerships and affiliations

- Strategic partnerships have been established with the Women's International Shipping & Trading Association (WISTA) Australia, Austbrokers Countrywide, the Boating industry Association (BIA) and the BIA of Victoria.
- A new strategic partnership will be shared with members in the near future.

Building the Membership Base

- The marketing of AIMS as the premier industry association for marine surveyors continues and has seen an increase in membership of marine surveyors from existing member businesses.

Business Development, Marketing and Promotion

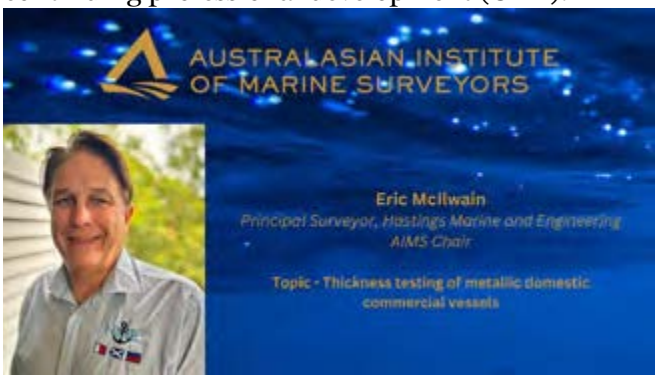
- Thirty-nine students in AIMS Diploma courses in the 2024-25 financial year.
- Posts promoting workshop presenters, membership of AIMS and diploma options developed for the AIMS LinkedIn and Facebook pages.

Professional Development and Standards

- Since February 2025, there have been 13 workshops delivered to members.
- The establishment of formal training opportunities for AIMS students.

1) Industry Workshops and Webinars

The AIMS continues to provide workshop and webinar content for members to engage with continuing professional development (CPD).



Workshop 9: Eric McIlwain, Principal Surveyor at Hastings Marine and Engineering and AIMS Chair – 2 April 2025

Topic: Thickness testing of metallic domestic commercial vessels

Eric commenced his surveying career in 2014. He became an accredited surveyor with Maritime Safety Queensland in 2014, then transferred to AMSA in 2015. His presentation focused on thickness testing of metallic domestic commercial vessels.

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; periodic surveys, periodic surveys for loadline and safety equipment. In November 2024, Eric became the new Chair of AIMS.

Workshop 10: Andrew Christie, Andrew Christie Consulting – 10 April 2025

Topic: Biosecurity threats relating to vessel loading and shipping

Andrew is a biosecurity facilitation specialist providing importers, exporters, customs brokers,

freight forwarders and approved premises assistance with biosecurity compliance of imported and exported cargo. His presentation focused on biosecurity threats relating to vessel loading and shipping.

He provides advice on import and export requirements, improved processes to assure compliance and promote import and export efficiency. In addition to biosecurity facilitation, he designs and delivers tailored training to support and businesses through biosecurity processes and import and export requirements.

Workshop 12: Nick Parkyn, Nick Parkyn Marine Surveying / MarineML – 23 April 2025

Topic: Introduction to Artificial Intelligence and Machine Learning

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 6B: Dr Eric Perez, AIMS Chief Executive Officer – 30 April 2025

Topic: Continuing Professional Development (CPD)

Eric presented an overview of the AIMS CPD policy and the process used to collect CPD evidence.

Workshop 5: Brad Fisher, Marine Officer with Maritime Safety Queensland (MSQ) – 6 May 2025

Topic: Abandoned vessels, wreck removals and the role of marine surveyors

Brad Fisher is a Marine Officer with MSQ in the Brisbane South Region. His presentation focused on abandoned vessels, wreck removals and the role of marine surveyors.

Brad is a shipping inspector and authorised officer, holds a Coxswain licence, a Certificate III in Marine Craft Construction and an International Diploma in Marine Surveying. Brad has been employed with MSQ since 2017, building and maintaining the Aid to Navigation network, responding to marine pollution events and enforcing relevant Queensland Marine Safety legislation at a Statewide level.

Workshop 13: Matt Kuc, Manager – Technology and Distribution, Austbrokers Countrywide) – 14 May 2025

Topic: Marine Surveyors Professional Indemnity - Claims, Learnings, and Liability

As an experienced Financial Lines, Technology and Distribution Manager with over 15 years industry experience, and a shareholder of the business, Matt forms a key pillar in devising and driving company strategy at Austbrokers Countrywide Insurance Brokers.

Bringing together a deep understanding of

translating complex professional risks into insurance solutions, as well as a personal interest in translating emerging AI and automation technology into business practice, Matt is able to wear a number of hats, adding value across a wide number of areas with clients and the broader insurance industry.

Note: Workshop 11 has been postponed to later this year to be delivered by Kerryn Woonings, Senior Marine Surveyor & Loss Adjuster - Global Technical Services at Crawford & Company. The topic, "Marine Incident Investigation Part 1 – The Role of the Expert Witness".

2) AIMS Subcommittees

My thanks to previous members of our subcommittees who work to advance the profession by providing expert advice on a range of industry issues. All subcommittee members volunteer their time to assist the Institute and their shared insights and knowledge are greatly appreciated.

Recreational Survey Standards Subcommittee

The role of the recreational survey standards committee is to consult on projects related to marine survey standards within the recreational survey sector. Members join the committee for a specified period to fulfill the requirements of a project or projects. The committee members act in an advisory capacity and contribute technical knowledge and expertise to the project.

Subcommittee Members	
Name	**Location**
Wade Nagel	WA
Nathan Clark	QLD
Russell Machan	NSW
Scott Cumming	QLD
Dr Eric Perez (AIMS Secretariat)	-

Training Subcommittee

The role of the Training Committee is to assist in the review and provide consultative input on marine surveyor training courses offered by the AIMS. This may involve reviewing the overall training suite and individual unit content currently offered as well as identifying gaps to assist in additional marine surveyor training either for the current needs of the industry or into the future.

The current Training Subcommittee is reviewing the units that comprise the Advanced Diploma of Commercial Marine Surveying.

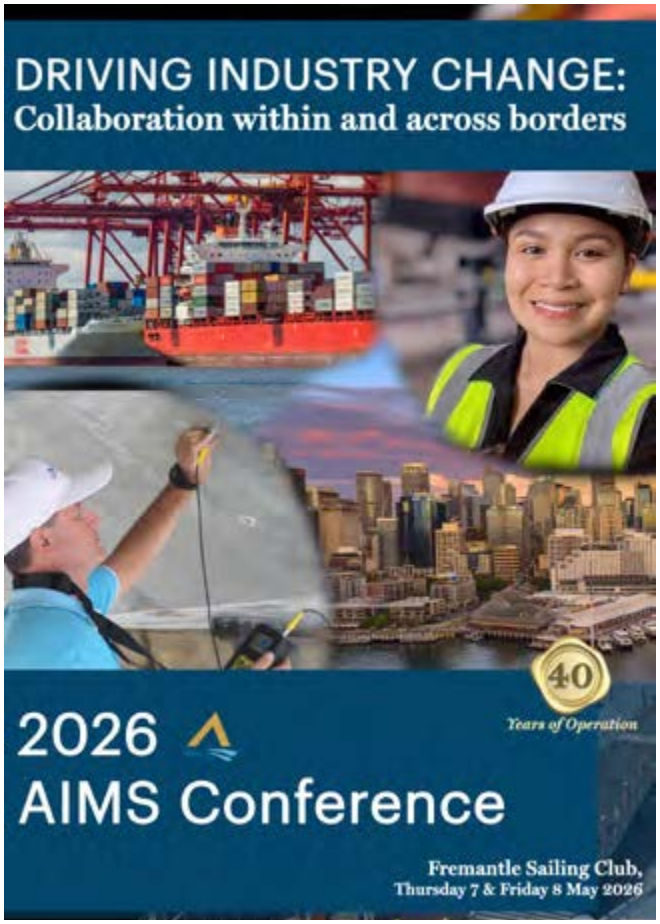
Subcommittee Members	
Name	**Location**
Capt Denis Sango	WA
David Higgins	QLD
John Holden	QLD
Capt William Burton	QLD
Capt Norman Maningo	NSW
Sue Brown (AIMS Secretariat)	-
Dr Eric Perez (AIMS Secretariat)	-

2026 Conference Subcommittee

The subcommittee was formed to help the Institute deliver the 2026 AIMS Biennial Conference.

Subcommittee Members	
Name	**Location**
Stuart Marra	WA
Kerryn Woonings	WA
Wade Nagel	WA
Dr Eric Perez (AIMS Secretariat)	-

3) 2026 AIMS Biennial Conference



In 2026, AIMS will celebrate 40 years as the peak industry body for marine surveyors in our region and the largest marine surveyor association in the Southern Hemisphere.

The AIMS Conference is a "must-attend" event for marine surveyors and those working in related fields, including the broader marine services industry and government.

The Conference provides an opportunity to hear from leading industry professionals and share in discussions on topical issues, and to network with fellow delegates.

Our conference theme is: "*Driving industry change: Collaboration within and across borders*".

The conference theme recognises that industry change is driven by collaborations that provide operational and strategic benefits that build individual and organisational capacity. AIMS has developed partnerships with Austrbrokers Countrywide, Boating Industry Australia (BIA), the BIA of Victoria and WISTA Australia on critical issues ranging from insurance, vessel safety and increasing the participation of women in marine surveying. AIMS also continues to build partnership with government agencies in Australia and New Zealand.

I would like to thank Hunter Marine Surveyors, Austbrokers Countrywide, Australian Marine Surveys Pty Ltd, Hastings Marine & Engineering and ADAPT MARINE for their sponsorship and support of the 2026 AIMS Biennial Conference.

You can support the conference by attending or becoming a sponsor. Please reach out for more information.

4) Member Feedback

Feedback is critical to improving service provision and boosting member engagement.

Feedback provided by members continues to help the Institute learn regarding the services it provides and provides an opportunity to engage in actively listening to the needs of members.

Seeking feedback from members is also an important part of the Institute's quality management system.

The Institute recently reached out to members to seek feedback regarding our service delivery overall and specifically the delivery of workshops.

I would like to share some interim findings:

Service Delivery Feedback

Primary membership benefits	**Satisfaction with communication from AIMS**
• Professional development – 67% • Networking – 33%	• Very satisfied – 67% • Satisfied – 28% • Very dissatisfied – 5%
Value of membership • Very valuable – 50% • Valuable – 30% • Neutral – 20%	**Satisfaction with AIMS membership** • Very satisfied – 44% • Satisfied – 56%

Workshop Feedback

Have workshops met your expectations?	**How would you rate the value of the workshop(s) you have attended?**
• Exceeded expectations – 23% • Met expectations – 77%	Very valuable – 31% Valuable – 65% Neutral – 4%
Satisfaction with – content and presenter diversity, speaker expertise and workshop duration • Very satisfied – 41% • Satisfied – 47% • Neutral – 11% • Dissatisfied – 1%	**Content presentation** • Very satisfied – 69% • Satisfied – 27% • Neutral – 4%
How engaging were the workshops? • Extremely engaging – 20% • Very engaging – 56% • Somewhat engaging –20% • Not very engaging – 4%	**Overall satisfaction** • Very satisfied – 34% • Satisfied – 58% • Neutral – 4% • Dissatisfied – 4%

A great set of results but ongoing work is always needed to ensure members get the best value for money possible.

5) Newsletter Contributions

Thank you to the members that contributed to this edition of the newsletter and for members who do contribute, your article can be used as evidence of continuing professional development.

I encourage members to contribute to the newsletter. If you would like to know more, please contact the office.

6) 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

WHEN we look at a ship sailing across the ocean, what we see is a complex machine designed to operate in one of the most challenging environments on Earth: the open sea. But what ensures that a ship and its countless components can perform safely and reliably under such conditions?

The answer lies in rigorous testing and certification processes that marine equipment must go through before being approved for use onboard. In this article, we'll break down the regulatory framework, the role of classification societies, and the step-by-step process that ensures marine components meet the highest safety and performance standards.

1) Understanding the regulatory backbone: maritime rules and standards

Ships are governed by international maritime laws, most of which are developed by the International Maritime Organization (IMO) - a UN agency responsible for regulating shipping.

These laws are made mandatory through flag states – the countries under which a ship is registered. Think of flag states as the government authority that ensures ships flying their flag meet global standards.

Two of the most important conventions are:

SOLAS (Safety of Life at Sea): Sets rules for the safe design, construction, and operation of ships.

MARPOL (Marine Pollution): Focuses on reducing pollution from ships, including oil, sewage, air emissions, and garbage.

These conventions provide high-level requirements. But to implement them effectively, we need detailed technical standards that guide how equipment and machinery should be built and tested. This is where additional IMO codes / resolutions come in:

LSA Code – Defines how life-saving equipment like lifeboats, life rafts, and life jackets should function.

FFA Code – Sets requirements for firefighting systems such as extinguishers, fire doors, and sprinkler systems.

IMO Resolutions – These outline performance standards for specific equipment like: EPIRBs (Emergency Position Indicating Radio Beacons) VDRs (Voyage Data Recorders) Ballast Water Treatment Systems, and more.

2) Who Makes Sure the Rules Are Followed?

The responsibility for ensuring compliance lies with the Flag Administration. This could be a national maritime authority, or an organisation authorised by the flag, like a classification society.

These bodies conduct inspections, testing and certification, and issue documents like Type Approval Certificates, which prove the equipment meets all required standards.

Here are examples of equipment that need statutory certification:

Life-saving appliances – lifeboat / rescue boat and launching arrangements, life rafts, lifebuoys, lifejackets, immersion suits, pyro techniques. Etcetera.

Pollution prevention systems – Oily water separator and oil content meter, ODMCS, sewage

treatment plant, NOX control equipment, exhaust gas cleaning system, incinerator, etcetera.

Firefighting equipment – Fire doors, insulation material, SCBA, fireman outfits, fixed and portable fire extinguishers, sprinkler systems, fire detection and alarm systems, hyper mist systems, Fire hose & nozzles material used for making furniture / draperies for ships, etc.

Navigation and radio systems – SART, EPIRB, VDR, ECDIS, magnetic compass, gyrocompass, RADAR, GNSS equipment, AIS, VHF / HF / MF radio, Inmarsat C equipment, navigation lights, etc.

In Europe, a common standard called the Marine Equipment Directive (MED) is followed. Equipment approved under this system carries a wheel-mark symbol, making it easier for suppliers and buyers to identify compliant products across EU nations.

3) The Role of Classification Societies: Setting the Technical Standards

Classification societies are organisations that create and enforce detailed technical standards – known as Class Rules – for the design, construction, and maintenance of ships and marine components.

While IMO conventions tell us what needs to be achieved, class rules tell us how to achieve it through the design and testing requirements for items which are not exclusively covered by the Statutory requirements. They cover things like:

- ❏ The strength and stability of the ship's structure.
- ❏ Design and testing of onboard machinery.
- ❏ Electrical and automation systems.

Major classification societies are part of the International Association of Classification Societies (IACS), which actively works to develop marine standards for use by all class societies. Both statutory requirements and class rules are designed to work together, ensuring a holistic approach to safety and performance.

4) Breaking Down the Certification and Testing Process

Let's walk through the typical steps involved in certifying marine equipment. Not every component goes through all these steps, but many do:

Technical Documentation Approval

Experts review design documents, engineering drawings, and calculations to ensure the product design meets regulatory and class requirements.

Type Testing

The component is physically tested – sometimes under extreme conditions – to verify that it performs as expected. This can include pressure tests, fire resistance tests or electrical performance checks.

Type Approval

Once a product passes design and type tests, it receives a Type Approval Certificate. This is especially useful for products that are mass-produced.

Manufacturer Approval

Inspectors audit the manufacturer's quality systems to ensure they consistently produce high-quality products.

Manufacturer Recognition

A step beyond approval: this shows a manufacturer has a track record of producing high-quality components, even if their products aren't under statutory regulation.

Material Testing

Raw materials like steel, rubber, or plastic are tested for strength, durability, and chemical composition to ensure they meet specs.

Workshop Monitoring

During manufacturing, inspectors may visit the workshop to verify that production processes are being followed correctly.

Final Inspection

Once the product is finished, it goes through visual checks and document verification. Inspectors look for any defects or inconsistencies.

Shop Testing

The completed product is tested at the manufacturer's facility to check its real-world performance. For example, a pump might be tested for flow rate and pressure handling.

Installation and Assembly

The equipment is installed on the ship. Inspectors check to make sure it's mounted and connected correctly.

Onboard Testing

Once the ship is operating (such as during sea trials), the equipment is tested again to make sure it functions correctly under actual operating conditions.

5) Tailored Approaches for Different Products

Not every product follows the same certification path. Here are a few examples:

A steel plate manufacturer may require full manufacturer approval, since their product forms part of the ship's core structure.

A company making ECDIS navigation equipment may only need type approval, since the same unit is used across many ships.

A supplier of non-regulated

products (like interior fittings) might get a manufacturer recognition certificate to build trust in the market.

In the case of critical components such as propeller shafts, propellers or other high-load mechanical parts, a highly detailed inspection process is necessary.

This involves: pre-production testing of raw material properties (like tensile strength and chemical composition); continuous quality control during manufacturing, post-production inspections including non-destructive testing (NDT); shop trials and, finally, sea trials onboard the vessel. These stages are closely monitored and verified by surveyors from the classification society.

On the other hand, for components that are mass-produced under a type approval scheme, such as small diesel engines, the process is more streamlined. A review of factory test reports, combined with a final inspection onboard after installation, is often sufficient for certification by the class society surveyor.

