

The logo for Nautilus Federation, featuring the word "NAUTILUS" in a bold, white, sans-serif font above the word "FEDERATION" in a smaller, orange, sans-serif font. A stylized blue and orange graphic element resembling a compass rose or a star is positioned to the right of the text.

NAUTILUS
FEDERATION

A full-page background image showing a worker in a bright orange protective suit and a yellow hard hat. The worker is standing on a wooden ladder, leaning forward and holding a dark green net against a wall. The wall is painted with diagonal red and white stripes. The scene is lit from above, creating strong shadows.

Mapping Our Maritime Future

A survey of maritime professionals' attitudes towards, and experience of, decarbonisation in the maritime industry

June 2024

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**Mark Dickinson, Director
Nautilus Federation**

Executive summary

Climate change is a real and present threat to our way of life, of that there is no dispute. There is an imperative on all sectors of our economy to lower, and eventually phase out, carbon emissions. That is why Nautilus supports efforts to decarbonise shipping.

However, the technological and fuel changes required cannot be to the detriment of our maritime professionals; in fact, while our industry experiences this transition, we should use this opportunity to address long-standing injustices and agree a new social contract for seafarers.

This is how we ensure a future for our maritime professionals that is just, equitable and human-centred.

There is a stark choice before us – to sit idle and watch change pass us by or be professional, outward-looking unions that are active in shaping the future we want to see, for our members and our industry. The latter was the clear message delivered from Nautilus Federation members at the Board meeting in Liverpool in October 2023. It was resolved that we would collectively campaign for a ‘Just Transition’ – one that puts seafarers and maritime professionals at the heart of change.

The **Mapping Our Maritime Future** survey seeks the views of members of Nautilus Federation affiliates on the future of the industry, particularly relating to decarbonisation and technological and fuel change. The survey was developed to create a strong bedrock of evidence for the Federation’s campaigning and influencing work, and is a core component of its long-term objectives.

The results, presented in this report, paint a stark picture. The fact that nearly half of respondents don’t believe net zero is achievable by 2050 should be a clear warning to policymakers that credible pathways to decarbonisation must be developed through meaningful consultation with maritime professionals – the people tasked with delivering it.

It should be deeply concerning to all stakeholders that most respondents to the survey believe that working conditions onboard ships will stay the same or worsen in response to the technological change needed to achieve environmental goals. This is a huge problem for an industry that faces a cliff edge in terms of retaining skilled crew to enable the implementation of these technologies.

The results of this survey are an important stepping stone in our campaign for a Just Transition

Improving working conditions onboard is essential to securing the maritime workforce of the future. It must be a priority to fix systemic failures in existing regulations on minimum crewing levels, and hours of work and rest, that lead to fatigue, protecting the workforce from accidents and preventing criminalisation of seafarers. We must strive for continuous improvement to the Maritime Labour Convention (MLC) and governments must support collective bargaining as a key mechanism for improving employment standards.

In 2022, the classification society DNV carried out a study on behalf of the UN Global Compact Maritime Just Transition Taskforce. This research revealed that 750,000 seafarers will require additional training in a 'net zero by 2050' scenario, with the number of seafarers expected to work on ships fuelled by liquefied natural gas or liquefied petroleum gas increasing by 100,000 every second year until 2038.

The task before us is enormous. As our

survey reveals, significant numbers of seafarers don't have enough information to understand new fuels and technological changes. Only a small number of respondents to the survey have worked on alternative fuel vessels and received requisite training. This must ramp up quickly, and the strong message coming from respondents to our survey is that the cost of retraining must be borne by the employer and be completed during work hours – not during allocated rest time or shore leave.

The results of this survey are an important stepping stone in our campaign for a **Just Transition**, promoting an environmentally sustainable shipping industry that is fair and inclusive for our members by ensuring decent work, pay and conditions.

As democratic and professional unions, our members' voice is at the heart of everything we do. Thank you to the nearly one thousand members who took the time to participate in this survey and, rest assured, your voice will be heard.

Introduction

The maritime industry's transition to 'net zero' greenhouse gas emissions by 2050 is under way and is set to have a huge impact on the working lives of seafarers.

Yet only one in five (20%) of the maritime professionals who responded to our survey on the future of the industry believe this goal is achievable.

It is a stark figure that indicates a disconnect between policymakers and those who must implement the measures necessary for global shipping to reduce its impact on the environment.

The figure also highlights why our survey and its results are so important – if the maritime industry is to oversee a **Just Transition** to net zero, the voice of seafarers must be heard.

The International Labour Organization (ILO) defines a 'Just Transition' as 'greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no-one behind'.

As our survey reveals, however, this is not the reality for many maritime professionals.

While the vast majority of respondents (76%) welcome efforts to decarbonise the industry, almost 60% say their company has not communicated its decarbonisation strategy to them. Of those who have seen a strategy, more than 80% say they have not been consulted about the company's decisions.

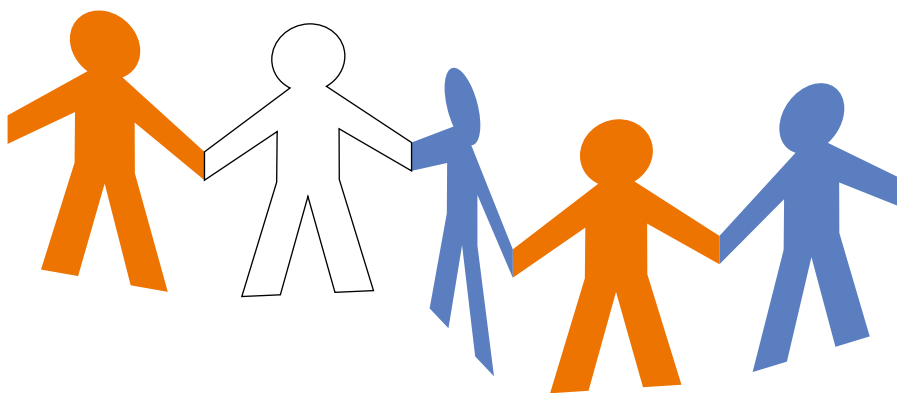
There is also a lack of confidence that the transition to net zero will create decent work opportunities, with most respondents believing pay, working hours and crew levels will be no better – and may even be worse.