6) Individual Product Certification vs. Type Approval

There are two main pathways for certifying a component:

- ❏ Individual Product Certification (IPC)
- ❏ Used for custom or critical equipment, like a ship's propeller, boiler or pressure vessel. These are inspected and tested individually.

Type Approval (TA)

Ideal for standardised, mass-produced equipment like pumps, radios, engines, and sewage treatment systems. Once the design is tested and approved, the same model can be used across multiple ships.

7) Wrapping Up: Why It All Matters

Whether it's a life raft or a diesel engine, every component onboard a ship has a job to do – often in high-stakes, high-pressure situations. That's why testing and certification aren't just formalities: they're essential steps to ensuring safety, compliance and peace of mind at sea.

Understanding how this system works helps everyone in the marine industry – from engineers and manufacturers to shipowners and regulators – make better, safer decisions.

Kalyan Das
ISM-ISPS & Service Supplier Auditor, Marine Surveyor, MLC Inspector at RINA and AIMS member

New AMSA exemptions introduced

AMSA has introduced new exemptions to provide a simplified process for certain vessels to obtain a certificate of survey and operate as domestic commercial vessels (DCVs), including vessels with minor non-conformances or vessels built to Navigation Act 2012 (Navigation Act) requirements. These new exemptions commenced on 1 March 2025.

An update on these exemptions was included in the March RSC regulatory program update paper but the direct links to the in-force exemptions were not available at that time.

The exemptions cover the following scenarios are:

Exemption instrument: Updates to Exemption 07 – Marine Safety (Temporary operations) Exemption 2024 (EX07).

Scenarios: A vessel with minor non-conformances that has been identified during an initial or renewal survey, but which is safe to operate in the circumstances. An existing vessel that has "triggered" the transitional vessel provisions in Marine Order 503 (MO503) but is not yet compliant with the transitional standards in MO503. The vessel must be safe to operate in the specific circumstances.

Exemption instrument: NEW Exemption 49 – Marine Safety (Domestic commercial vessels — compliance with international standards) Exemption 2024 (EX49).

Scenarios: A vessel built to Navigation Act requirements, such as a regulated Australian vessel (RAV) that is transitioning to be a DCV.

The updates to EX07 enable transitional and non-transitional vessels to continue to operate up to a maximum period of 12 months, while undertaking work to rectify non-conformances with the applicable standards in MO503. The exemption is only available where a surveyor has conducted an initial or renewal survey and considers that any non-conformance will not jeopardise the safety of the vessel or any person on board the vessel. An approval is required from AMSA and a surveyor must provide a survey report that meets the criteria in the exemption. For more information, please see sections 6 and 7, Division 2, of the updated EX07 here.

The new EX49 introduces a simplified process for vessels built to Navigation Act requirements to operate as DCVs, provided the vessel continues to meet the technical standards as required for a RAV. Operators do not need approval for this exemption but will need to meet the eligibility conditions and apply for a certificate of survey. For more information, please see the new EX49 here.

AMSA: https://bia.org.au/news/new-exemptions-from-amsa/

Industry partnerships valuable

INDUSTRY partnerships enable the exchange of knowledge, skills and ideas. The knowledge and networks developed promote a culture that helps build a continuous improvement in mindset and approach. We will continue to work with our industry partners and build innovative solutions to issues of mutual importance. This article provides background to leaders in our partner organisations.

Fabian Pasquini, FAICD: Manager - Key Clients and Corporate Partners Austbrokers Countrywide

With a 40+ year insurance career, mainly in executive and leadership roles, Fabian has been exposed to substantial business risks and understands the importance of protecting what is crucial. As a result, he has a passion for getting to know clients and their business, clarifying their risk appetite and creating tailored insurance solutions accordingly.

Fabian has also served on a number of insurance industry committees and boards, including as Chair of the National Insurance Brokers Association (Vic), and currently sits on the Broker Advisory Board for the Australian and New Zealand Institute of Insurance and Finance.

In his role at Austbrokers Countrywide, he also works closely with associations and key clients to ensure he creates value for stakeholders. His previous experience as a non-executive director of several SME and family businesses means he understands and relates to the challenges many of our members face.

Women's International Shipping & Trading Association (WISTA) Australia Donna Jones, GAICD: President and Chair

Internationally acclaimed, industry award winner, Donna Jones, founder of Asheville Consulting Group, partners with organisations to develop organisational change strategies that drive innovation, inclusion and equity, embracing key stakeholders every step of the way. Donna's extensive experience includes talent and performance, customer centricity, tendering, diversity and sustainability, translating strategic goals into operational action plans garnering tangible outcomes.

Donna's 25 years of experience spans across the transformation of traditional industries, including transport, supply and logistics, government and essential services, driving change from board and executive levels to frontline employees having the greatest impact. She is currently a member of a Transport Advisory Group and a non-executive director of a not-for-profit organisation.

Boating Industry Association Andrew Fielding, Chief Executive Officer

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, 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.

Boating Industry Association of Victoria Steve Walker, Chief Executive Officer

Steve Walker is an experienced and successful CEO and event organiser. In CEO terms Steve has lead the Boating Industry Association of Victoria for the past seven years, and prior to that held the same role at Yachting Victoria for a similar period. He's also had extensive CEO experience at Tennis New Zealand and Baseball Victoria.

Steve specialises in the government related advocacy area, working with stakeholders across various levels of government, and, in particular, has a very close connection to the Victorian State Government. Business development, revenue generation and association management, in both good and tough times, is another area of strength. Major events have always been central to Steve's roles, with him holding leadership / event director roles in international tennis tournaments, world cup sailing regattas, major boat shows and many other events. Steve is a member-focused association professional who works on incremental and ongoing enhancement for the associations that he leads.

Gangway railing collapse during pilot boarding

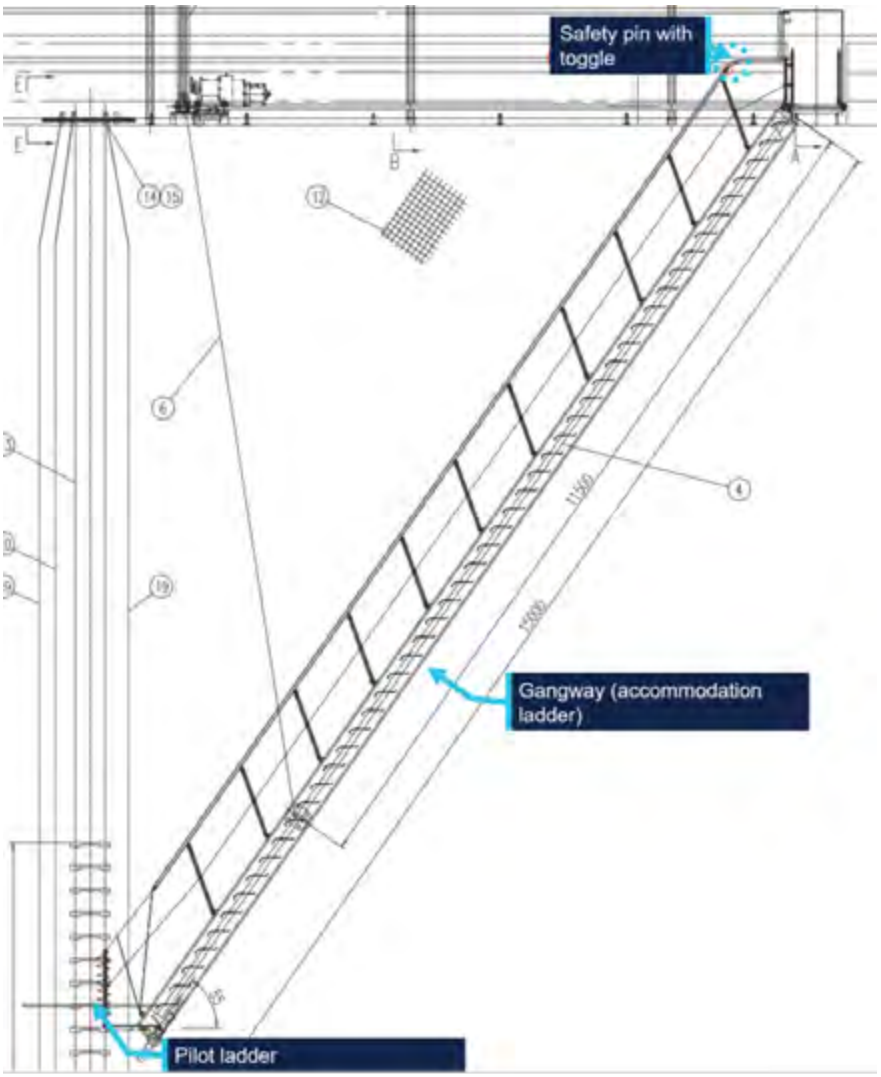


Figure 1: *Combination ladder schematic diagram. (Source: ATSB 2025.)*

THIS article relates to a gangway railing collapse during pilot boarding about 18 km east of Gladstone, Queensland, and is a reprint of an Australian Transport and Safety Bureau's (ATSB) LinkedIn post dated 29 April 2025.

1. Introduction

An ATSB occurrence brief describes a gangway railing collapse during pilot boarding, about 18 km east of Gladstone, Queensland.

2. What happened

At about 1920 local time on 4 March 2025, a cargo ship arrived at the pilot boarding ground for the port of Gladstone, Queensland to board a harbour pilot.

The harbour pilot had travelled to the boarding ground by boat and was planning use the pilot ladder to board the ship.

The ship's crew rigged the pilot ladder in combination with the gangway (combination ladder)[1] on the starboard side following shipboard procedures.

1 The use of a ship's pilot ladder in conjunction with the ship's accommodation ladder is also referred to as a combination ladder.

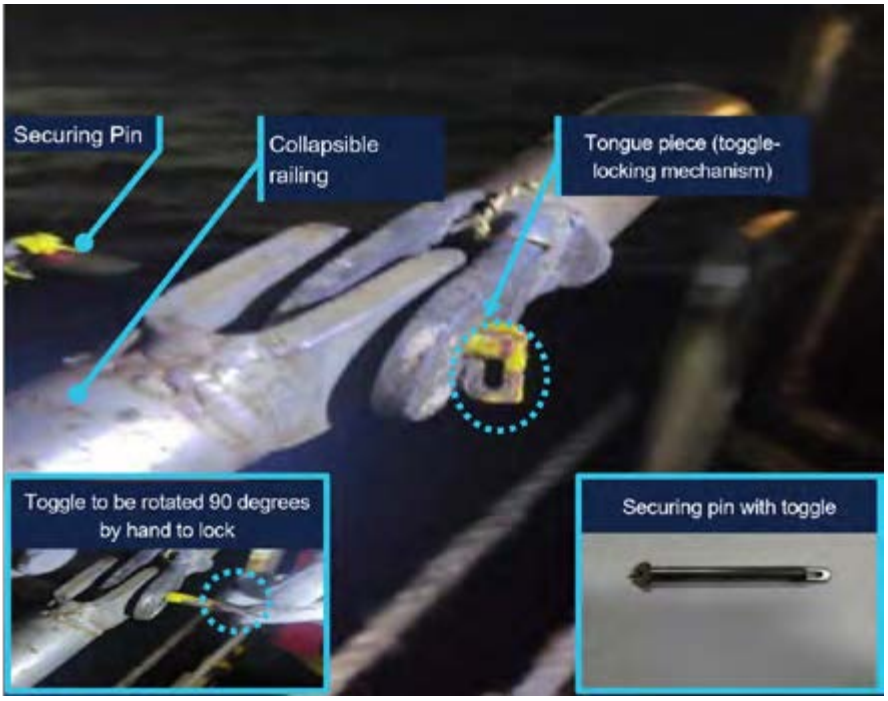


Figure 2: *Securing pin arrangements. (Source: ATSB 2025.)*

The gangway has an inboard and outboard railing. During the rigging process for pilot embarkation, the gangway is lowered, and the railing latched securely.

However, on this occasion, the tongue piece on the safety latch on the outboard railing was not rotated to lock the tongue at the required 90° angle (Figure 2), resulting in the securing pin not being correctly inserted. As the ship rolled and vibrated, the securing pin gradually worked its way loose.

This movement eventually caused the pin to completely dislodge from its position, compromising the stability of the outboard railing.

The pilot began boarding the ship at 1925 local time. When they grasped the handrail while transitioning from the pilot ladder to the gangway, the gangway railing on outboard side partially collapsed when the locking pin dislodged. The pilot was not injured.

3. Safety action

Following the occurrence, the ship's manager advised that the following safety actions had been taken.

Crew members have received extra training to ensure they fully understand the importance of properly engaging the securing pin's safety latch, with a focus on the correct procedure for rotating the tongue to the required angle to engage the locking mechanism. Additionally, a comprehensive review of the combination ladder securing arrangements has been started, including verification procedures for securing pins and further crew training on proper locking mechanisms.

The ship's maintenance schedule now includes more frequent and thorough inspections of all securing mechanisms, including the securing pins of the pilot ladder and gangway. These inspections aim to identify and fix any potential issues before they lead to incidents.

A new protocol has been implemented requiring a double-check of all securing mechanisms before use. This protocol mandated that two crew members independently verified that the securing pins were properly locked and secure.

Pre-use inspection checklists have been updated to ensure securing pins are correctly engaged before pilot transfers

The lessons from this incident have been shared with all ships managed by the ship manager, including training on how to correctly insert the securing pin in the locked position.

4. Safety message

This occurrence highlights the importance of properly securing pilot transfer arrangements, particularly ensuring that all locking mechanisms, including securing pins, are fully engaged.

Ship operators, masters, and crew should perform thorough pre-use checks to verify the correct engagement of safety mechanisms before personnel transfers. Compliance with SOLAS[2] Chapter V, Regulation 23 and ISO 799-1 standards (industry best practices) assists preventing similar failures in the future.

5. About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation.

For this occurrence, no investigation has been conducted and the ATSB did not verify the accuracy of the information.

A brief description has been written using information supplied in the notification and any follow-up information in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.

2 International Maritime Organisation (IMO), 1974, The International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS 1974), IMO, London.

Managing the safe use of ammonia as a marine fuel

AS ammonia gains traction as a marine fuel, the focus on safe operation is growing. Safe ship design with added technical barriers forms the foundation for safe operation, with DNV class rules setting requirements for these measures.

However, crew training is also essential to effectively manage the risks associated with the safe use of ammonia. In collaboration with industry partners, DNV has developed a new recommended practice that outlines a clear framework for the safe use of ammonia as fuel.

Low-emission ammonia is increasingly recognised as a viable alternative fuel with significant potential in helping the maritime industry decarbonise. Unlike conventional fuels, it has distinct characteristics that necessitate specific handling and safety protocols. However, with proper training, a strong safety culture, and ship designs engineered to eliminate risks as much as possible, its use can be effectively and safely managed.

"Ammonia is a chemical that deserves respect but should not be feared. This starts with a clear understanding of the hazard profile, both for ship design and safe handling," says Laurent Ruhlmann, HESQ Vice President, Yara Clean Ammonia.

The company handles 20 per cent of all globally traded ammonia, produces more than eight million tonnes of ammonia per year, and has a history of producing ammonia dating back to 1927.

Bridging the ammonia competence gap in maritime

"There is a lot of experience from handling ammonia on land for decades that can be easily ported over to the maritime world to help it meet the upcoming decarbonisation targets," Ruhlmann explains.

The maritime industry needs to embrace viable alternative fuels to successfully decarbonise. However, despite three ammonia-fuelled vessels already in operation and more than 30 currently on order (according to DNV's Alternative Fuels Insight platform), specific training programs for its safe handling as a marine fuel have been relatively slow to develop. This has created a growing competence gap, as existing training frameworks for alternative fuels like LNG do not adequately address the distinct properties and handling requirements of ammonia.

Maritime stakeholders shape ammonia safety practice

"Technical safety control measures incorporated into the ship and human factor in design and technical class rules are the basis for managing safety risks in operation. However, the crew onboard and the personnel ashore need to have competence in the technical safety barriers, how these can be maintained and knowledge and understanding of hazards and consequences if the safety barriers are degrading or failing," explains Kirsten Strømsnes, Business Development Leader at DNV Maritime Advisory.

"Alternative fuel guidelines provide a strong foundation for safe adoption and handling, but ammonia requires a dedicated framework and strategy tailored to its specific properties," says Erlend Erstad, Senior Consultant, Safety, Risk & Reliability at DNV Maritime Advisory.

Together with industry

DNV's new Recommended Practice is helping the maritime industry develop the procedures, training and risk awareness needed to safely operate ammonia-fuelled vessels.

partners, DNV has developed a recommended practice (RP) to provide shipowners, operators and regulators with the structured approach needed to ensure competence readiness for ammonia-fuelled vessels.

DNV's new Recommended Practice is helping the maritime industry develop the procedures, training and risk awareness needed to safely operate ammonia-fuelled vessels.

"DNV's RP assists shipowners and training institutions as they develop new marine fuel programs based on its guidance and with input to reviewed safety protocols, risk assessment frameworks and crew training requirements. It was developed with input from a number of key stakeholders, including Amon Maritime, Azane Fuel Solutions, Yara Clean Ammonia, Wärtsilä, Kongsberg Maritime and Bernhard Schulte Shipmanagement / Ula Ship Management. This provided us with rounded and comprehensive best practice," says Erstad, highlighting the benefits of close industry collaborations.

Learning from Yara's leadership in ammonia safety

Yara Clean Ammonia was a key contributor to the RP's development and has a strong safety culture. As a leader in ammonia production and handling, the company has decades of experience producing and transporting ammonia and operates the largest global ammonia network, with 15 vessels and access to 18 terminals worldwide.

Yara Clean Ammonia has already taken a final investment decision on Yara Eyde, which will be the world's first ammonia-fuelled container vessel. The ship will transport goods between the Oslofjord area and other parts of northern Europe. Sixty per cent of the cargo will be Yara's fertilizer products, thereby helping to reduce scope-3 emissions for Yara International.

In an important step towards establishing ammonia as a low-emission ship fuel, Yara Clean Ammonia, Azane and Fjord Base are planning to build a floating bunkering terminal for offshore supply vessels.

"Yara Clean Ammonia's extensive experience with the worldwide ammonia trade has helped shape the RP's recommendations, particularly those regarding handling protocols, emergency response and risk assessment," Strømsnes reports. "The development of alternative fuels to replace heavy fuel oil (HFO) has been ongoing for decades, particularly since the adoption of gaseous fuels like liquefied natural gas (LNG). This extensive experience, along with insights from other industries such as Yara, gives the shipping industry an advantage in managing the safe use of ammonia as a fuel."

Ammonia growth: safety key to drive future investments

Greater demand for ammonia as fuel could require expanding production, potentially doubling or tripling output within the next 20 to 30 years, making the need for specific ammonia fuel safety guidance even more urgent.

In an important step towards establishing ammonia as a low-emission ship fuel, Yara Clean Ammonia, Azane and Fjord Base are planning to build a floating bunkering terminal for offshore supply vessels.

"Safety incidents could severely impact industry confidence in ammonia as a fuel. To mitigate this, human factors must be integrated with technical design from the outset, and both human and operational considerations should be prioritised throughout the vessel's life cycle. Shipowners must ensure they have the necessary expertise on board and adhere to best practices from industries that have safely handled ammonia for decades," Erstad emphasises.

The transition to ammonia requires a shift towards a risk-based approach, Ksenia Zakariyya, HESQ Manager at Yara Clean Ammonia, says. "To ensure safe ship design and operations, dedicated risk assessments are essential for enhanced decision-making and the definition of technical, operational and organisational barriers to effectively control risks throughout the asset's life cycle.

"Understanding ammonia's hazardous profile is crucial for responsible handling. Ship operators must develop ammonia-specific competence and training programmes to address its unique safety requirements. Emergency response plans should be based on credible risk scenarios and tailored response strategies. Our experience demonstrates that with proper precautions in place, ammonia can be a safe marine fuel."

The role of training institutions and flag states

With the RP, training institutions and the rest of the global maritime industry will now have a clear roadmap for developing concrete ammonia-specific training courses. The goal is to ensure that all crew members operating ammonia-fuelled vessels have the necessary competence for safe handling and use, ensuring that seafarers receive quality, standardized training that meets industry best practices.

The RP can also be used as input to competence planning and operational manuals, as well as for reviewing safety management systems. It can also be used by third parties for certifying training programs.

Flag states also have a key role to play as they currently need to approve the readiness of operations, including competence, before vessels with new fuels, following the alternative design approach, set sail. By endorsing the RP and referencing it in their guidance to shipowners, they can help drive the widespread adoption of ammonia safety standards in a more systematic way instead of case by case / vessel by vessel. This alignment will be crucial as the maritime sector moves towards integrating ammonia into global shipping operations.

Ammonia safety: what maritime can learn from the chemical industry

Yara's Ruhlmann highlights that the chemical industry has had a strict regulatory framework in place for almost 50 years. This has supported a proactive approach in developing very robust safety management systems and practices which maritime can learn from and incorporate into its highly regulated framework.

In the past decades, significant safety incidents with ammonia have occurred in its downstream usage where safety management systems and best industry practices are less developed. While onshore applications may face different challenges, the maritime industry has the unique advantage of being able to incorporate robust safety measures and recognised good practices from the very beginning when using ammonia.

"While ammonia presents certain challenges, shipowners and operators can confidently integrate it into their operations by implementing structured safety protocols, clear regulatory guidance and comprehensive crew training," explains Ruhlmann.

"Seafarers must receive ammonia-specific instruction, coveringsafehandling,emergency response and maintenance procedures. Regular simulated emergency drills and credible scenario-based training should also become standard practice to ensure operational safety and preparedness."

The future of ammonia in maritime

"We need to be respectful of ammonia as a fuel and take the right precautions, such as safe ship designs, building a proactive safety culture and being aware of small deviations and failures before situations develop into incidents. For many it is a different mindset, but we have to come around to using ammonia as a fuel," Strømsnes concludes.

Regulations and safety frameworks will define the future use of ammonia-powered vessels. An industry-wide collaboration involving ammonia producers, regulators and vessel operators is critical for a safe transition, as shipowners will ultimately be responsible for implementing it aboard vessels as shipping complies with internationally agreed decarbonisation targets set by IMO.

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Erlend Erstad
Senior Consultant
Kirsten Birgitte Strømsnes
Business Development Leader – Safety

Professional development so important

CAPTAIN Peter Murday, Fellow and a Past Chair of AIMS, shared the LinkedIn post below drafted by Chaz (Merlin) Leeuwenburg from W. C. Leeuwenburg Inc. We reached out to Chaz and asked his permission to reprint his post.

Does anyone remember a picture I posted about 10 months ago of Billy Berg commencing his training as a draft surveyor under my tutelage? Well, here he is today, all grown up and attending his very own vessel discharging scrap steel products in Charleston.

From day one of his time with me, I was impressed with how quickly he picked up the concepts of performing the calculations manually. Then it came to me: he comes from a background in construction and knows his way around a tape measure, and performing distance and volume measurements.

I'm probably going to get some hate mail, but I've had a revelation: don't recruit people claiming to be former ship officers, hire carpenters. And, yes, he's still performing the calculations manually, having committed to not use a computer for a minimum of one year.

Chaz Leeuwenburg (W. C. Leeuwenburg, Inc).

Billy Berg (left) on the bulk carrier m/v Vela.

It's ironic the two finest surveyors I ever trained have no seagoing experience. I'm not at all convinced sea service is an asset for someone entering this business. Unlike me, these gents didn't have to unlearn some bad habits picked up at sea.

I feel like the blind Shaolin master in the 1970s TV series, "Kung Fu", who tells the young Caine: "When you can snatch the water paste from my hand, it will be time for you to leave."

Rather that beating my chest about what a good instructor I am, Chaz 3.0 did all the work, completing his study assignments correctly and on time while working full time. All I did was provide him with the tools. Everyone, let's keep the comments civil but if you just can't help yourself: hatemail@wcleeuwenburg.com.

Our original agreement was "Manual calculations for 12 months." Something tells me, he's in no hurry to transition to a computer: Welcome to the Gong Tuners, young grasshopper.

We also reached out to Billy Berg, owner at Double B Marine Services to ask him about his journey as an early career marine surveyor.

As someone still early in my career as a marine surveyor, I've quickly learned the importance of continuous professional development. The hands-on experience I've gained over the past year, especially under the mentorship of Charles of W.C. Leeuwenburg, Inc., marine cargo surveyors, has been invaluable in understanding the complexities of the work.

My journey into surveying

started with a background the boating world working on charter fishing boats all through high school and college. I later got into land development and construction, which gave me a strong foundation in measurements and problem-solving. After six years working in land development, I decided to return to the marine industry.

I was introduced to yacht and small craft surveying and eventually connected with Charles at a surveyor meet-up, where I was able to tag along and get a firsthand look at the world of cargo surveying.

I've come to realise that this profession isn't just about technical skills, it's about maintaining a mindset of continual learning and adapting. Every new project and challenge has expanded my knowledge and deepened my expertise.

Chaz and Billy.

Having mentors like Charles has been crucial in developing my skills. He has a love for the marine surveying and cargo world and even teaches an online draft and bunker survey course.

As I move forward, my focus is on continuing to expand my knowledge, learning from experienced professionals, and tackling new challenges. It's an exciting field, and I'm eager to see where this path leads as I grow in my career.

Rudders for sailing craft

STERNPOST-MOUNTED rudders started to appear on Chinese ship models starting in the First Century AD. However, the Chinese continued to use the steering oar long after they invented the rudder, since the steering oar still had practical use for inland rapid-river travel.

The rudder was a flap at the aft end of the keel and owed a large part of its effectiveness from a considerable force (lift) carry over on the keel just in front of it (Figure 1). After the transition to steel hulls, the shape remained the same for a considerable period.

After the Second World War, as yacht design evolved the keel and the rudder became increasingly separated, both keel and rudder were treated as lift-generating appendages (wings), and so the plan form and section shape shapes based on wing theory were utilised (Figure 2).

1) The function of a rudder

The function of a rudder is to apply a yawing moment to a vessel so that it takes up an angle of yaw, thus causing hydrodynamic forces and moments to come into play, which causes the vessel to turn.

The yawing moment due to the rudder may be applied to cause the vessel to turn away from its original steady course; ie, manoeuvring or to offset a tendency for the vessel to turn away from its original course due to wave disturbances, etcetera, such as course-keeping.

There is also a function of a rudder which can be applicable to small sailing dinghies and that is the function of resisting leeway.

Figure 1: *Rudder at the aft end of the keel*

Figure 2: *Separated rudder and keel*

This was a function of some importance in Chinese junks, some of which had beamy, shallow hulls with no keel or centerboard but carried a large centerline rudder which, by a series of tackles, could be lowered as required to resist leeway and to provide manoeuvrability. The Chinese junk is worthy of closer study for anyone interested in the development of sailing craft.

2) Types and Terminology

A control surface at the stem of a sailing craft has been in use since pre-history. The rudder is certainly the oldest ship control surface in existence; from the earliest available pictorial evidence can be seen the steering oar with a rudder-like blade at the stern. It is also obvious that some experimentation and development of the steering oar took place over a period of hundreds of years.

During the Thirteenth Century, change took place among the mariners and designers and the steering oar was replaced by a hinged centreline rudder hung on the stem post. Some 5,000 years had passed before this change came about and, in some parts of the world today, the steering oar is still in existence.

The advent of steel ships saw the appearance of the rudder stock passing through the hull below the waterline. This was in the latter part of the nineteenth century, although there is evidence to suggest attempts were made earlier with sailing craft.

It is not until recent decades that the rudder became completely disassociated from a stern post or keel. Now, in the form of the spade rudder or flap rudder behind the skeg, they have become a true control surface.

The spade rudder is relatively new and has significant advantages. The flap rudder behind a skeg has been in evidence for many years but only recently have there been serious attempts at obtaining the most hydrodynamically efficient shape and size.

The rudder hung over the transom. a direct descendant from the steering oar, is very much in evidence, and in function it has not altered much in the past two or three hundred years.

The following are the universally used definitions in relation to rudders and will be used in this article (Figures 3, 4 and 5).

The **leading edge** of a rudder is the forward edge; ie, the edge which meets the water flow first. The **trailing edge** of the rudder is the after edge; ie, the edge where the water flow leaves the rudder.

The **chord length** is the distance between the leading edge and the trailing edge of a rudder. It is defined further as the root chord length at the top of the rudder and the tip chord length at the bottom. It is the straight-line distance from the leading edge to the trailing edge, and not the distance measured around the skin of the rudder.

The **span** of a rudder is the overall depth.

The **thickness** of a rudder is generally measured from one outer skin to another and is indicated as a thickness to chord ratio; for example, 12 per cent rudders typically have a foil thickness of 10 to 15 per cent. The only reason to exceed 12 per cent is to accommodate the rudder shaft and the increased thickness is at the top of the rudder.

The **aspect ratio** is the ratio of overall depth of rudder to overall width of rudder; ie, the ratio of maximum span to maximum chord length. The rudder **axis** is a line taken through the rudder stock or pintles.

3) Balanced Rudders

Balanced rudders are designed with the pivot point positioned behind the centre of pressure, making steering easier and requiring less force (Figure 6). A balanced rudder normally has about one-sixth of the area ahead of the axis. More than one-sixth can be dangerous.

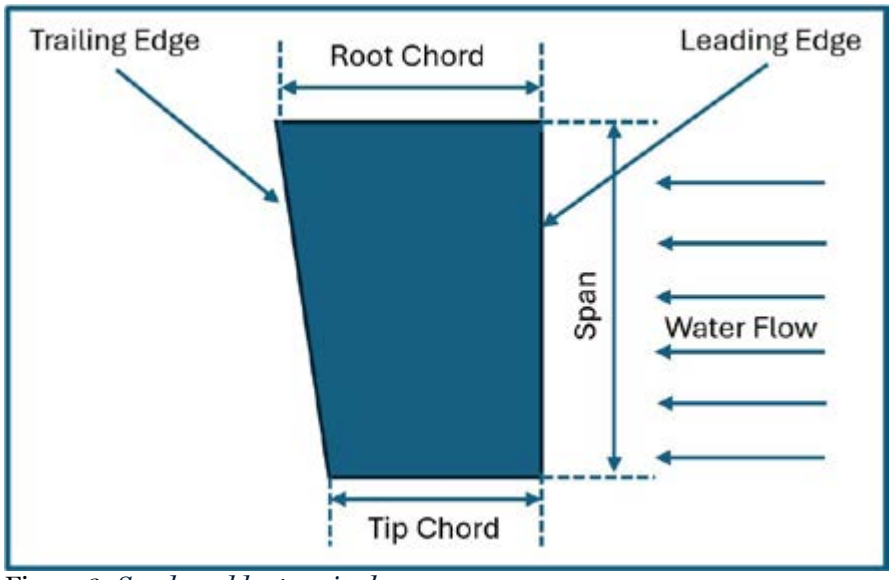

Figure 3: *Spade rudder terminology*

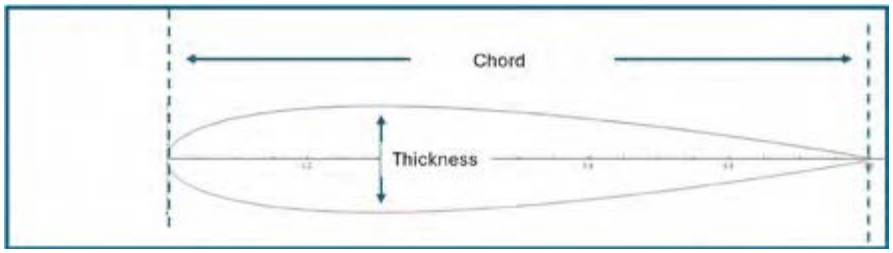

Figure 4: *Aerofoil (hydrofoil) terminology*

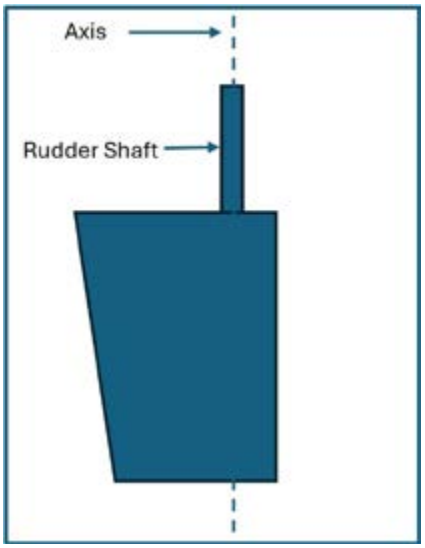

Figure 5: *Rudder terminology*

Advantages: Easier to steer, especially for extended periods, and less tiring for the helmsman.

Examples: Spade rudders are a common type of balanced rudder, with the pivot point well back from the front edge.

Commonly found on: Larger yachts and offshore boats where endurance is crucial.

4) Unbalanced Rudders

Unbalanced rudders, on the other hand, have the pivot point closer to the front edge, potentially requiring more effort to turn. (Figure 6):

Advantages: Can offer more precise steering in specific conditions, especially in tight manoeuvres.

Examples: Transom-hung rudders are often considered unbalanced (Figure 9).

Commonly found on: Small sailboats and sports boats, in-shore racers, and some dinghies.

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Semi-Balanced Rudders

Definition: A compromise between balanced and unbalanced, offering a balance of steering effort and effectiveness.

Advantages: Provides a good balance of steering effort and control.

Commonly found on: Many sailboats offer a semi-balanced rudder setup.

Key Considerations

Steering Effort: Balanced rudders generally require less effort to turn than unbalanced rudders.

Performance: The type of rudder chosen can impact steering feel and responsiveness.

Boat Type: The type of sailboat (e.g., racing, cruising) will influence the choice of rudder.

Steering Mechanism: The type of steering gear (e.g., tiller, wheel) also plays a role in the overall steering experience.

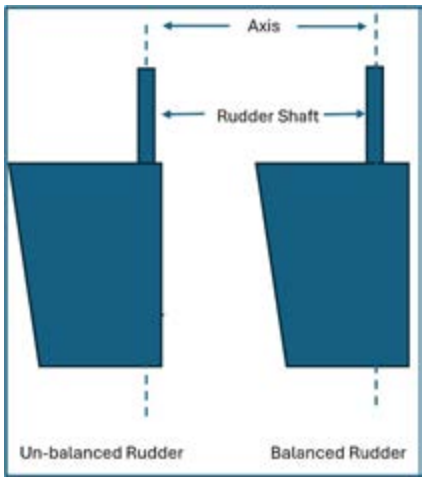


Figure 6: *Unbalanced and balanced rudder*

Figure 7: *Shoal draft cruising yacht with low aspect ratio rudder and keel*

For the small sailing dinghy or yacht with transom hung rudders – eg, laser dinghy – the rudder is significant in providing resistance to leeway. As the hull, excluding the centre board, provides very little immersed area (lateral area) and hence resistance to leeway, this function must be provided by either a centre board or lee boards, or a combination of centre board and rudder.