With investment in alternative fuels and new technologies, plus further automation of vessels, set to accelerate in the coming decades, it is imperative that maritime industry decision-makers listen

to the voices of seafarers.

As this survey shows, seafarers are keen to help tackle climate change by contributing to the creation of a cleaner, greener sector – but their views and concerns about skills, training, pay and conditions, and safety at sea must be taken onboard if it truly is to be a just transition that leaves no-one behind.

If the maritime industry is to oversee a Just Transition to net zero, the voice of seafarers must be heard



Only one in five maritime professionals believe net zero by 2050 is achievable

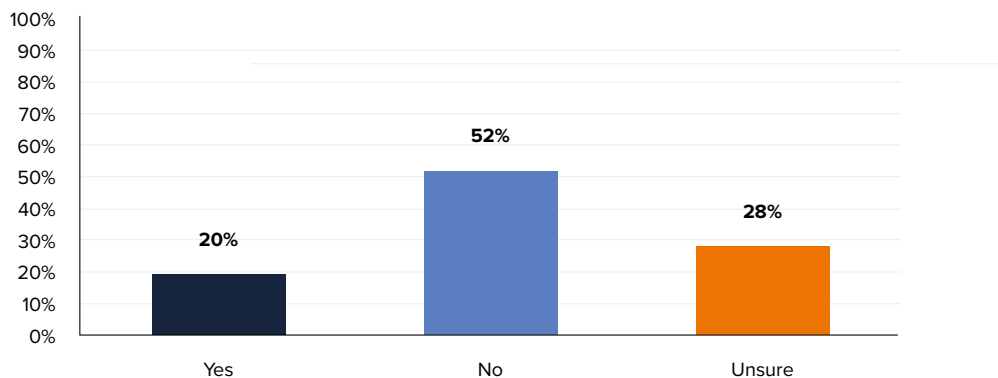
There is also a lack of confidence that the transition to net zero will create decent work opportunities, with most respondents believing pay, working hours and crew levels will be no better – and may even be worse

A seafarer wearing a green hard hat with a headlamp and a high-visibility green and black jacket is working on a complex electrical panel. The panel is a vertical stack of metal boxes with various ports, dials, and cables. The seafarer is looking towards the camera with a neutral expression. The background is a blurred industrial setting, likely the interior of a ship.

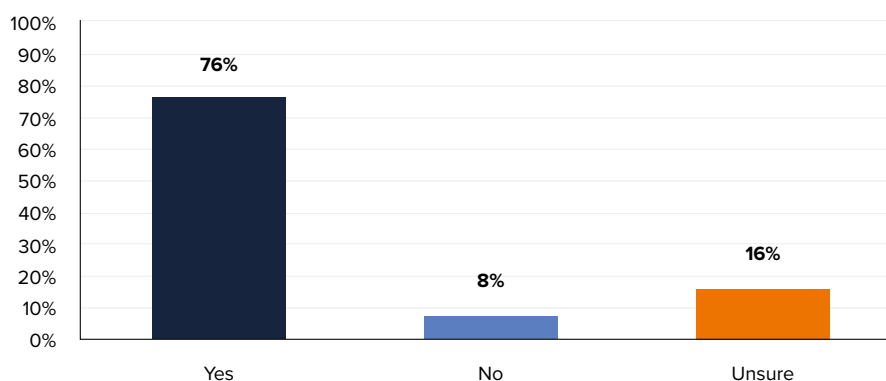
**Inserting the
seafarers' voice
in the transition
to net zero**

Maritime professionals do not believe environmental goals are realistic

Do you believe achieving net zero around 2050 is achievable for the maritime industry?



Do you welcome efforts to decarbonise the shipping industry?



The International Maritime Organization (IMO) has agreed to reach net-zero greenhouse gas emissions by or around 2050. This represents the most ambitious target to date for decarbonising the global maritime industry. The UK has positioned itself to be a global leader in 'clean maritime', with the European Union (EU) also going

further than the IMO. Shipowners are discussing alternative fuels and new technologies to help reduce their carbon emissions.

However, only one in five (20%) of the survey respondents believes that the maritime industry's goal of net-zero carbon emissions by 2050 is achievable.

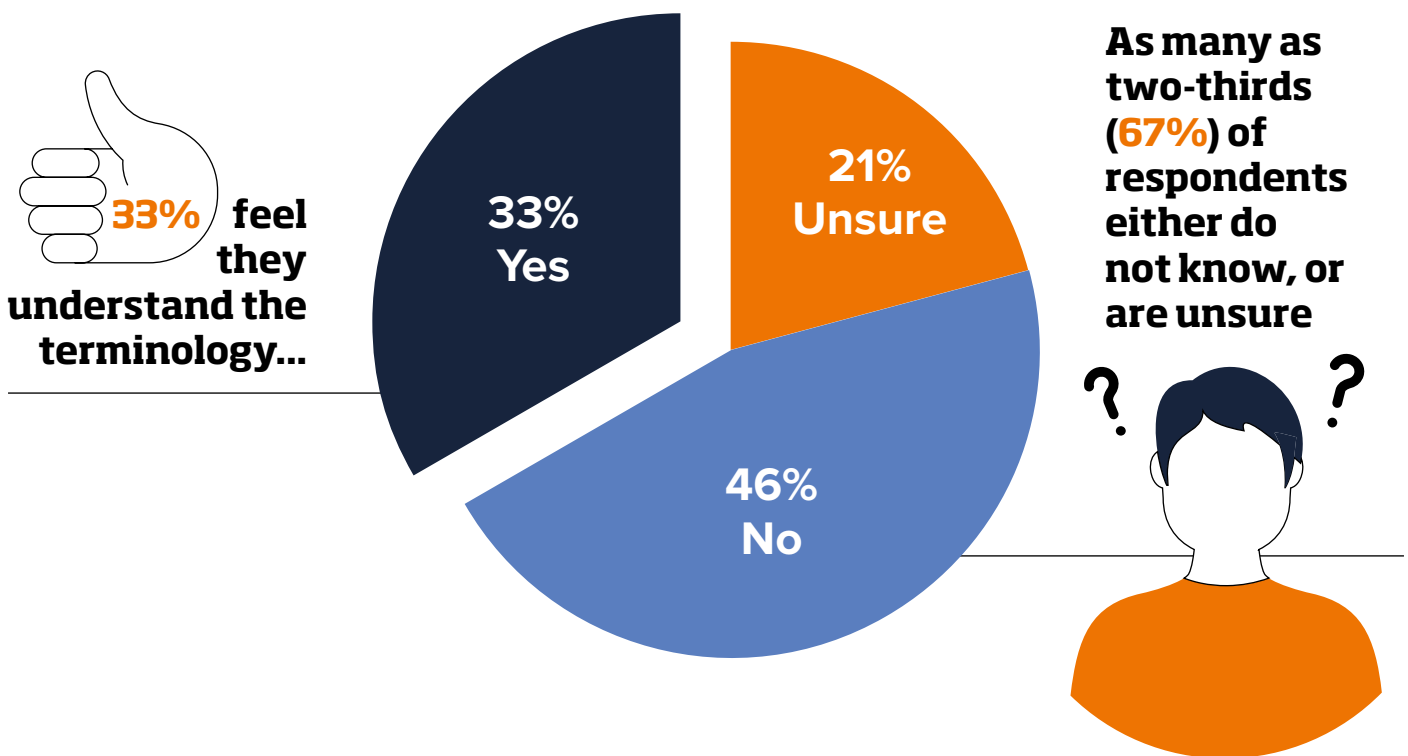
More than half (52%) believe that

it is unachievable, while 28% are unsure.

This downbeat assessment of the sector's ability to make the transition this quickly cannot be attributed to a lack of enthusiasm among seafarers for a more environmentally friendly sector: more than three-quarters (76%) of respondents welcome efforts to decarbonise the shipping industry.

Seafarers are deeply cynical about environmental jargon

Do you know what is meant by 'Just Transition'?



Environmental jargon – such as ‘decarbonisation’, ‘net zero’ and ‘Just Transition’ – has been met with cynicism from serving seafarers and other maritime professionals.

Some see it as a veil, or label, to hide cost cutting; a clever disguise to mask the harsh realities of financial adjustments.

Others perceive it as a harbinger of unwanted change, a forced change that is being ‘pushed down everybody’s throat’, or a new reality for which the industry is not entirely

prepared, yet is being rapidly implemented across various sectors.

A few respondents associate environmental jargon with the notion of ‘more excuses for cheap untrained labour’. They see it as a justification for employing less-skilled workers at lower wages, under the guise of transition and change.

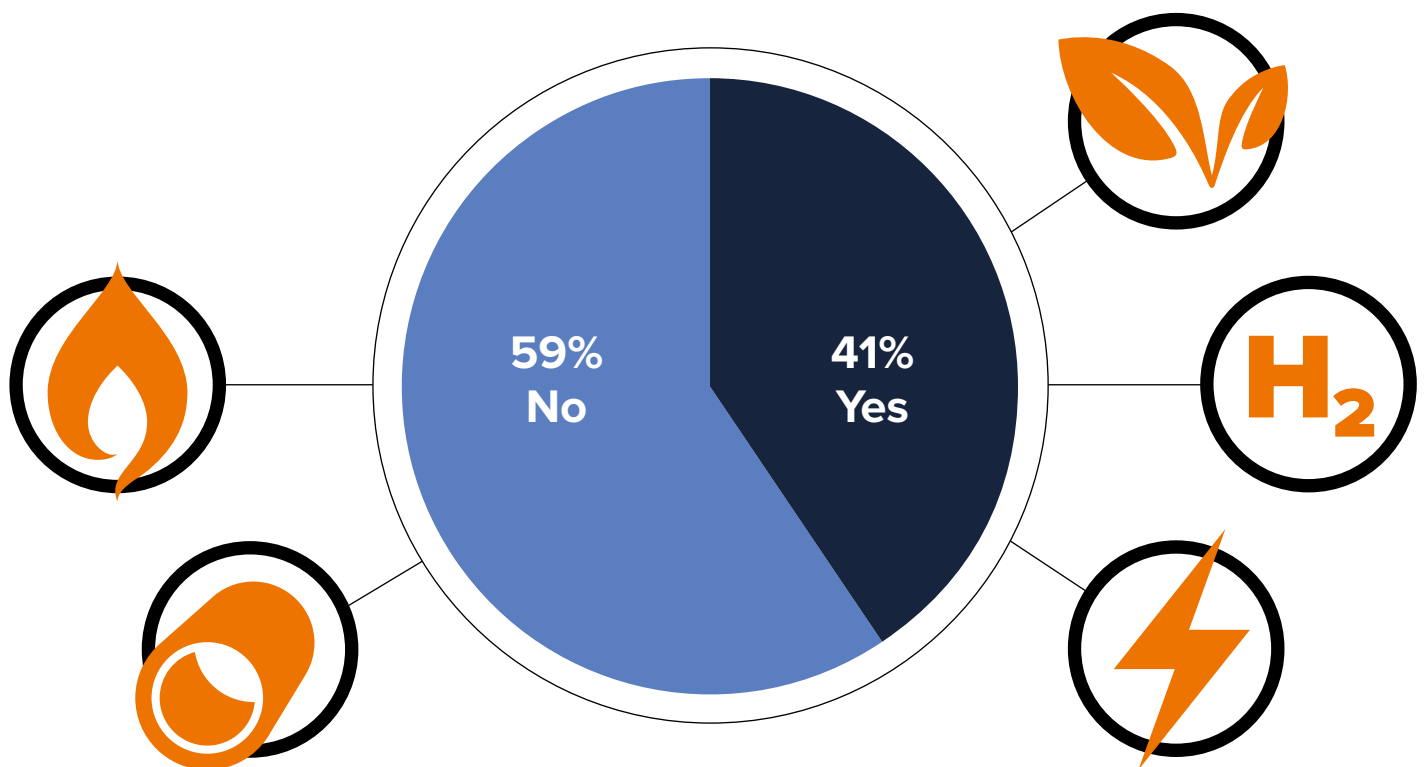
These diverse responses highlight the scepticism and apprehension that often accompany change, especially when it’s perceived as being imposed, rather