Relying on a centre board alone would lead to an excessively large centre board with associated drag penalties and, as a rudder is necessary, it can help in this function as well. For the small craft, the rudder area coefficient is small; ie, a rudder area of between one-eighth and one-quarter of the immersed lateral area is utilised. From steering requirements alone, rudders fitted to small boats are typically larger than necessary.

On larger craft – ie, over 20 ft LWL – this function is not necessary, generally, and the rudder area is reduced accordingly. Greater aspect ratio provides greater efficiency (figure 8) but is often limited by draft requirements (figure 7).

However, the exact contribution of the rudder in resistance to leeway has not been scientifically proven. In many designs, rudders are far too large as well as being of the wrong aspect ratio and section shape.

Attention to these aspects of rudder design and centre board design will bring more benefits than from changes in rudder area.

Figure 8: *Racing yacht with high aspect ratio rudder.*

Figure 9: *Transom hung rudders*

The rake of the leading edge is one aspect of profile shape which needs further explanation. Looking at current designs, particularly in yachts with the rudder over the stern, a wide variety of angles of rake can be seen.

Rake will result from a given design of rudder only and is not in itself a separate concept in rudder design philosophy. Here is a quote from a well-known helmsman: *"The more vertical a rudder the lighter the feel and the quicker the turning moment."*

The greater the rake of the leading edge of a rudder, the greater will be the distance between the rudder axis and the centre of pressure, and hence greater torque requirements and

greater force required on the tiller if tiller steering is used.

A vertical leading edge will have the minimum distance between rudder axis and the centre of pressure (except for the spade rudder) and hence the minimum torque requirements.

Excessive aft rake of the leading-edge leads to a downwards deflection of water now across the rudder blade, particularly when the rudder is highly loaded; ie, rapid helm movement is made.

This deflection of flow can lead to two detrimental effects:

- this effect may initiate and promote ventilation (aeration); and
- rudder tip lift losses may occur from excessive leakage over the tip.

Both effects are reduced by reduction in the degree of rudder leading edge rake to the point where a small angle of forward rake (positive rake) creates a component of upward flow at the leading-edge preventing ventilation (aeration). Slight forward rake is often used on fast craft like multihulls and is a common setup on the Hobie Cat and similar craft.

The trailing edge, if too thick, will produce vortex shedding, lift losses and noise. A trailing edge too thin is difficult to maintain and is susceptible to damage. A rudder of steel construction with a thin trailing edge will not hold paint surfaces and is prone to corrosion.

For the rudder with the stock or pintles at the leading edge, the curvature should again be easy, terminating in the required thinness of trailing edge. The thickness of rudder should be kept to a minimum consistent with strength requirements. If the designer is seeking the optimum, a thickness to chord length ratio of 12 per cent will give a symmetrical section of minimum drag characteristics.

The fairness of the rudder surface is important, and it must be free of runs of weld, rivets, etc. In connection with this, there are benefits to be gained by the occasional scrubbing down of the rudder by divers or any other device to remove fouling. The presence of heavy fouling will certainly, reduce the efficiency of the rudder in producing lift.

The foregoing discussion is related to a rudder without a skeg. When applied to a rudder behind a streamlined skeg, the skeg and rudder are assumed as one, and the requirements for leading edge, middle body and trailing edge are applied to the skeg and rudder as a single unit (hydrofoil).

The gap between skeg and rudder should allow movement of the rudder without fouling but should be kept to a minimum to avoid leakage.

5) Section (Airfoil) Shape

As previously indicated, after the Second World War the keel and the rudder became more and more separated. Both keel and rudder were treated as lift generating wings, and so the plan form and section shape considerations based on wing theory came into play.

NACA initially developed the numbered aerofoil system, which was further refined by the United States Air Force at Langley Research Centre.

During the late 1920s and into the 1930s, the NACA developed a series of thoroughly tested aerofoils and devised a numerical designation for each aerofoil – a four-digit number that represented the airfoil section's critical geometric properties.

The NACA four-digit wing sections define the profile by:

- first digit describing

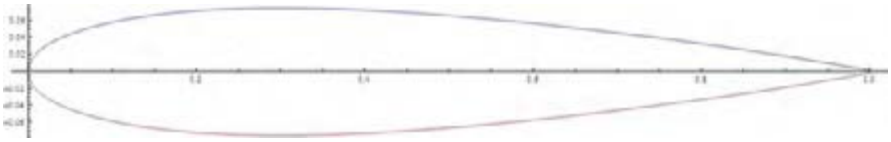


Figure 10: *NACA symmetrical four-digit aerofoil cross section*

Figure 11: *Rescue step on rudder – Picture courtesy Chuck Paine Design*

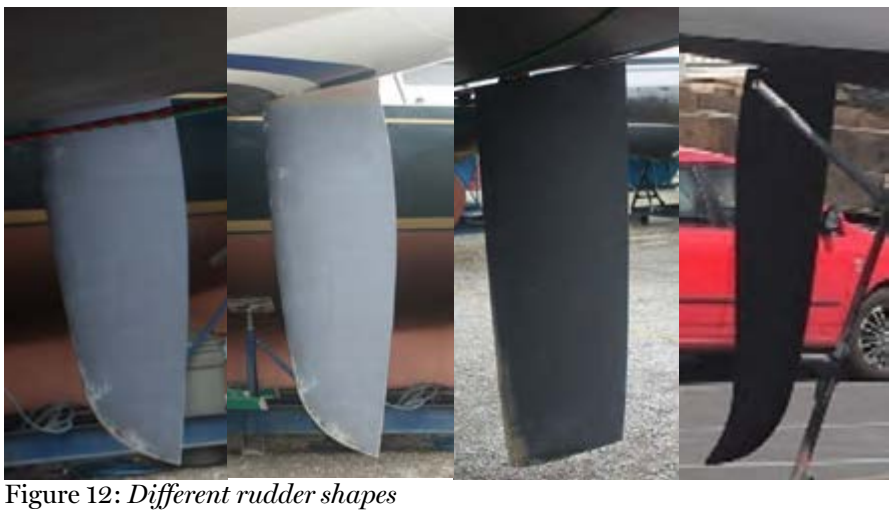


Figure 12: *Different rudder shapes*

maximum camber as percentage of the chord;

- second digit describing the distance of maximum camber from the foil leading edge in tenths of the chord; and
- last two digits describing maximum thickness of the foil as percent of the chord.

With respect to the effect of different thicknesses:

- thinner foils have less drag; and
- thicker foils have higher stall angle and greater maximum lift.

Most applications of foil sections for hydrofoils, including rudders, use symmetrical aerofoil sections, as the rudder must provide the same amount of lift when sailing on both tacks.

The NACA four-digit series is the most used aerofoil cross-section for rudders on sailing craft (Figure 10). Since rudders typically have a foil thickness of 10 to 15 per cent, the NACA 0010 thru NACA 0015 symmetrical sections are used, with the NACA 0012 (12 per cent thickness to chord ratio) being most popular.

6) Rescue Step on Rudder

Yacht designer Chuck Paine developed and used the idea of a rescue step attached to the rudder below the waterline to assist with reboarding the craft from the water (Figures 11). It is an extremely valuable addition to any craft.

Other solutions place steps on the side of the rudder stock above the waterline.

These solutions are only applicable to transom hung rudders.

Rudders come in many shapes and sizes (Figure 12), especially on racing yachts where designers are trying to improve rudder performance and reduce drag; however, the fundamental principles still apply.

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

MARITIME NZ is proposing important changes to the Maritime Rules for vessel design, construction and equipment. These rules (sometimes known as the "40-Series") are well over 20 years old and are in need of reform.

The proposed changes are being consulted on as packages, each including four proposed new Rule Parts and the associated maritime transport instruments (MTIs). In total, 15 existing Rule Parts will be reformed through this programme. The proposed new rules and MTIs will come into force at the same time, after all changes have been consulted on.

Maritime NZ consulted on the first package of proposals towards the end of 2024. Consultation on package two is now open. The proposed changes in package two relate to:

- Stability, Drainage, Freeboard and Subdivision;
- Watertight and Weathertight;
- Electrical; and
- Radio Equipment.

"Consultation is your chance to tell us what you think, and help to influence the new rules. The proposals in this consultation aren't a done-deal" says Peter Brunt, Deputy Chief Executive Regulatory Frameworks at Maritime NZ.

"In particular, we really want to hear how you think the new stability rules should apply to existing vessels. We really want to understand the costs and practical implications of the different options".

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

A "snapshot" of the proposed changes sits alongside the 'Invitation to Comment' and drafts of the new rules. These documents are all available on the Maritime NZ website at *https://www.maritimenz.govt.nz/public/consultation/dce-40-series-package-2/*

You can use this information to help you to comment on the proposals by Friday, 11 July 2025.

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

Nō te rere moana Aotearoa
MARITIME NEW ZEALAND

Resources

Chuck Paine Design - https://www.chuckpaine.com/

Airfoil Tools - http://airfoiltools.com/airfoil/naca4digit

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

Collision between container ship *Maersk Shekou* and tall ship STS *Leeuwin II*

THIS article is a reprint of the Australian Transport and Safety Bureau's (ATSB) interim report regarding the collision involving container ship *Maersk Shekou* and tall ship STS *Leeuwin II*, Fremantle, Western Australia, on 30 August 2024.

1) The Occurrence

At 1100 local time on 22 August 2024, container ship *Maersk Shekou* arrived off the Port of Fremantle, Western Australia following a voyage from Adelaide, South Australia and commenced drifting off the coast while awaiting entry into the port. The ship was loaded with 4,164 containers and was intending to proceed to berth CT3 (Figure 1).

The previous day, the Fremantle harbour master advised *Maersk Shekou*'s master (via the ship's agent) that, due to industrial action taking place in the port, the ship's scheduled 22 August berthing time had been postponed to 25 August.

Thereafter, Fremantle Port was evacuated of all vessel traffic due to unfavourable weather conditions, and *Maersk Shekou*'s pilot boarding time was rescheduled to 0700 on 30 August as per the harbour master's instructions. At the request of the terminal operations manager, *Maersk Shekou*'s pilot boarding time was revised to 0500 on 30 August, so that the vessel could be alongside by 0700.

At 0300 on 30 August, the second mate, who was the officer of the watch (OOW) recorded commencing navigational checks, and operation of the steering gear as per SOLAS regulations[1].

At 0321, the OOW engaged the engines, and the *Maersk Shekou* commenced slowly making its way towards the outer pilot boarding ground.

By 0333, the wind speed had increased, with speeds recorded on the vessel's anemometer[2] of about 30 knots. At 0345, the *Maersk Shekou*'s crew had unlashed both anchors in preparation for the inbound passage and at 0400, the second mate gave the vessel's master and duty engineer one hour's notice for pilot boarding. At around the same time, the third mate[3] relieved the second mate on the bridge.

The master arrived on the bridge and at 0436, took over conduct (con) of the ship from the third mate. The vessel continued to encounter wind speeds above 20 knots, with occasional gusts up to 25 knots. At 0455, two harbour pilots boarded the *Maersk Shekou* in the vicinity of the outer pilot boarding ground while it was making good about 11.6 knots. Both pilots made their way to the bridge where they met the master and others from the vessel's bridge team.

The primary pilot (pilot) immediately commenced the exchange of information with the master for the intended pilotage transit. The pilot briefed the master that they had four tugs available, and intended on making them fast, one on each shoulder, and one at each quarter[4]. The pilot informed the master they would keep the vessel's speed unchanged at about 11.6 knots[5], transit the deepwater channel (DWC)[6] and wait at the harbour entrance, to maintain an estimated time of arrival (ETA) of 0600 for daylight arrival into the port.

At 0500, the pilot made VHF radio contact with Fremantle vessel traffic service (VTS)[7] and advised the duty vessel traffic service officer (VTSO) that *Maersk Shekou* had just passed the Fairway Landfall buoy. The VTSO acknowledged the pilot's message and confirmed that the route for the ship into the port via the DWC was clear. During this time, the second (secondary) pilot set up their portable pilot unit (PPU)[8] aerials on the bridge wing.

Meanwhile, the pilot and master continued discussing pertinent information provided on Fremantle Pilots' "master/pilot exchange of information" (MPX) form. This included the route to be followed and an inner harbour manoeuvre involving a 180° turn, so that the vessel could be berthed heading outwards and starboard side alongside at berth CT3. During the exchange, the

1 The International Convention for the Safety of Life at Sea (SOLAS) Regulation V/26 provides the requirements with respect to testing and drills for steering and emergency steering.

2 The vessel's anemometer could display either true or relative wind speed, with the relative wind speed mode selected. Relative wind is the speed of the wind as experienced on the moving ship. Unless otherwise specified, wind speeds in this report are true wind speed, calculated using the ship's anemometer values.

3 Maersk Shekou carried 2 third mates, one keeping the 4–8 watch and the other the 8–12 watch.

4 The shoulder is the area where a ship's hull form changes from the bow shape to the parallel mid body, and the quarter is located at the stern of the ship.

5 One knot, or one nautical mile per hour, equals 1.852 kilometres per hour. All ship speeds referred to in this report are 'made good/over the ground'.

6 The DWC is for vessels under pilotage from the Outer Pilotage Boarding Ground to berth, referred to as a 'full pilotage'.

7 The Fremantle Port Authority operates a 24-hour Vessel Traffic Service (VTS), with the call sign 'Fremantle VTS'.

8 A Portable Pilot Unit is a specialised navigation device used by marine pilots to assist with navigation.

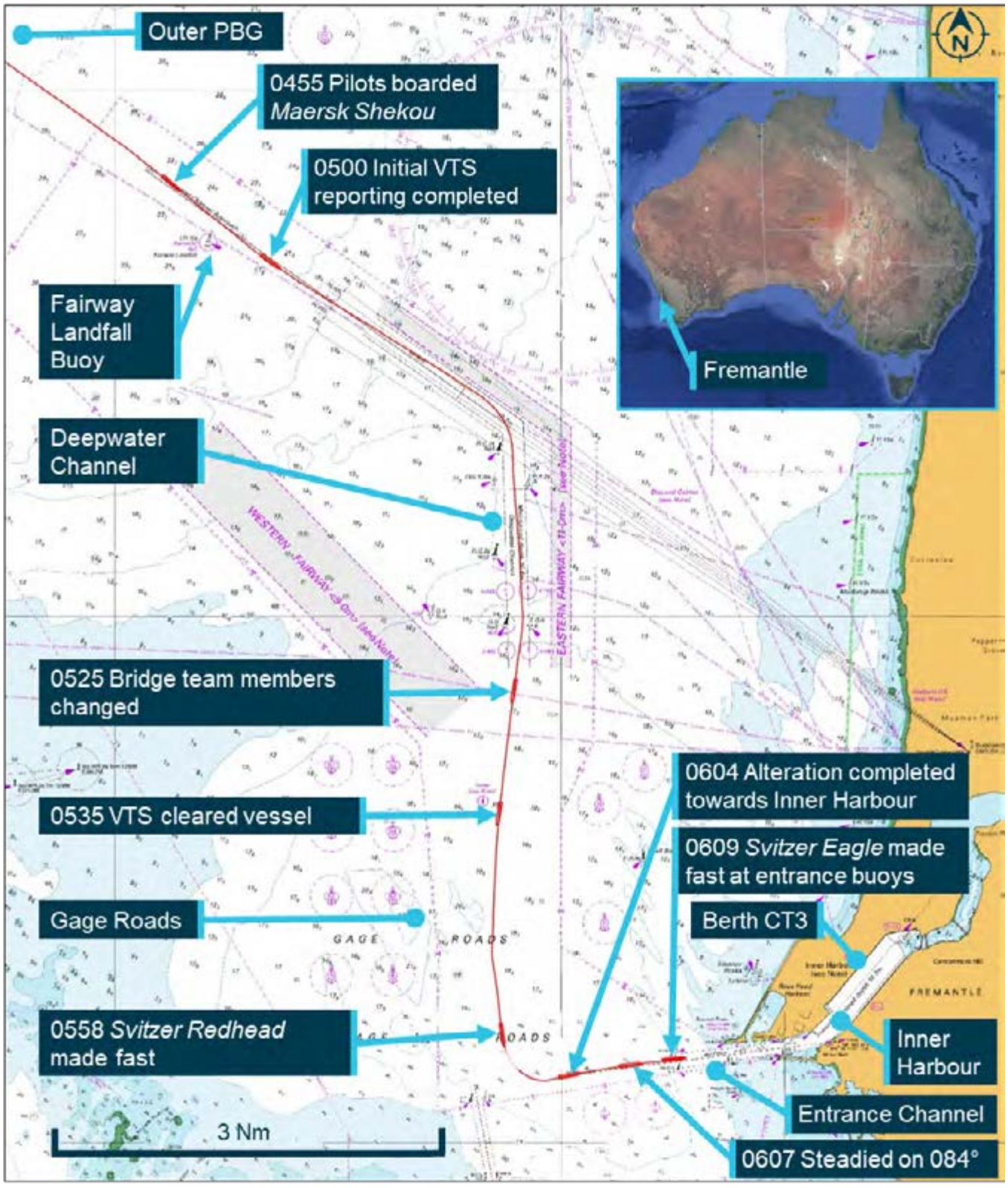


Figure 1: *Section of navigational chart Aus112 showing Maersk Shekou's inbound track* (Source: Australian Hydrographic Office, annotated by the ATSB)

pilot advised the master that they were the backup / substitute pilot but had taken on the primary pilot's role as the secondary pilot, who was originally scheduled to be in charge, "was tired". The pilot also informed the master that a 20-25 knot westerly breeze had been forecast throughout the day and the tide was flooding, with high water expected at 0706.