than chosen. It underscores the importance of clear communication, transparency and inclusivity in the process of change, ensuring that it is indeed ‘just’ and beneficial for all involved.

As many as two-thirds (67%) of respondents either do not know, or are unsure of what is meant by ‘Just Transition’. Of the 33% that do feel as if they understand the terminology, responses range from ‘small changes until final goals are achieved’, to ‘training’, ‘fairness’, ‘acceptance’ and ‘legitimacy’.

Employers must communicate better with crew

Has your company communicated with you its decarbonisation strategy?*



*Such as the plan to move to liquified natural gas (LNG), piped natural gas (PNG), bio-methane, hydrogen or electric

There is clearly a need for the global maritime industry to ensure that seafarers' voices are heard during the move to net zero, to ensure a Just Transition is achieved

The more likely explanation for seafarers' pessimism regarding the IMO's 2050 target – at least in part – is a lack of communication and consultation by their employers about their decarbonisation plans.

Although most survey respondents (75%) feel they should be consulted about plans to introduce decarbonisation measures, only 19%

say they have been, while 59% say their company has not communicated its decarbonisation strategy to them.

There is clearly a need for the global maritime industry to ensure that seafarers' voices are heard during the move to net zero, to ensure a Just Transition is achieved.

As shipowners and operators begin planning to meet decarbonisation targets, it is vital

that they engage in meaningful consultation with their maritime professionals over new ship design and retrofitting with a view to implementing new technologies and alternative fuels. This will not only help ensure shipowners develop credible and sustainable pathways, but will create greater understanding across the industry of how it is seeking to meet net zero by 2050.

Inserting the seafarers' voice in the transition to net zero

Recommendations

1 **'Just Transition' must be clearly defined and communicated to maritime professionals.**

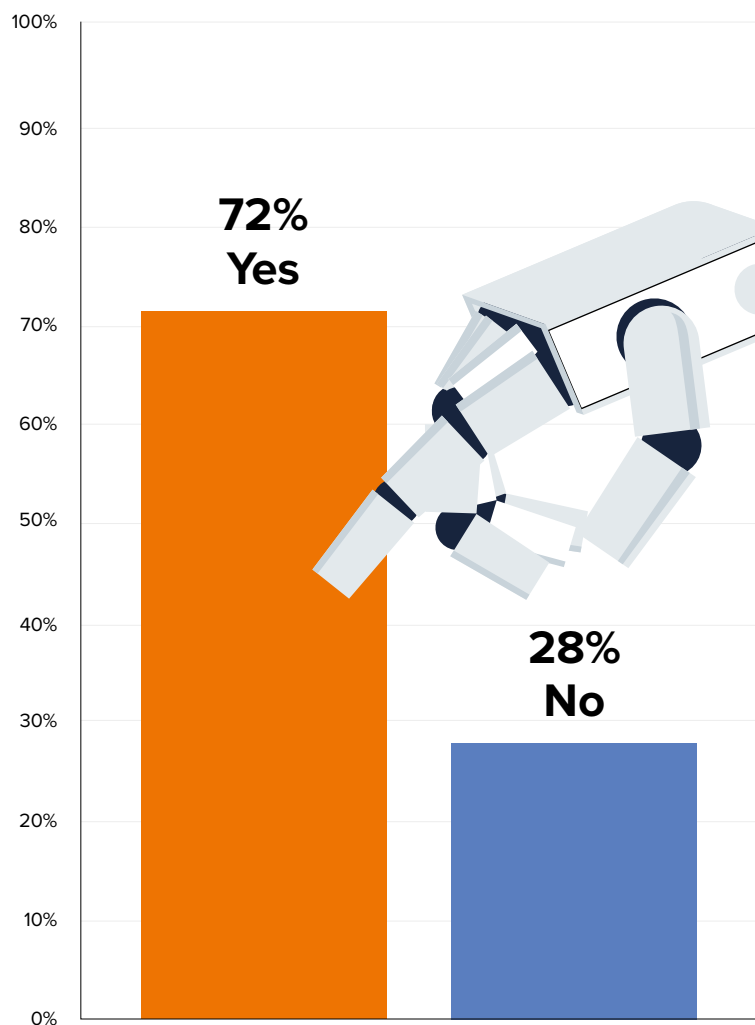
2 **Maritime professionals must be consulted by employers and shipowners as they progress towards decarbonisation and the deployment of alternative fuels.**

Attitudes towards automation



There is a willingness to engage in automation

Have you seen increased automation onboard in the last decade?



Automation and artificial intelligence (AI) are playing a crucial role in shaping the future of the maritime industry – from optimising vessel routes and engine performance to reducing fuel consumption, cutting emissions, improving safe operations to reduce oil spills, and responding

to emergencies faster to prevent potential environmental disasters. Yet automation is not new.

From electronic chart systems to dynamic positioning, the industry has always embraced new technologies.

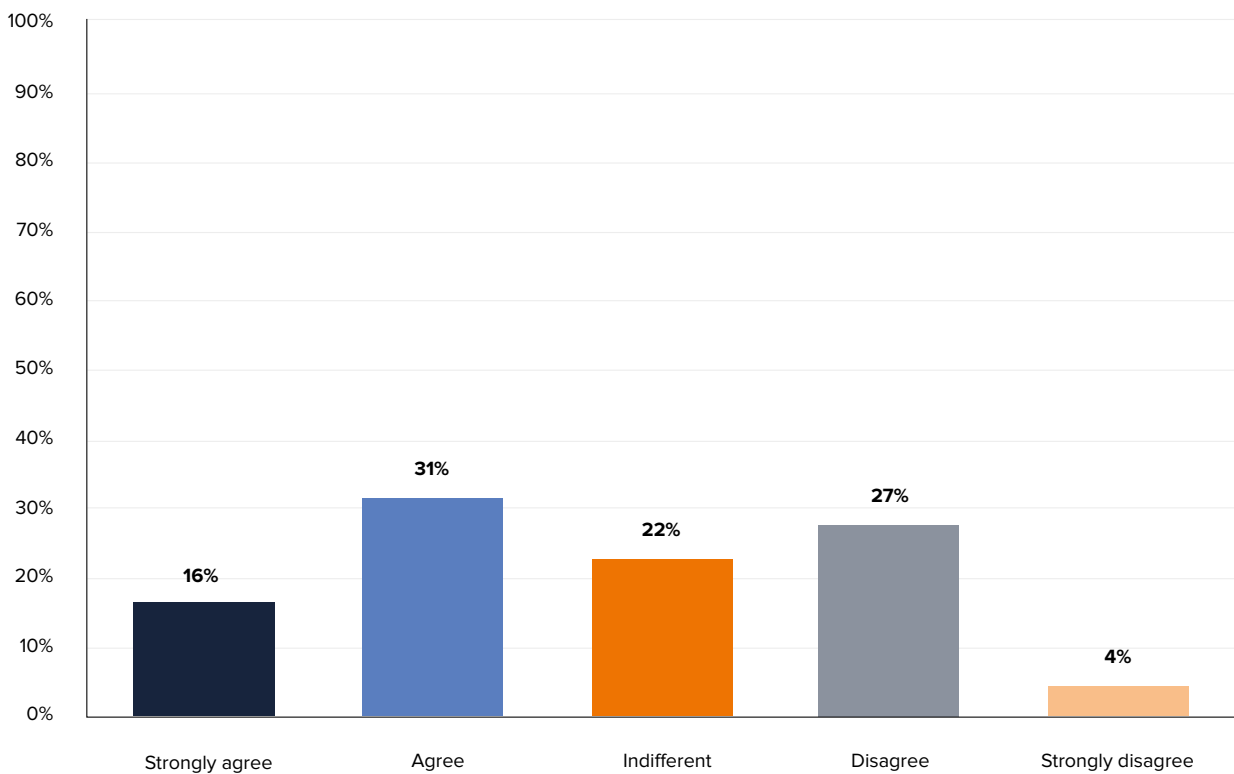
It is perhaps unsurprising, therefore, that 81% of survey

respondents believe that automation is inevitable.

Almost three-quarters (72%) have seen an increase in automation onboard in the past decade – and while 61% of respondents agree or strongly agree that this is a good thing, a significant proportion (47%) view it as a threat.

Challenging fears and assumptions on automation

To what extent do you agree or disagree with the following statement: ‘Automation is a threat to the workplace?’



Automation in the maritime industry is not new, but the pace of change is unprecedented. There is an urgent need for a maritime automation strategy to underline the ethical deployment of automation, consistent with the views of maritime professionals.

Employers too often rely on an assumption that autonomous ships will naturally lead to reduced crewing and eliminate the requirement for onboard crew quarters. Without humans aboard, so the argument

goes, vessels can be designed without features such as galleys, restrooms or railings. This streamlined design reduces weight, increases cargo space and, ultimately, contributes to energy savings and emissions reductions.

While this argument may be compelling, members of Nautilus Federation affiliates remain sceptical of its viability and desirability across large segments of global seagoing vessels. Of respondents to the survey, 47% agree that automation is a threat to the workplace, with another