The vessel continued its inbound transit with the bridge team comprising the two pilots, master, third mate, and an ordinary seafarer at the helm. The third mate was relieved by the chief mate at about 0525, and the helmsman was also relieved by an able seafarer a few minutes later. The pilots engaged in various work-related and social discussions during the transit. The vessel's bridge team was also engaged in separate conversations in a non-English language.

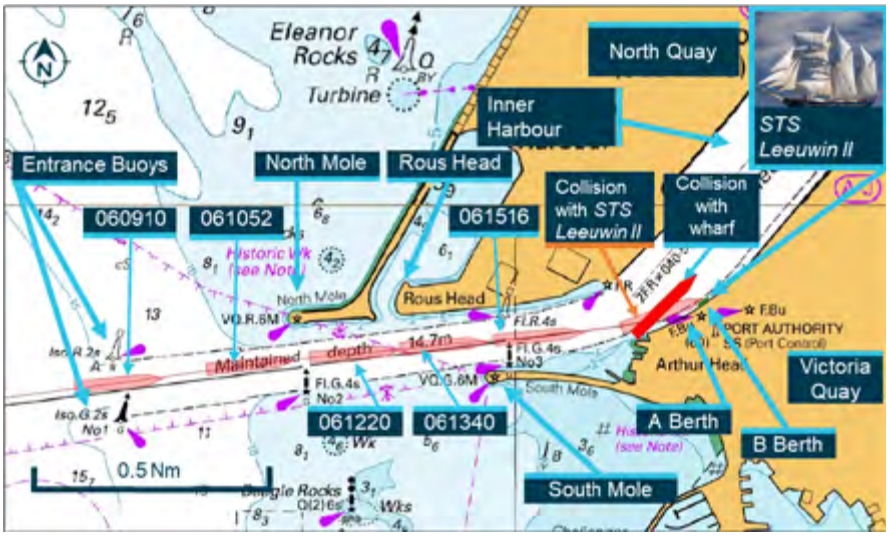


Figure 2: Maersk Shekou key times of port entry (Source: Australian Hydrographic Office, annotated by the ATSB)

During the inbound transit through the DWC, the *Maersk Shekou* experienced sustained strong winds. By 0518, while on a southerly heading, the relative wind gusts peaked at 54 knots from about 4 points[9] on the starboard bow.

At about 0535, while passing Hall Bank beacon, the pilot contacted Fremantle VTS advising they were proceeding very slowly and awaiting daylight to enter the port. The duty VTSO confirmed the vessel was clear to proceed into the Inner Harbour on that basis. The wind speed had abated slightly but remained in the vicinity of 25-30 knots.

Between 0531 and 0543, the pilot contacted the masters of the four tugs and advised them of their intended placement around the *Maersk Shekou*. At 0558, the escort tug, *Svitzer Redhead*, was made fast on the port quarter. Continuing on a southerly heading at approximately 6.8 knots with its main engine on slow ahead, the vessel was experiencing relative wind speeds of about 30-35 knots from approximately 5 points on the starboard bow. The pilot then ordered an increase to half-ahead on the engine and port helm to facilitate a course alteration through an approximately 96° port turn to line up with the inner harbour entrance channel (IHEC).

At 0604, on completing the turn, the wind speed had decreased to below 20 knots. *Maersk Shekou* was proceeding at 9.4 knots and slow-ahead was ordered on the main engine. At 0607, the pilot instructed the helmsman to steady the vessel on a heading[10] of 084°. About a minute later, the vessel's speed had increased to 9.9 knots and the pilot ordered dead slow ahead on the main engine.

At 0609, as the vessel passed the IHEC entrance buoys, A and No1, the *Svitzer Eagle* tug was made fast on the starboard quarter (Figure 2). Between helm and engine orders, the pilots continued to engage in various marine and social discussions. About a minute later, the *Svitzer Emma* tug was secured at the *Maersk Shekou*'s port shoulder. At this stage, the vessel's speed had reduced to 9.3 knots. At 0610:52, the vessel was heading 084°, with its bow approximately in line with North Mole. The pilot ordered 085°, which was immediately acknowledged and actioned by the helmsman.

As the vessel proceeded along the IHEC, the south-westerly winds escalated and, by 0612:05, the relative wind speed had increased to upwards of 30 knots from the starboard quarter. At about that time, as the *Maersk Shekou* was at 8.6 knots with its bow in line with Rous Head, the pilot ordered both stern tugs to pull back at quarter power to reduce the vessel's speed.

At around 0612:36, the vessel developed a slight starboard rate of turn. To maintain the 085° heading ordered by the pilot, the helmsman put the helm over to port 25° and then port 30°. The wind speed was steadily increasing and by 0612:50, the vessel was encountering a persistent relative wind speed of 40 knots on the starboard quarter. Despite the port 30° helm, the vessel continued to swing slowly to starboard and was heading approximately 086°.

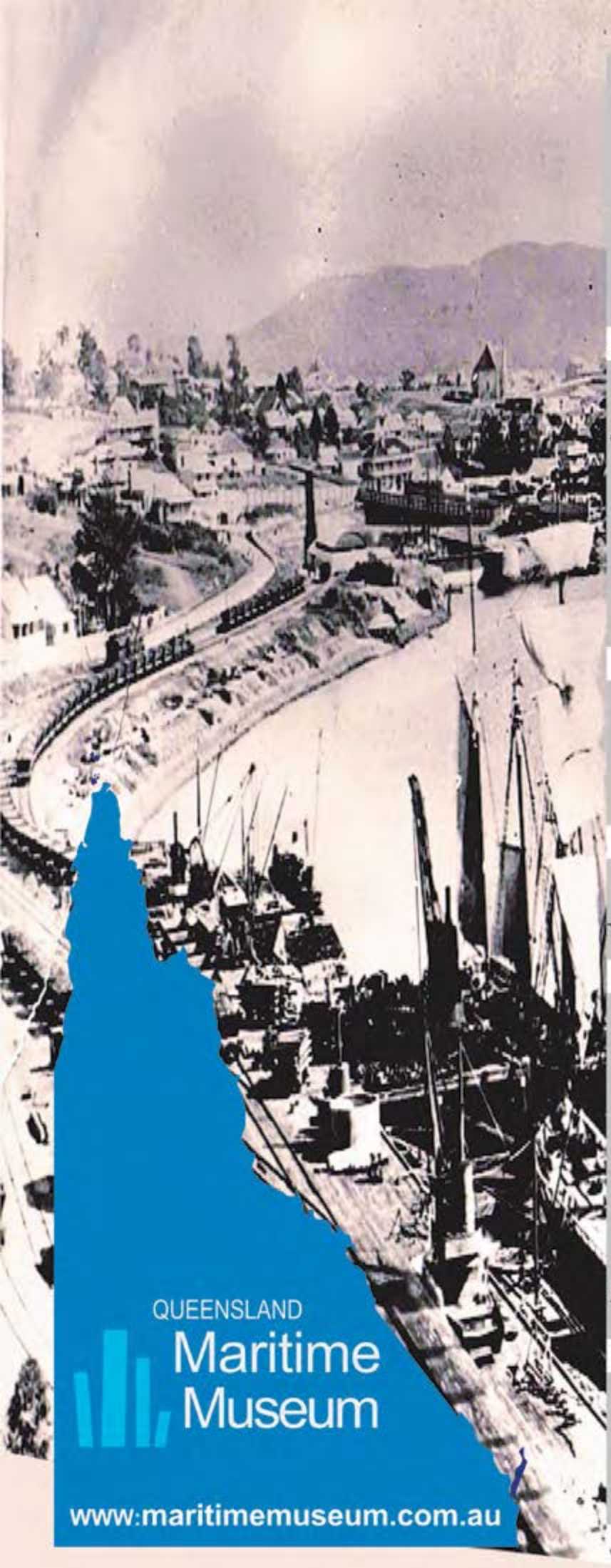
About then, as the vessel was passing the entrance to Rous Head Harbour (Figure 2), the secondary pilot stood at the rear of the wheelhouse, behind the helmsman, and made a telephone call to the duty pilot (see the section titled Fremantle pilots).

At 0613:26, the vessel's speed had slowed to about 8.0 knots, and the pilot ordered the tug *Svitzer Redhead* (already pulling back at quarter power) to increase engine speed to half power. At 0613:40, as the *Maersk Shekou*'s bow was in line with South Mole, the pilot ordered the helmsman to steer 083°. The helmsman apparently did not hear the order completely and responded by saying '08…'. The pilot immediately repeated the 083° order, which was then correctly acknowledged by the helmsman without delay at 0613:45.

Around that time, the *Svitzer Falcon* tug was made fast at the *Maersk Shekou*'s starboard shoulder. In the following 15 seconds, several verbal exchanges of information occurred between the vessel's crew on forward stations and the bridge team on UHF radio, between the pilot

9 One point refers to an angle of 11.25° on a compass.

10 All ship's headings in this report are in degrees by gyro compass.



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and *Svitzer Falcon*'s tug master on VHF radio, and between the master and pilot (in person on the bridge). Shortly after, at 0614:10, the pilot instructed the *Svitzer Eagle* to stop pulling back. Despite the helm being maintained nearly at hard port, the vessel was heading almost 087°, making good 7.5 knots, with a 1°/min rate of turn to starboard.

As the primary pilot was conning the vessel from the front of the wheelhouse, the secondary pilot was stationed at the rear and continued to be engaged in their phone call. At 0614:24, the pilot instructed *Svitzer Emma* on the port shoulder to pull back with half power. The helmsman then reported aloud that the wheel was on hard port, but the vessel was swinging to starboard. The master immediately reiterated this to the pilot and suggested increasing the engine to full ahead[11] to facilitate a quicker turn. The pilot agreed and at 0614:34, the master ordered full ahead on the main engine.

At 0614:40, the pilot ordered *Svitzer Eagle* to "come out square, standby to lift off[12] on the starboard quarter" and a few seconds later, the master of *Svitzer Eagle* confirmed that it was square on the starboard quarter. With the helmsman continuing to maintain the helm nearly at hard port, the *Maersk Shekou*'s bow started slowing swinging to port.

At 0614:56, the pilot then stated on the VHF radio "we need to take the stern to starboard please". The *Svitzer Eagle*'s skipper later advised that, based on their assessment, they were unable to assist in the direct towing mode and altered

Figure 3: *CCTV footage of STS* Leeuwin II *at its mooring with Maersk Shekou inbound* (Source: Fremantle Port Authority, annotated by the ATSB)

to indirect towage[13] to generate more force with the manoeuvre.

The engine RPM was steadily increasing to full ahead and, by 0615:03, it had increased to 68 RPM. At 0615:10, the master advised the pilot that the (relative) wind speed had increased to 45 knots, which the pilot acknowledged.

By 0615:16, the vessel was making good 7.1 knots and continued to swing to port, achieving a maximum rate of turn of 9°/min. However, as the heading came around to 086°, the helmsman brought the helm to midship and then to starboard 33° for a brief period before returning it to midship. The helmsman's actions resulted in the vessel's port swing being arrested, and the vessel being steadied on a heading of approximately 083°, into the path of A and B berths at Victoria Quay.

With neither pilot nor the ship's bridge team observing the actions of the helmsman, the primary pilot informed the secondary pilot that they were in trouble, resulting in the latter then concluding their phone call at 0615:33. At the time, the rate of turn was almost nil, however, the rudder position was still at starboard 31° and returning to midship following the helmsman's actions. The secondary pilot questioned, "not turning?", but did not receive any verbal response from the primary pilot.

Both pilots then coordinated their efforts in directing the tugs to assist with the vessel's port turn. The primary pilot continued to communicate with the tugs, with the secondary pilot providing advice. The pilot instructed *Svitzer Emma* on the port shoulder to "come out square, lift off as much as you can".

At 0615:47, the *Maersk Shekou*'s engine achieved its full ahead potential of 76 RPM and the helmsman maintained the rudder in the amidships[14] position. The ship was proceeding at 7.2 knots on a steady 083.5° heading, into the path of STS *Leeuwin II*, which was less than a ship's length away, and moored port side alongside B berth at Victoria Quay (Figure 3).

In a continued effort to maintain a steady heading of 083°, the helmsman turned the helm briefly to port 20° for about six seconds, before returning it to midship. It also started to rain heavily around this time.

11 Full ahead is rated at 76 RPM on the Maersk Shekou.

12 A 'lift off' instruction requires the tug to pull at a 90° angle to the ship's fore and aft line.

13 Indirect towage is a specialised towing technique effective at speeds between 6 to 10 knots where the tug uses its own thrust and drag effect to generate high towline assistance forces.

14 Zero (0) degree mark on the rudder angle indicator.

At 0615:54, on the secondary pilot's orders, the master put the bow thrusters full power to port and at 0616:05, the *Svitzer Falcon* tug pushed with full power on the starboard shoulder following the pilot's instructions. At 0616:10, the secondary pilot ordered stop engines and, five seconds later, full astern. The master instructed the crew at forward stations to stand by to release the port anchor.

With the *Maersk Shekou* proceeding at 7.0 knots and bow thrusters at full power to port, the vessel was heading 082° and commenced swinging to port at a rate of approximately 5°/min.

At 0616:21, the helmsman gave further starboard helm of 12-20° for about 10 seconds, followed by starboard 24-29° for 46 seconds before returning the wheel to the midship position. At 0616:49, the vessel achieved its full astern potential of 76 RPM and its speed had reduced to 5.7 knots.

At 0616:54, one of the pilots ordered the port anchor to be released, and the master immediately conveyed this instruction to the crew at forward stations. The bridge team then sounded a long blast on the ship's whistle to caution other craft of an impending collision.

The relative wind speed recorded on the *Maersk Shekou*'s anemometer remained at approximately 40-45 knots from the starboard quarter with heavy driving rain. At 0617:29, the tug master of *Svitzer Falcon* informed the pilot that they needed to abandon position due to the danger of being crushed between Victoria Quay and the closing in hull of the *Maersk Shekou*. The crew of the *Svitzer Falcon* readied the gangway in case it was required for their emergency evacuation onto the wharf, but the tug was manoeuvred clear in time and the crew remained on board.

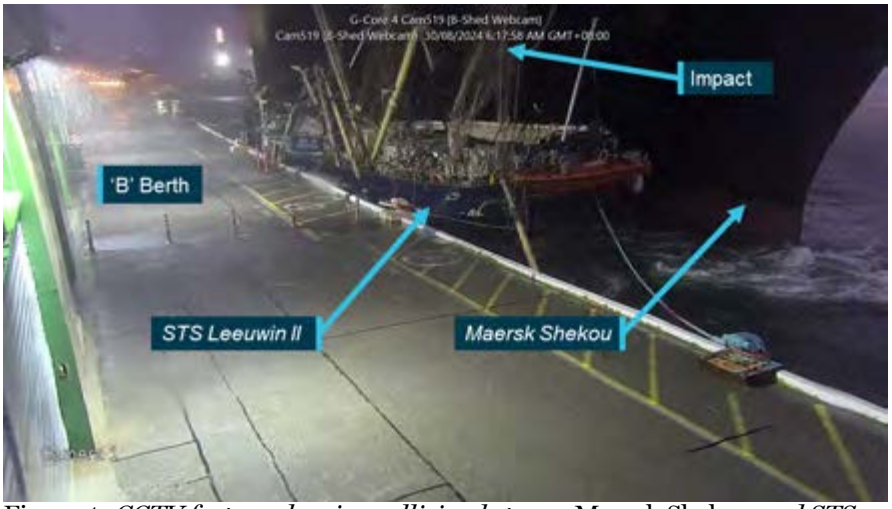


Figure 4: *CCTV footage showing collision between* Maersk Shekou *and STS* Leeuwin II (Source: Fremantle Port Authority, annotated by the ATSB)

At 0617:33, on the secondary pilot's suggestion, the lead pilot instructed *Svitzer Eagle* to push on the starboard quarter. This command was not acknowledged by the tug, however, a few seconds later, the pilot instructed *Svitzer Eagle* to pull back with full power, which was then duly acknowledged. The *Maersk Shekou* still had headway with a ground speed of just over 3 knots and decreasing.

Due to the action of the tugs and bow thrusters, the *Maersk Shekou* continued to maintain a port swing of about 10°/min, away from the direct path of the STS *Leeuwin II*. However, *Maersk Shekou* did not make a clear turn, and moments later, its starboard bow flare collided with the STS *Leeuwin II*, dismasting the latter (Figure 4). Two crew members, on board the sailing vessel at the time, escaped via its gangway just as the collision occurred.

Maersk Shekou's bow kept swinging to port and in the seconds after the collision, its port anchor was dropped. Unable to visually sight the STS *Leeuwin II* and ascertain the safety of its crew, either the secondary pilot or the *Maersk Shekou*'s master sounded another long blast.

By 0618:35, the *Maersk Shekou* had lost almost all speed, however, its bow was still swinging to port at about 7°/min, and its stern moving to starboard in the direction of the WA Maritime Museum located at the western edge of Victoria Quay. To push the vessel's stern away from the wharf, the pilot instructed *Svitzer Falcon* to push on the *Maersk Shekou* wherever it was possible and at 0618:45, ordered the master to stop engines.

At 0619:01, the pilot instructed *Svitzer Redhead* on the port quarter to lift off with full power and a few seconds later, ordered *Svitzer Emma* to stop pulling back on the port shoulder. With the *Maersk Shekou* swinging to port at about 13°/min, the pilot ordered the helm hard to starboard and then dead slow ahead at 0619:23. The pilot again requested *Svitzer Eagle* to push on the starboard quarter, but the tug master advised they were unable to comply due to limited access between the vessel's hull and the wharf. Instead, it assisted by pulling astern with full power.

The primary pilot remained in the wheelhouse while the secondary pilot moved between the wheelhouse and starboard bridge wing, checking the tugs' positions and overside clearances. At 0619:30, the pilot ordered slow ahead and, subsequently, ordered the wheel hard to starboard. Twenty seconds later, half ahead was ordered. The *Maersk Shekou*'s bow kept swinging to port at about 12°/min, with its stern closing in

to the edge of the wharf. As the vessel continued to come around to a north-easterly heading, it experienced 20-40 knot winds from astern.

At 0619:52, the master alerted the pilots that the bow thrusters were still running with full power to port. The secondary pilot immediately instructed the master to stop the thrusters to keep the stern away from the wharf. By 0620:04, the thrusters had stopped, and the rate of turn had decreased rapidly to about 6°/min. Having been advised by the aft station's crew that the vessel's stern was about three metres away from the wharf and closing in, the master suggested going full ahead on the engine, which was agreed to by the pilots.

At 0620:09, the helm was brought to midship but the rudder momentarily moved to about port 12° for a few seconds before returning to amidships. This movement was later reported to have been due to a fouled towline from the *Svitzer Eagle*. The vessel's rate of turn continued to decrease to nearly zero, but its stern continued to drift towards the wharf. At 0620:23, the pilot ordered the bow thrusters to be put full to starboard, however, the outermost stack of containers on the *Maersk Shekou*'s poop deck collided with the roof of the museum, and the vessel's starboard quarter contacted the wharf (Figure 5).

Thereafter, the vessel developed a slight forward motion and starboard swing, resulting in the edge of the wharf scraping against and rupturing the vessel's hull by approximately 1.84 m x 0.51 m. The breach was situated above the waterline, and no ingress or egress resulted. Concrete and timber debris from the wharf lodged within the breached section of the hull as the vessel pulled away from the wharf (Figure 6).

Figure 5: *Footage showing contact of* Maersk Shekou *with the shore* (Source: Fremantle Port Authority, annotated by the ATSB)

Figure 6: *Contact damage to* Maersk Shekou's *hull* (Source: Maersk Shekou's P&I representative, annotated by the ATSB)

At 0620:48, the pilot ordered the bow thrusters to be stopped and once the vessel's stern had moved clear of the wharf, stopped the main engine. Subsequently, the pilots utilised the tugs, bow thrusters and the main engine to navigate the *Maersk Shekou* towards the centre of the channel. Meanwhile, the secondary pilot made phone calls to the VTSO and duty pilot to confirm the next course of action. On the harbour master's instructions, the VTSO directed the *Maersk Shekou* to continue to its intended berth. It was also decided that two additional pilots would board the vessel to relieve the initial pilots of their duties for the berthing manoeuvre.

At 0631, the *Maersk Shekou*'s crew commenced retrieving the port anchor following the pilot's instructions, and the two relief pilots boarded the vessel at 0713. Following a handover, the initial two pilots disembarked at 0810 and the port anchor was fully aweigh at 0812. The *Maersk Shekou* was then navigated into the inner harbour and safely made fast to its berth by 0930.

The *Maersk Shekou* sustained minor damage. The STS *Leeuwin II* sustained substantial damage and two of its crew members sustained minor injuries during the incident.

2) Context: *Maersk Shekou*

Maersk Shekou was a 333-metre container ship built in 2010 by Daewoo Shipbuilding and Marine Engineering, Korea. It was registered in Singapore and classed with Lloyds Register Asia. At the time of the occurrence, the ship was owned by A.P. Moller Singapore Pte Ltd, managed by V Ships (Hamburg) GmbH & Co

KG of Germany and operated by Maersk A/S of Denmark.

Maersk Shekou had a moulded breadth of 43.20 m and a depth of 24.50 m. At its summer draught of 14.52 m, the ship had a deadweight of 108,622 t and had a cargo capacity of 8,814 20-foot equivalent (TEU)[15] containers. Propulsive power was provided by a single Doosan-MAN B&W two-stroke, single-acting diesel engine that developed 57,100 kW at 104 RPM.

The main engine drove a single, right-handed fixed-pitch propeller, which gave the ship a service speed of 24 knots. The ship was also equipped with an electrically-driven controllable pitch propeller bow thruster producing 3,000 kW. Upon its arrival at Fremantle, the vessel had a maximum declared draft of 13.3 m, and displacement of 141,076 t.

Maersk Shekou had a crew of 26 Ukrainian, Lithuanian, Burmese and Romanian nationals. This included four mates with an additional third mate on board to assist in maintaining the rest-hour requirements of the Standards of Training Certification and Watchkeeping for Seafarers (STCW) Code[16].

The master had 35 years' experience at sea and held a Ukrainian master mariner's certificate of competency. They had sailed as master for 22 years and served in command of the *Maersk Shekou* for the last 12 years on a three-monthly on-off rotation.

The chief mate held a Ukrainian master mariner's certificate of competency, first obtained in 2021. They had been serving as an officer for 21 years. They had sailed as chief mate on the *Maersk Shekou* on a rotational basis for the last 12 years and had worked with the master for that time. The chief mate kept the 1600-1800 bridge watch at sea and usually formed part of the bridge team during port arrival and departure manoeuvring.

The helmsman at the time of the incident obtained their Burmese certificate of proficiency as an able seafarer in 2022 and had been with the operator for the last 10 years. They had joined *Maersk Shekou* three months before the incident and reported that they had visited the port of Fremantle once before. This was their first contract as an able seafarer.

3) STS *Leeuwin II*

STS *Leeuwin II* was Australia's largest sail-training tall ship. It was a three-masted 1850s-style barquentine[17] built, owned and operated in Western Australia by the Leeuwin Ocean Adventure Foundation Limited, a registered Western Australian charity run by staff and volunteers. The ship was launched in 1986. It had a length overall of 55 m, 9 m beam and stood 33 m tall at its main mast. The tall ship was moored at B Shed in Victoria Quay, Fremantle Port.

The hull was constructed from welded steel, with a teak deck and 16 canvas sails. It was equipped to accommodate a full complement of 15 crew and 40 trainees.

STS *Leeuwin II* was used to run youth training programs, as part of the Leeuwin Ocean Adventure Foundation. In addition, the tall ship offered sailing tours to members of the public.

4) Port of Fremantle

The Port of Fremantle operated through two harbours: the Inner Harbour in Fremantle, at the entrance to the Swan River, and the Outer Harbour, about 22 km to the south at Kwinana.

The Inner Harbour handled almost all the container trade for Western Australia and also provided facilities for livestock exports, motor vehicle imports, other general cargo trades, cruise ships and visiting naval vessels.

The Fremantle Port Authority, operating under the name Fremantle Ports, was the port's strategic manager. The port included a mix of facilities and services managed by Fremantle Ports and private operators. Fremantle Ports provided and maintained shipping channels, navigation aids, port infrastructure and amenities whereas services such as towage, line boats and bunkering were provided by the private sector. Pilotage service is provided by Fremantle Ports through a contract with Fremantle Pilots.

Fremantle vessel traffic services (VTS), operated by Fremantle Ports, provided "continuous monitoring of vessel movements within the VTS areas of Fremantle and Cockburn Sound". The service provided navigational advice using information from radar, vessels' own Automatic Identification System (AIS), and VHF radio, while also documenting all communications and relevant data.

To ensure the safe and efficient operation of vessels within port limits, Fremantle Ports issued mandatory directives by way of Harbour Master's Instructions (HMI) which applied to commercial vessels operating within these limits. The HMI covered a range of operational, safety and procedural aspects.

HMI 03-2023 referred to Re-

15 Twenty-foot Equivalent Unit, a standard shipping container. The nominal size of a ship in TEU refers to the number of standard containers that it can carry.

16 International Maritime Organisation (IMO) 1978, International Convention on Standards of Training Certification and Watchkeeping for Seafarers, 1978, as amended (STCW Code), IMO, London.

17 A barquentine is a sailing vessel with 3 or more masts, with a square rigged foremast and fore-and-aft rigged main, mizzen and any other masts.

vised Operational Parameters for Large Container Vessels (LCV)[18] for their safe berthing and unberthing within the Port of Fremantle Inner Harbour. The instruction addressed towage, weather, daylight manoeuvring, pilotage and other operational considerations for large ships such as the *Maersk Shekou*, having a length overall greater than 310 m or beam exceeding 43 m.

Pilotage was compulsory within the port limits for vessels with LOA[19] exceeding 35 m. As noted in the Fremantle Ports operational parameters, LCV with length 310 m or greater required a two-pilot operation.

5) LCV project

Between 2020 and 2023, Fremantle Ports worked in conjunction with Fremantle Pilots and Svitzer across various simulation manoeuvres at the Fremantle Maritime Simulation Centre (FMSC). This included a series of "live" trials involving LCV being turned around while inbound into port. This process was adopted to improve port efficiency and enable vessels to depart port during hours of darkness. These operational trails and simulations culminated in the harbour master setting out the relevant revised parameters in HMI 03-2023.

Accordingly, Fremantle Pilots provided two pilots for the full pilotage of LCV and arranged for vessels between 310 m and 347 m LOA to be turned around on arrival inside the Inner Harbour, in a daylight-only manoeuvre. In conjunction with HMI 03-2023, the Fremantle Ports operational parameters specified that for the daylight-only turning on arrival berthing manoeuvre: "*Sunrise or Sunset is to coincide with the vessel's position at the entrance [emphasis added] of the Inner Harbour Channel.*"

18 www.fremantleports.com.au/shipping/harbour-master's-instructions

19 Length Overall.

6) Fremantle pilots

Fremantle Pilots (FP) was a privately owned company[20] that provided continuous contracted pilotage services within the Port of Fremantle since 1994. FP was reported to pilot about 3,500 vessel movements annually. Pilot bookings were managed through the Port of Fremantle via the vessel's contracted shipping agent. Prior to the incident, FP had been involved in approximately 400 LCV movements at the Port of Fremantle since February 2022 (when turning on arrival was mandated).

The pilot roster allocated a team of five pilots working on a four-day on/off rotational basis. While rostered on, four pilots worked a fixed 12-hour shift each day and overlapped duties such that there were at least two pilots available at any given time. The remaining pilot assumed the duty pilot role and supplemented the four pilots on roster by arranging their transportation, reviewing HMI and marine notices and providing relevant feedback. If the rostered-on pilots were unable to manage the work demands, an additional standby pilot could be requested from those pilots on their break.

Both pilots assigned to *Maersk Shekou* on 30 August 2024 held an unrestricted licence as a port pilot issued by Fremantle Ports and a master mariner's certificate of competency issued by the Australian Maritime Safety Authority (AMSA). The primary pilot had 36 years of pilotage experience overseas and in various Australian ports and had worked for FP since 1997. The secondary pilot had been a pilot for 25 years, of which 20 had been with FP.

7) Towage

The towage requirements for ships entering the Port of Fremantle were set by the harbour master and outlined in the Port Information Guide. All tugs in the Port of Fremantle were privately owned and operated, and available 24 hours.

For LCV between 310 m and 336 m turning on arrival, the towage requirements prescribed in HMI 03-2023 mandated that four A-Class[21] tugs were required for the inbound manoeuvre.

The latest revision of the Fremantle Ports operational parameters, as authorised by the harbour master on 14 March 2024, mandated that in respect of the LCV, the towing arrangement would comprise one escort tug and three other tugs.

The escort tug and the other tugs were required to be "on station" at distances of 1.5 NM and 1.0 NM respectively from the inner harbour entrance[22]. Further, the escort tug was required to be made fast to the inbound ship by 1.0 NM from the inner harbour entrance, and the three other tugs were to be made fast by the inner harbour entrance buoys.

Towage services of the A-Class tugs were provided by Svitzer. Azimuth stern drive (ASD) tugs were by far the largest group of tugs within the Svitzer fleet, and the most popular tug type worldwide. This type of tug is equipped with two azimuth thrusters in nozzles at the stern. Some are also fitted with bow thrusters. The thrusters can be turned around 360°, enabling the propeller thrust to be in any direction. ASD tugs mainly tow over the bow with the towing winch and towing staple forward, but some are fitted with an aft winch and staple or a towing hook with the aft towing point aft of amidships. The bollard pull of the tugs used for the *Maersk Shekou*'s inbound manoeuvre

20 www.fremantlepilots.com.au

21 Azimuth Stern Drive tug with a bollard pull of > 60T @ 85% Maximum Continuous Rating (MCR) over the bow.

22 The inner harbour entrance is defined as the channel position abeam Buoys No. 1 and A.

varied between 65 tonnes and 80 tonnes.

8) Pilotage procedures

FP had documented procedures for pilot rostering and scheduling, fatigue management, passage planning and execution, which included the roles and responsibilities of pilots. The procedures stated that in cases where a second pilot was scheduled as a secondary pilot for a pilotage movement:

The primary pilot was responsible for preparing the passage plan, reviewing and agreeing to the same with the secondary pilot prior to joining the vessel. They were also responsible for completing the MPX with the master, the overall conduct of the vessel[23], and maintaining and monitoring radio communications.

The secondary pilot was to assist in pilotage and passage planning as instructed by the primary pilot. In addition, the secondary pilot was required to:

- ❏ set up the PPU
- ❏ participate in the MPX
- ❏ monitor all aspects of passage execution including turn execution
- ❏ support the primary pilot with communication and reporting
- ❏ maintain a log of events
- ❏ pack up the PPU on completion of the movement.

The secondary pilot was also to remain prepared to take conduct of the vessel should the primary pilot become incapacitated at any time.

FP also had specific passage planning procedures in place for the full pilotage of LCV at Fremantle Port. The procedures included recommendations for the vessel's speed during the various legs of the passage, wheel over and abort points, dynamic under keel clearance considerations, and the required information exchange with the vessel's bridge team. The recommended turn radius at the various wheel over points, including the turn into the inner harbour, was 0.75 NM.

While the FP procedures specified locations to rendezvous with and make fast tugs, considerations were only made in respect of three tugs. There was no procedure detailed for the fourth tug that was required for LCV operations by the Port of Fremantle procedures.

For the approach into the inner harbour, the FP procedures stated that the dedicated escort tug was to be made fast to the vessel's aft centre lead at a minimum of seven cables from the inner harbour buoys, and the remaining two tugs were to be in position before the vessel arrived at North Mole.

9) Bridge resource management

Bridge resource management (BRM) is defined as the use and coordination of all the skills and resources (people, procedures and equipment) available to the entire bridge team to achieve the established goal of optimum safety and efficiency[24]. All individuals make errors, and BRM aims to minimise the occurrence and outcome of errors through the best possible use of resources. All ship's navigators must have training, and demonstrate competence, in BRM techniques.

In areas of increased risk to safe navigation, one or more pilots are often added to the ship's navigation team. The pilots' local knowledge and practised piloting techniques are intended to reduce risks to an acceptable level. In the case of LCV operations at Fremantle port, the addition of a secondary pilot was deemed necessary.

Bridge resource management is a broad topic which covers many inter-related subjects, including but not limited to:

- ❏ shared mental model;
- ❏ situational awareness;
- ❏ error management;
- ❏ contingency planning;
- ❏ challenge and response; and
- ❏ distractions and interruptions.

The ship's master and the pilots are responsible for taking steps to actively engage and include other members of the ship's bridge team in the pilotage. Through effective BRM, all personnel involved in the navigation of the ship should have a clear understanding of, and expectations for, the pilotage. A clear understanding of the agreed passage plan and the establishment of a 'shared mental model' by the entire bridge team forms the basis of a safe voyage under coastal pilotage conditions[25].

Navigational, operational and general safety priorities should be set and constantly reviewed in the context of the prevailing circumstances and conditions. Non-essential activity and distractions should be avoided, suppressed or removed.

Although section 326(3) of the Navigation Act 2012 provides that masters are not relieved of responsibility for the conduct and safe navigation of a vessel when the vessel is under pilotage, it is essential that coastal pilots work closely with masters and bridge teams to ensure that errors are detected and corrected as early as possible.

10) Weather

Pursuant to HMI 03-2023, Fremantle Ports had stipulated the maximum weather criteria for inbound LCV. For ships turning on arrival, such as the *Maersk Shekou*, the relevant parameters were:

23 The master always remained in command of the vessel.

24 Nijjer, R 2000 Bridge Resource Management: The Missing Link, Sea Australia 2000, Sydney.

25 https://www.amsa.gov.au/safety-navigation/navigating-coastal-waters/bridge-resource-management-and-reduction-single-person

- maximum wind: 20 knots[26]
- maximum current: 0.3 knots at swing circle (inner harbour) / 1.0 knots at railway bridge.

In the days leading up to 30 August, the Bureau of Meteorology (BOM)[27] had issued strong wind and gale warnings, with winds predicted to reach 35 knots at times. Accordingly, the Port of Fremantle was evacuated, and vessel movements were stopped during that time.