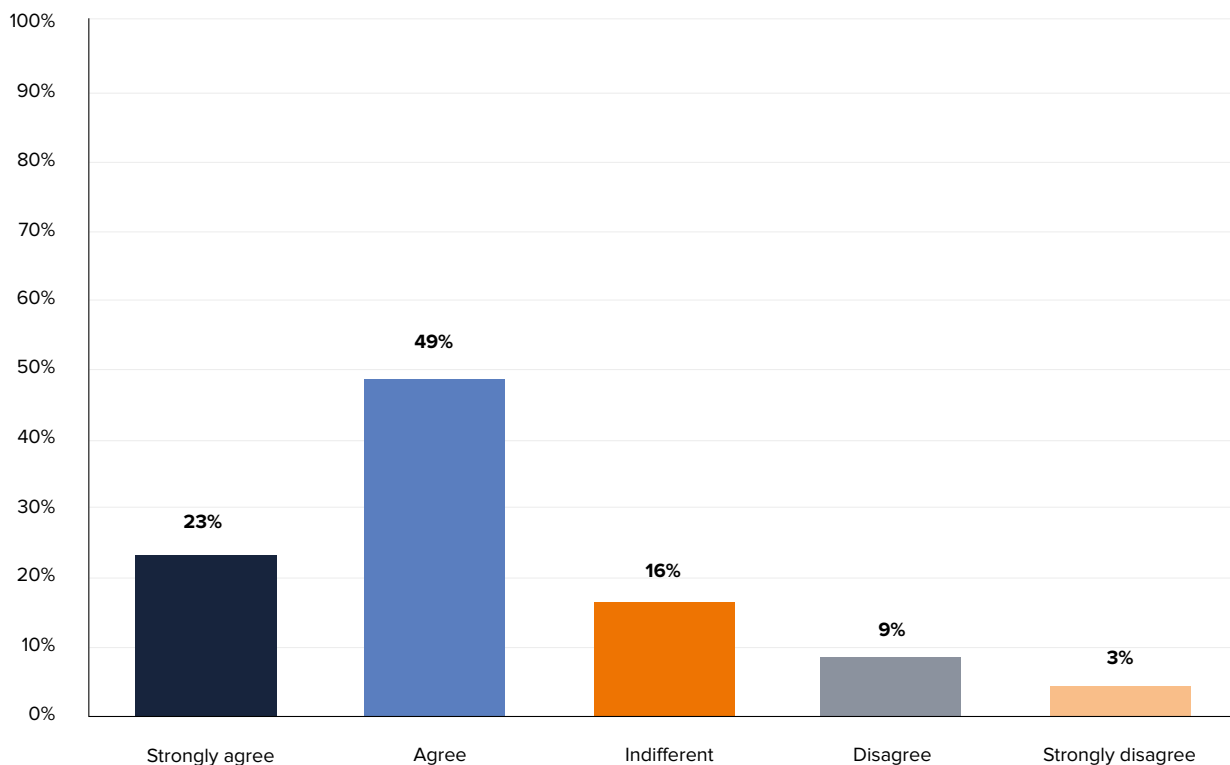
22% feeling ‘indifferent’ about it.

Where automation is seen as a threat by seafarers, fears over job security and skill erosion rank highly. Some fear it could lead to significant job losses, leaving many seafarers unemployed, or too few crew onboard ships. Others fear that their skills will become obsolete or less valued.

‘So far in the tug industry,’ says one respondent, ‘automation has been the excuse to cut manning below safe levels with a total inability to respond effectively to an emergency situation.’

Automation should reduce workloads, not crew

To what extent do you agree or disagree with the following statement: 'Automation should be used to reduce long working hours?'



Automation could present a compelling solution to the issue of long working hours for seafarers. It can, for example, handle repetitive and time-consuming tasks, allowing seafarers to focus on more critical aspects of ship operation.

Automation could also contribute to safer working conditions onboard

ships. Long working hours leads to fatigue, which can compromise a seafarer's ability to perform tasks safely and effectively. By taking over routine tasks, automation can reduce the risk of human error, a common factor in maritime accidents. Moreover, automated systems can perform tasks in hazardous conditions where human safety would be at risk.

Members of Nautilus Federation affiliates have consistently shown² a reasonable and pragmatic approach to onboard automation. There is clear support for automation where it does not replace crew and where it can help with routine tasks, with 72% of respondents agreeing or strongly agreeing that it should be used to reduce long working hours.

² www.nautilusint.org/en/news-insight/resources/nautilus-reports/autonomous-shipping-research/