The BOM forecast issued during the late hours of 29 August predicted that "a vigorous west to south-westerly flow" would ease that night, with 15-20 knot winds from the south-westerly direction forecast for Friday, 30 August. There was no strong wind or gale warning forecast for 30 August.

26 Wind speed is the 10-minute average with maximum gusts not exceeding 10 knots above the 10-minute average parameter stated.

27 Local Waters Forecast for Perth Waters.

Fremantle Ports had also issued Shipping Agents' Memos for the forecast adverse weather, advising of cessation of shipping movements within the port for this period.

The BOM forecast, issued at 0400 on 30 August, maintained an unchanged wind prediction, partly cloudy skies with a chance of showers, seas of 1.5 m, westerly to south-westerly swell of 2.5-4.0 m. All BOM forecasts contain the following cautionary advice: *Wind and wave forecasts are averages. Wind gusts can be 40 per cent stronger than the forecast, and stronger still in squalls and thunderstorms.*

11) Further investigation

To date, the ATSB has:

- ❏ interviewed the vessel's master and crew, both pilots, tug skippers and VTSOs; and

reviewed:

- ❏ recordings of relevant communications and written communications between various parties;
- ❏ bridge recordings;
- ❏ Fremantle Pilots and Fremantle Ports procedures; and
- ❏ Bureau of Meteorology data the vessel's logs and records.

The investigation is continuing and will include further review and examination of:

- ❏ pilots and crew actions including bridge resource management; and
- ❏ shipboard SMS, port and pilotage procedures for inbound vessels.

A final report will be released at the conclusion of the investigation. Should a critical safety issue be identified during the course of the investigation, the ATSB will immediately notify relevant parties so appropriate and timely safety action can be taken.

The ATSB's interim report can be accessed here

Leeuwin II *under full sail. (Photos on these pages and front cover courtesy of Leeuwin Ocean Adventure.)*

Leeuwin II *after the accident in the Port of Fremantle last year.*

Update on STS *Leeuwin II*

REPAIRS have begun on the STS *Leeuwin II* in Western Australia.

Media reports said *Leeuwin II* left her quayside berth at B Shed in Fremantle Port on May 19, accompanied by a tug, heading for the Australian Marine Complex at Henderson, where she was to be repaired.

In an earlier (May 12) media release, Leeuwin Ocean Adventure (LOA), operators of the *Leeuwin II*, announced a timeline for the ship's refit.

"Over the past six months, significant planning and preparation have taken place behind the scenes," the LOA statement said.

"Leeuwin Ocean Adventure is delighted to confirm that progress has been made on our insurance claim, allowing us to move forward with our comprehensive 2025 rebuild and refit plans.

"We have now committed to a 19th May haul-out date for our out of water refit to commence.

"Key components of the rebuild include:

- 3,000 lineal metres of Douglas fir timber for the yards, topmasts, booms and gaffs have been ordered from British Columbia, Canada and are being loaded onto sea containers to be shipped to Fremantle;
- sewage system upgrades are being ordered;
- a full set of replacement sails are currently being sewn by Peter Ripley and his team;
- digital plans of the ship's masts and rigging have been produced;
- assessment and load testing of rigging is underway;
- our working shed has relocated to the North Quay: the Leeuwin Rig Shed will be the home of all rigging work for the project, and we are currently picking over the recovered rigging – measuring, counting and assessing what we have, and what we need to produce over the coming months; and
- our office relocation to a temporary site next to E Sheds is set to happen in the next couple of weeks, ahead of a more permanent office space being developed in the Port in 2026.

"We have an excellent space to do all the work needed, so we invite any volunteer who wants to be part of this historic effort to reach out to alex@sailleeuwin.com for all volunteering.

"For those with a passion to build trade skills in rigging, carpentry or sailmaking, please apply to our Trade Skills Volunteering Program online.

"This next chapter in *Leeuwin's* journey reflects not only our commitment to maritime youth development but also the strength of our community and partners, who've stood by us during this time of uncertainty.

"We look forward to welcoming trainees, volunteers and supporters back onboard very soon."

Checklists: What we often get wrong about them

THE following article is a reprint of an article drafted by Capt. Debashis Basu, Managing Partner, Navguide Solutions, and was published under the Inspections at Sea Newsletter posted to LinkedIn.

Legacy Systems

How do we expect our masters and chief engineers to prepare or maintain vessels ready for any inspection? How do we expect seafarers to learn and perform their jobs? Broadly speaking, in the same way we did 40 years back!

After having spoken to over 350 vessel operators and stakeholders, the pattern is clear to us. There are primarily three techniques used across the industry to gauge onboard performance.

There is an over-reliance on checklists and other text-based instructions, such as manuals, SMS, PMS, Safety Circulars, and vetting bulletins. Expectation: People should read and perform.

There is a dependence on on-board mentoring from the senior. Expectation: The master, chief engineer and other seniors must mentor the juniors as needed.

Dependence on shore training workshops. Expectation: Seafarers would come to the classrooms, learn a certain skill and perform differently when they are on board.

By far, the above sums up the approaches we have always had.

The myth and fallacy

All of the above are fair assumptions, the only flaw being:

- ❏checklists are subject to misinterpretation, text instructions cannot convey application skills (as in - I cannot explain how to tie a knot using written text);
- ❏proper mentorship may not always happen due to cultural differences, mixed nationalities, language barriers, lack of time, interest or knowledge, etc; and
- ❏no matter how well the workshops are conducted, there is a rapid drop in retention after someone receives a course certificate, so that very little is translated into on-the-job skills.

This is not to say that legacy systems do not work. Just that there are better approaches.

Five things we need to know about checklists

Checklists are probably the most misunderstood tool on a ship. Some swear by them. Some copy them. Some treat them like a sacred gospel. And some … well, some would rather deep-clean the bilge than fill another one.

But here's the truth: the problem is not with checklists. It's with how we use them, what we expect them to do, and what we forget they can never do.

Let's unpack that.

1. Checklists are not training tools. Period.

You can hand over a checklist that says:

- ❏"Inspect the condition of the lifeboat wire."
- ❏"Verify the SCBA pressure gauge."

And you think the seafarer knows what to look for.

But what if they don't? Even in a reputable company, do we always know the mindset of the person holding it? What if they've never seen a frayed wire before? What if they don't know how to identify a regulator leak?

What if they're new, or shy, or unsure – but they tick it anyway?

That's the first takeaway. We cannot assume that a checklist can compensate for a lack of clarity, skill or confidence.

A checklist, well, as the name suggests, is a reminder, not a teacher.

2. They don't show you what "good" looks like

"Check that the lifebuoy grab line is in good condition."

Cool. But what's "good"? What's "acceptable"? What's the difference between a weathered line that's fine and one that'll fail in an emergency? Most importantly, how do you check it?

Unless someone shows it, explains it, and demonstrates it, it may reduce to ticking vague boxes.

3. Checklists can be misused

Boxes can be ticked without consequence. We've seen it on hundreds of ships: A well-intentioned officer rushes through a checklist before an inspection because he has other things to do. A junior officer ticks every box out of fear of being blamed, sometimes unsure of what he or she should be looking for.

Checklists, in theory, are about discipline. But, in practice, they often become rituals without reflection. Checklists filled with fear or confusion are worse than no checklists at all.

4. Then there's the "too many checklists" problem

We asked the crews on several vessels about the procedure for inspecting the liferaft.

One person showed us the manufacturer's manual. Another opened the ship's PMS. Someone pointed to the laminated circular. Then we find three different

checklists – none of which match with each other. Though not always, this is more common than we would like to believe.

Too many checklists lead to checklist fatigue. People stop reading, stop comparing, and just go through the motions.

If everything is important, nothing is.

5. Checklists are rarely created with empathy

Imagine holding up a standard pre-SIRE or pre-PSC checklist. Typically, it lists the things to do without much concern for how the person using it would navigate on the ship. For example:

- ❑ ensure the Enclosed Space entry checklists are properly completed;
- ❑ make sure the Enclosed Space entry drill is carried out at regular intervals; and
- ❑ make sure all enclosed spaces are clearly marked on the deck and in the engine room.

All of these pertain to entering an enclosed space. But should they be clubbed together? How do I perform these checks in the sequence above? I would need to check the first one in the deck office with the chief officer's documentation, the next one in the electronic PMS system and, for the third one, I would have to go around the entire vessel!

The structure of most checklists makes it difficult for them to be followed diligently. OCIMF had introduced a ROVIQ system for inspectors, which considered their movement pattern. However, we do not see similar considerations in most company checklists.

So, what's the way out?

As I claimed earlier, there are more evolved ways to ensure the performance of a vessel.

Over the last few years, our work – Navguide Solutions LLP – has been with the HSEQ departments to ensure that vessels demonstrate tangible performance improvement in SIRE 2.0, Rightship and Port State Inspections. These techniques involve a deep empathy for the seafarer, understanding their thought processes and blending with them seamlessly.

Let us make the checklist the end of the process, not the beginning.

Mentorship is integral to vessel preparation

As is evident, it is impossible to declutch mentorship from performance.

Training and inspections cannot be treated under separate silos. Let's start with mentorship, real skill-building and seeing things being done right. Let's use visual references. Let people fail in safe environments before they face the real ones.

Then – and only then – use checklists to make sure it sticks. Think of them as a double check, not a one-size-fits-all solution.

Guide2Inspections™, our flagship Inspection app, was designed with that core philosophy: to help ship staff practice inspection routines on their own, blending mentorship within and giving the shore team real-time insight into what's actually happening onboard.

Legacy systems must evolve

OCIMF (Oil Companies International Marine Forum)'s SIRE 2.0 and RightShip's RISQ 3.1 introduced human factor implications and behavioural expectations. Inspectors are expected to look at patterns, not just paperwork. And operators are realising that standard forms don't prepare people for non-standard situations like these.

So, if our systems haven't changed in the last 40 years, but our vessels have ... It's time to upgrade more than just the form.

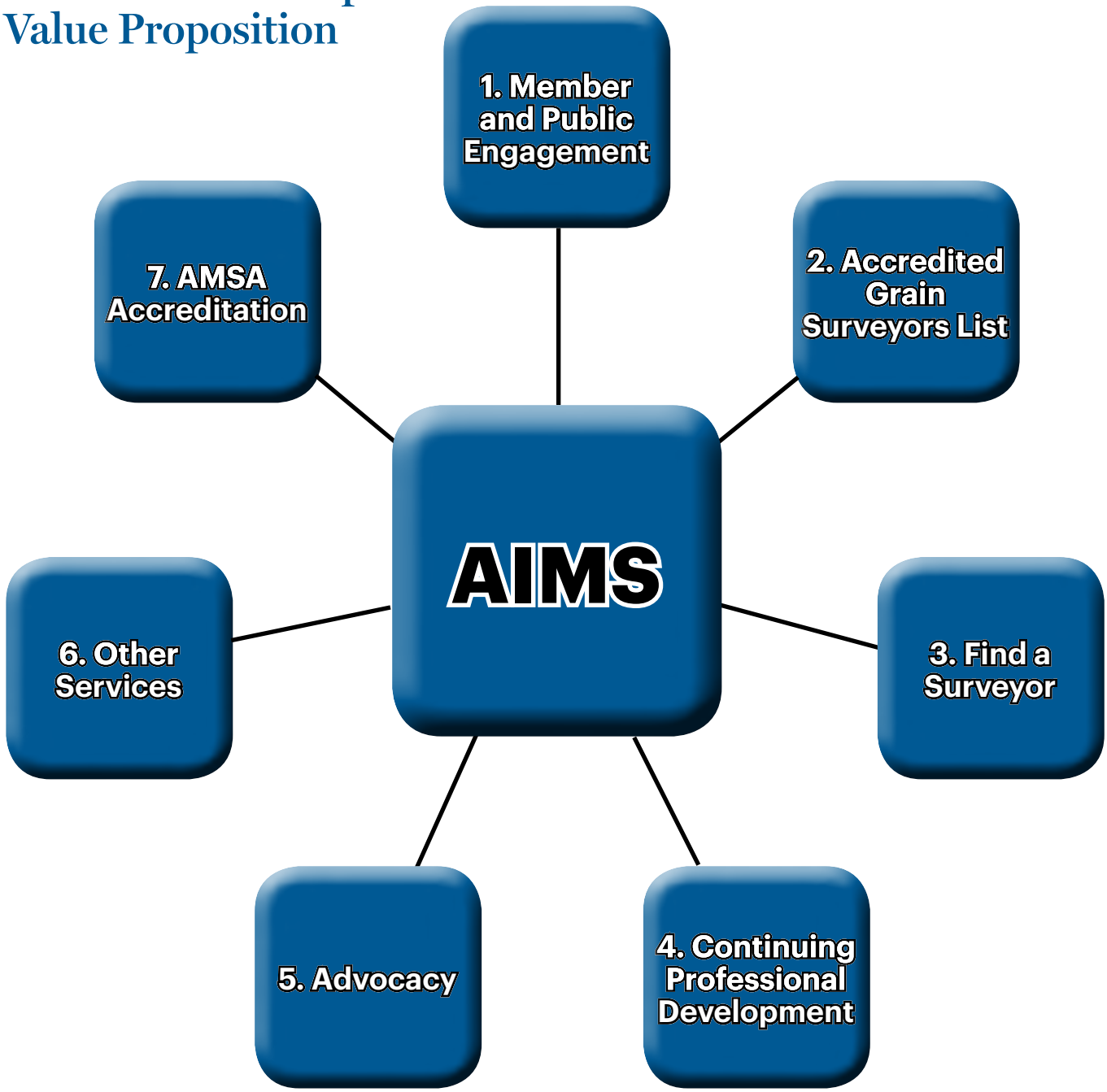
Capt Debashis Basu
Inspections at Sea Newsletter
Posted to LinkedIn 20 April 2025

AUSTRALASIAN INSTITUTE
OF MARINE SURVEYORS

Benefits of Membership

The largest industry body in the Australasian region for professional marine surveyors.

AIMS Membership: Value Proposition

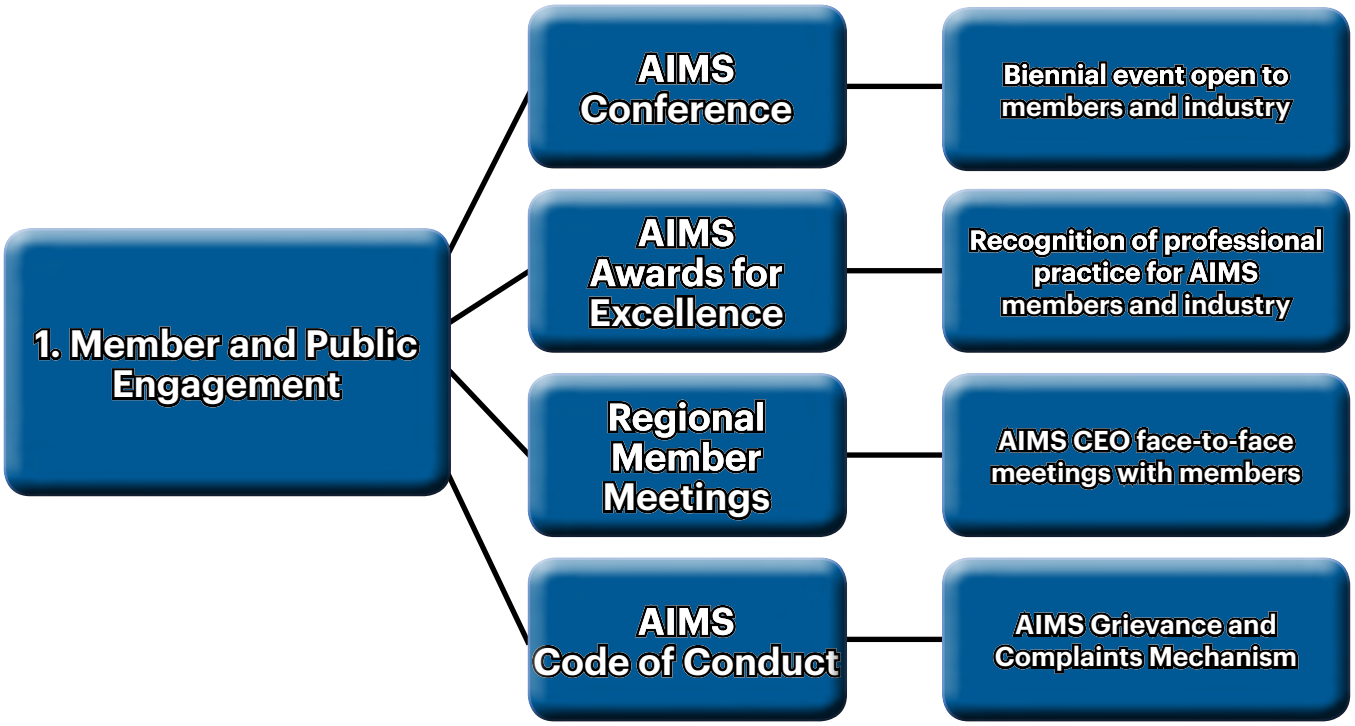


As a member of the Australasian Institute of Marine Surveyors (AIMS), you gain access to a network of highly-skilled professionals and a wealth of resources to support you. AIMS provides continuing professional development opportunities, ensuring you stay up to date with industry trends.