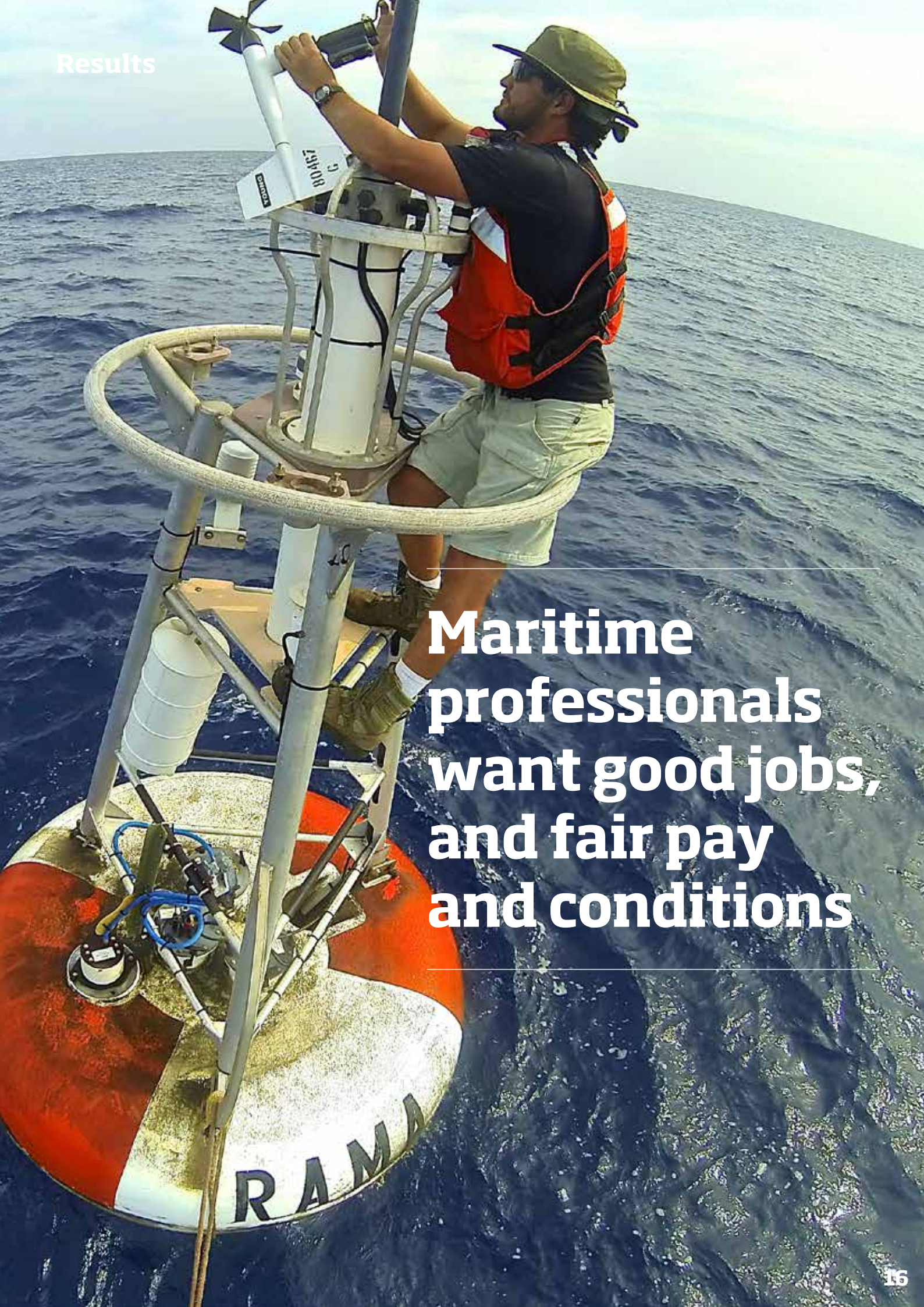
Attitudes towards automation

Recommendations

1 A coherent maritime automation strategy should be established, encouraging shipowners to commit to the ethical use of automation, where technology is deployed to support routine and repetitive tasks, not used as an excuse to cut employment and reduce crewing levels.

2 Foster a collaborative approach to automation where seafarers are engaged in the development and deployment of AI systems to ensure the technology meets their needs and complements their work.

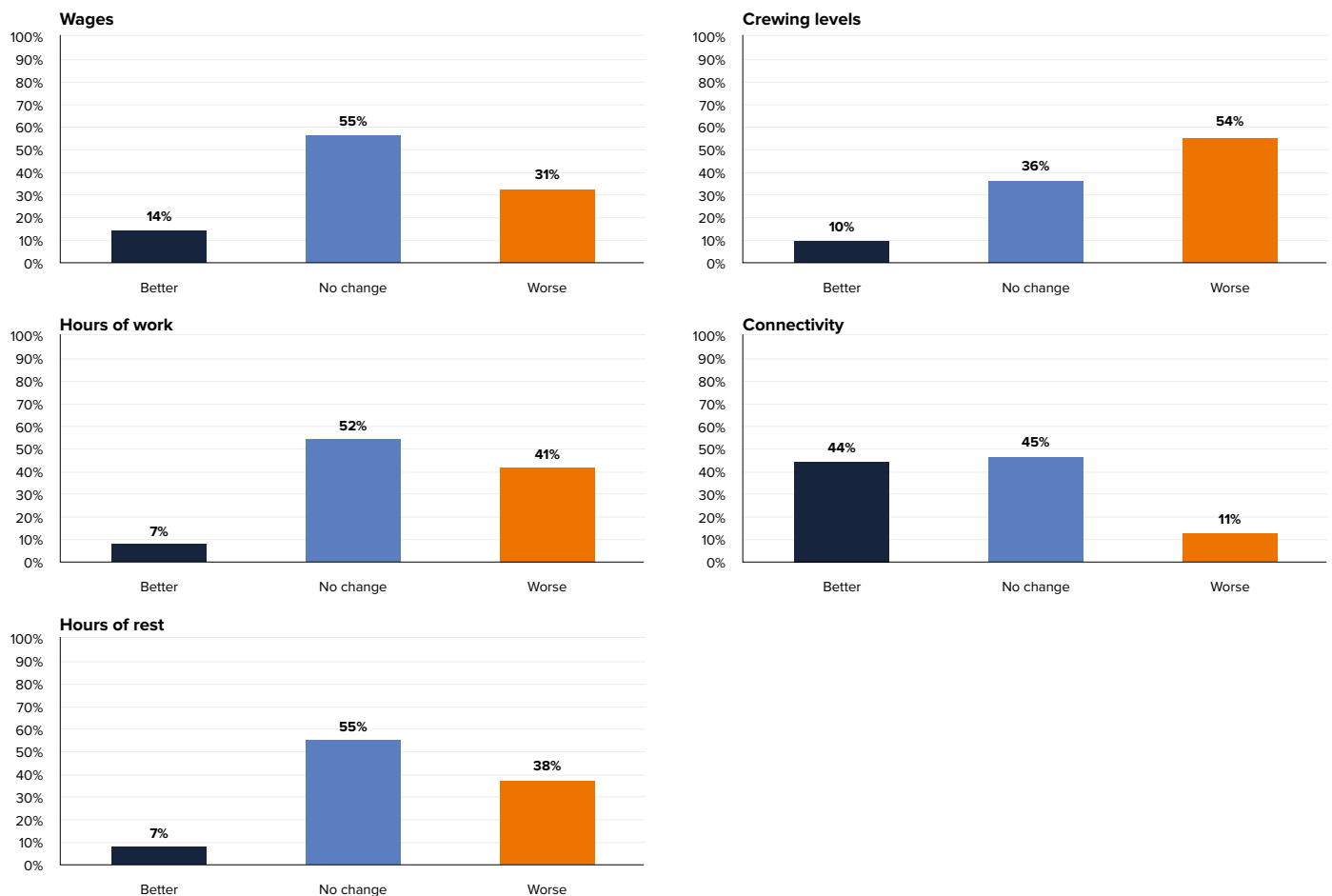
3 Provide training programmes to help crew members and other maritime professionals develop the skills needed to work alongside AI systems effectively.