By being part of a respected organisation, your credibility and reputation with clients is enhanced as AIMS members are recognised for their expertise and commitment to ethical practice. The Institute's advocacy efforts on behalf of members further strengthen your position in the maritime industry, ensuring that your interests are represented in key discussions and regulatory decisions. Ultimately, AIMS membership offers both professional support and personal growth opportunities.

For more information regarding membership, please contact the AIMS CEO, Eric Perez, at gm@aimsurveyors.com.au or call +61 2 6232 6555.

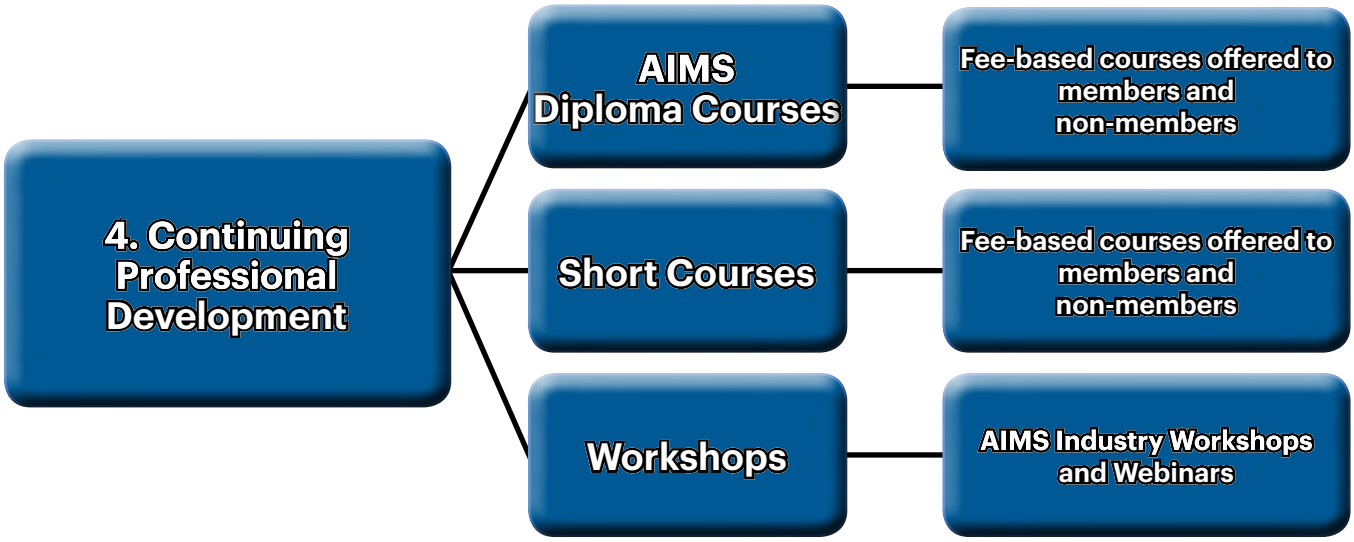
The Institute believes it is critical to engage with members in a variety of forums.



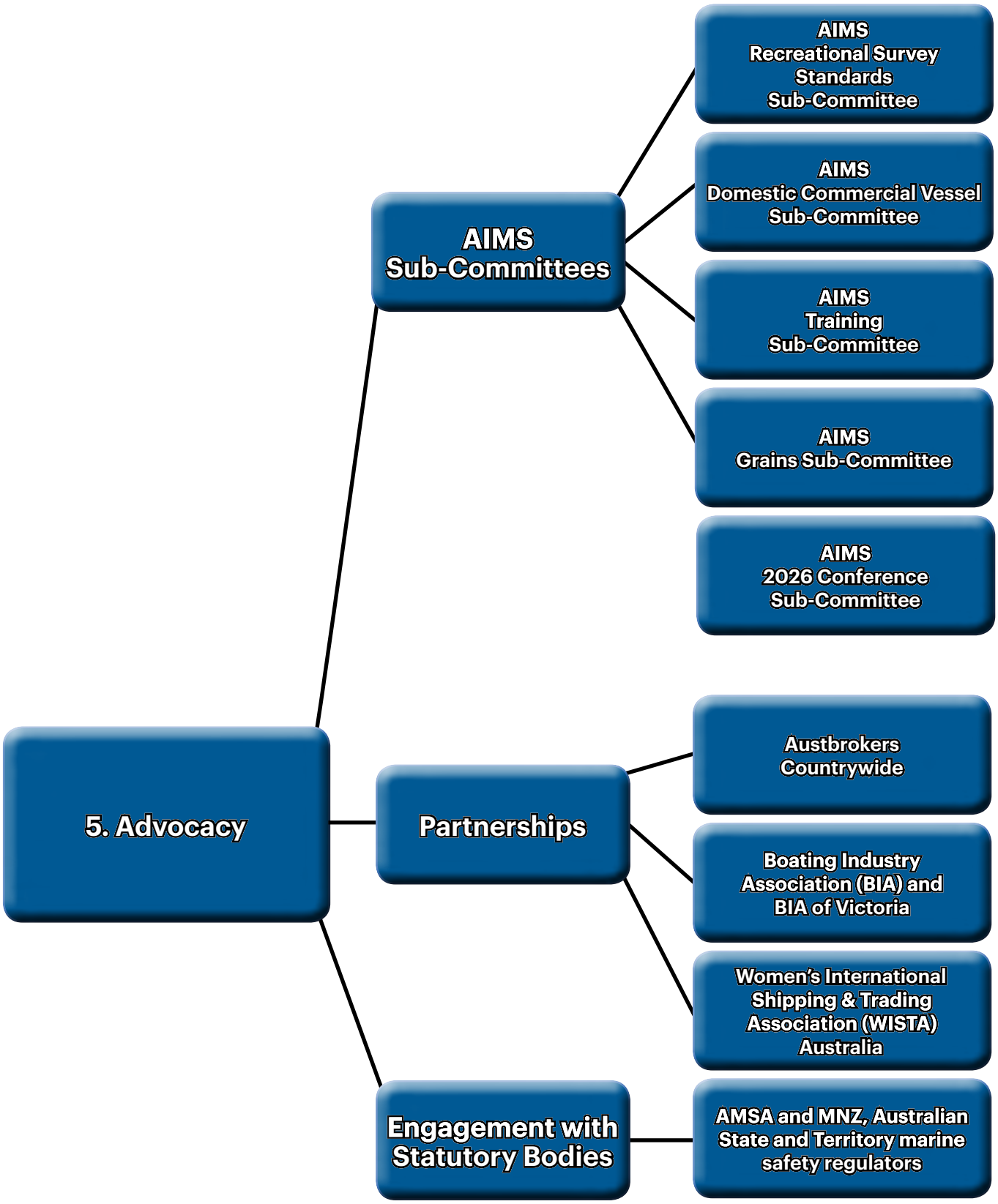
The Accredited Grain Surveyor Assurance (AGSA) Scheme outlines the requirements for marine surveyors to be accredited to perform bulk vessel surveys and, as of the 1st of July 2023, anyone wishing to survey bulk vessels to load prescribed plants or plant products must be accredited by AIMS under the AGSA Scheme.

AIMS Marine Surveyors are highly qualified and most specialise in different areas within the industry, so it is important to understand the areas in which members operate.

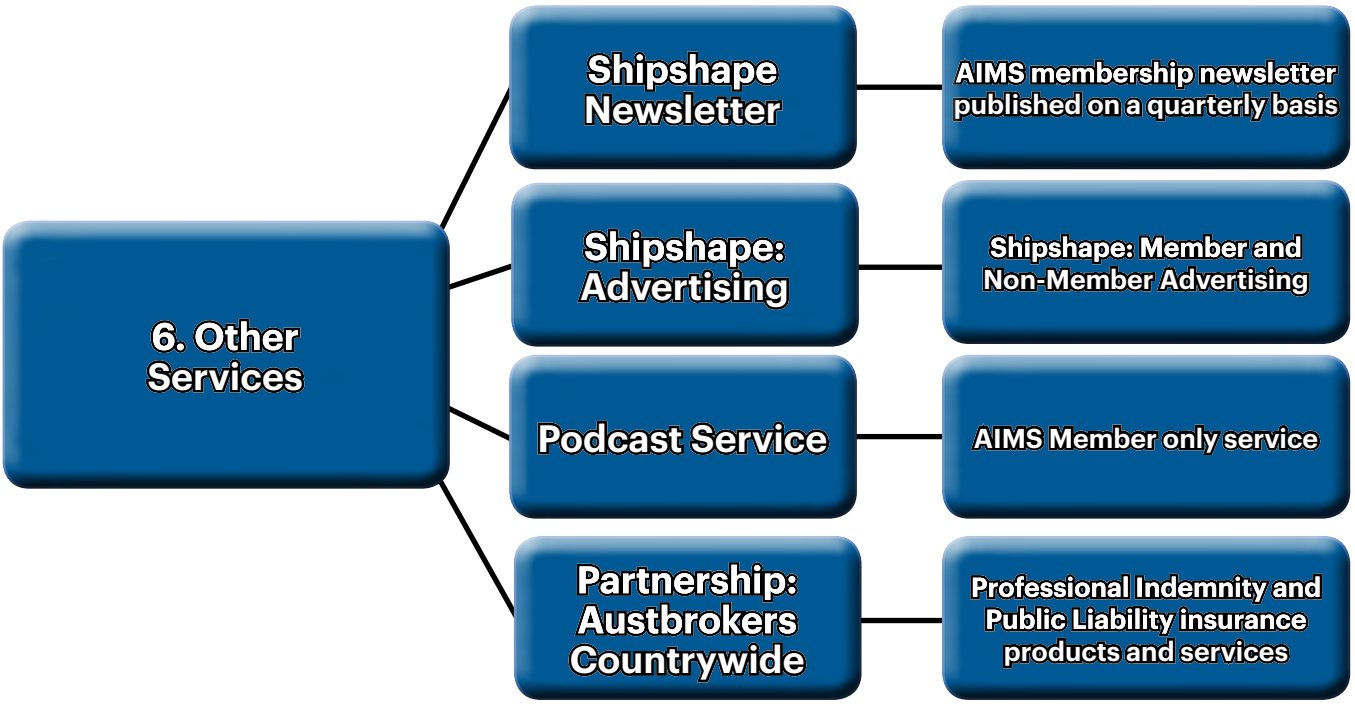
AIMS provides members with multiple professional development opportunities. Diploma courses are accessible to members and non-members, while workshops/ webinars are for members only.



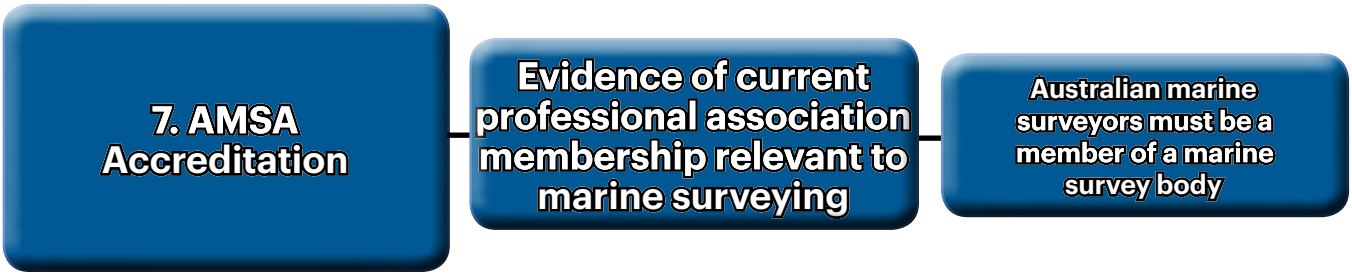
Creating partnerships helps to advocate for work on key issues of interest to members and the public, and increases the visibility of members.



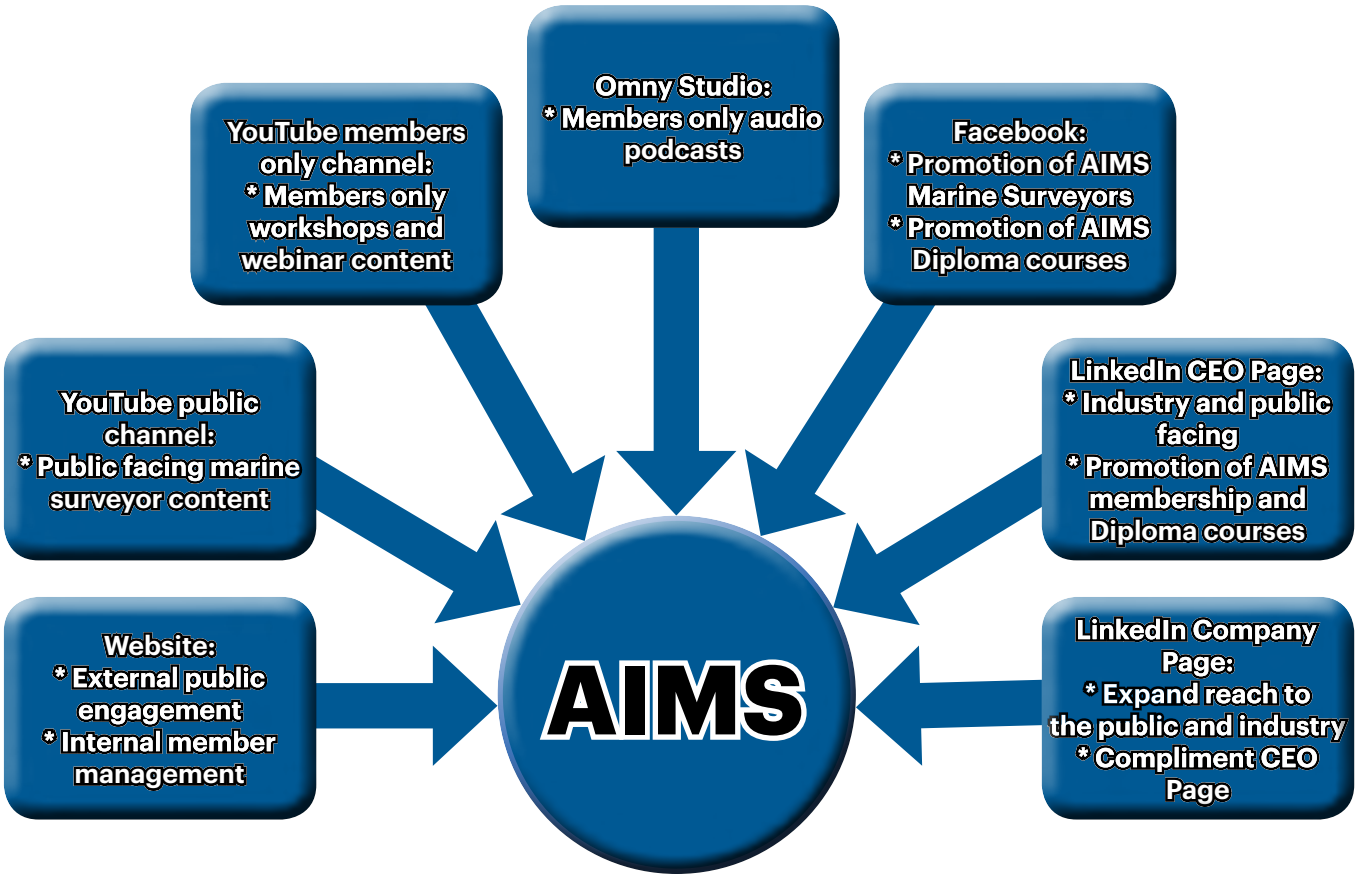
AIMS provides a range of member services and discounted advertising rates.



The AIMS is the peak industry body for surveyors in our region and the largest marine surveyor association in the Southern Hemisphere.



Traditional and Social Media Platforms



AUSTRALASIAN INSTITUTE
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AIMS Affiliate

Team up with the largest industry body in the Australasian region for professional marine surveyors.

The Australasian Institute of Marine Surveyors (AIMS) is the largest industry body in our region for professional marine surveyors and their cross-sector colleagues. The AIMS is a not-for-profit membership-based institute which allows members access to a wealth of knowledge, training, support, networking opportunities and professional accreditation; facilitates the link between industry consumers and quality professional surveyors via the membership database on our website; and enforces strict codes of conduct and ethical behaviour.

AIMS Affiliate

There are three categories available: an individual or business; industry groups; and government agencies. While demonstrating support for the establishment and maintenance of the highest levels of skills and performance in marine surveying, an AIMS Affiliate also attracts a range of direct benefits.

Category 1. Individual / Business

Any individual or business including ship owners or operators, P & I Clubs, classification societies. hull or machinery underwriters, hull and machinery producers, insurance companies, vessel manufacturers, vessel retailers, marinas, oil, gas or grain businesses and law firms.

Fee – $175 annually.

Category 2. Industry Groups

Any industry body in the maritime sector representing individuals or businesses in the maritime sector.

Fee – $375 annually.

Category 3. Government Agencies

Any government agency with an interest in the work of marine surveyors or the sector.

Fee – $575 annually.

Benefits of being an AIMS Affiliate

Benefits of being an AIMS Affiliate include:

- a listing on the AIMS website that includes logo / business name / website / contact number;
- recognition in the quarterly AIMS magazine (*Shipshape*) in a feature article;
- AIMS member advertising rates for affiliates; and
- opportunity to present an AIMS workshop/webinar.

To discuss becoming an AIMS Affiliate, please contact the AIMS CEO on +61 2 6232 6555 or mobile +61 492 881 737 or at gm@aimsurveyors.com.au