A man wearing a green hat, sunglasses, a black t-shirt, and a red life vest is operating a scientific instrument on a buoy. The buoy is white and red, with the word "RAMM" written on it. The man is holding a white cylindrical device with a propeller on top. The buoy is floating in the ocean. The text "Results" is in the top left corner. The main text "Maritime professionals want good jobs, and fair pay and conditions" is overlaid on the right side of the image.

**Maritime
professionals
want good jobs,
and fair pay
and conditions**

Can decarbonisation efforts improve working conditions?

Aside from the positive environmental impact of the move towards net-zero, how do you think these topics will be affected?



It is clear from responses to this survey that many maritime professionals are deeply cynical about decarbonisation of the sector, and do not believe it will improve their working lives, contrary to the idea of a **Just Transition**.

Responses from members of Nautilus Federation affiliates range from ‘jobs will obtain lower

status/pay compared with shore’ to the ‘usual smokescreen to reduce manpower and introduce cheap substandard labour’.

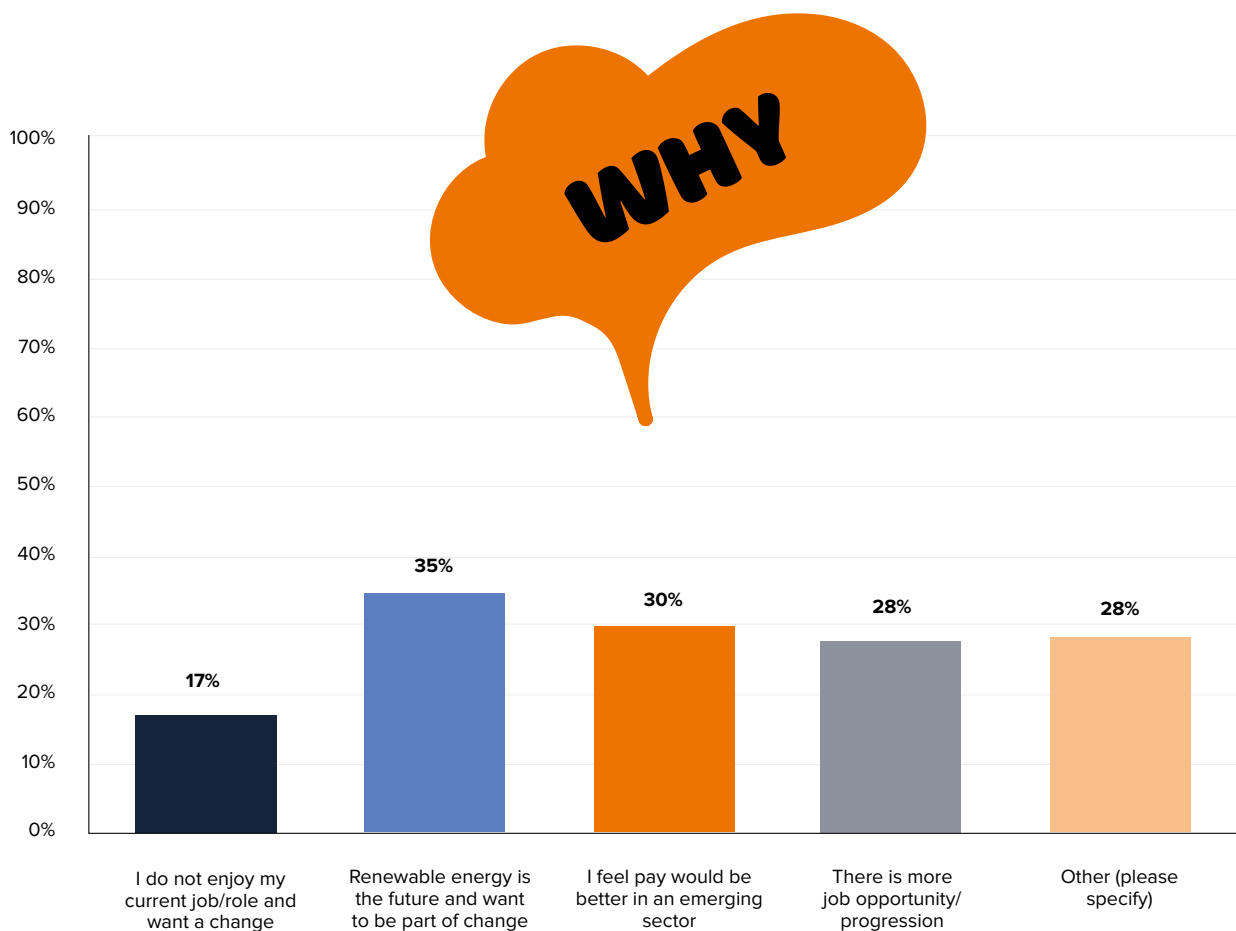
In fact, nearly all seafarers believe that, as the industry moves towards net zero, working conditions will either remain the same or get worse. That includes wages (86%), hours of work (93%), hours of rest (93%) and crewing levels (91%).

Respondents believe only one aspect of their working conditions will get better: connectivity.

Nautilus Federation affiliates believe that collective bargaining is one of the key mechanisms to support social and employment rights, and that governments must, where possible, support collective bargaining, recognising it as central to ensuring the ‘just’ in **Just Transition**.

Maritime professionals are looking for new opportunities

Why would you consider changing jobs into a new and emerging sector (e.g. renewable energy, such as offshore wind)?



Despite obvious cynicism about environmental jargon and enforced changes voiced by members of Nautilus Federation affiliates, nearly half (48%) say they would consider changing jobs to be part of a new and emerging sector such as offshore wind – and more

than a third (35%) of these say this is because renewable energy is the future, and they want to be part of that change.

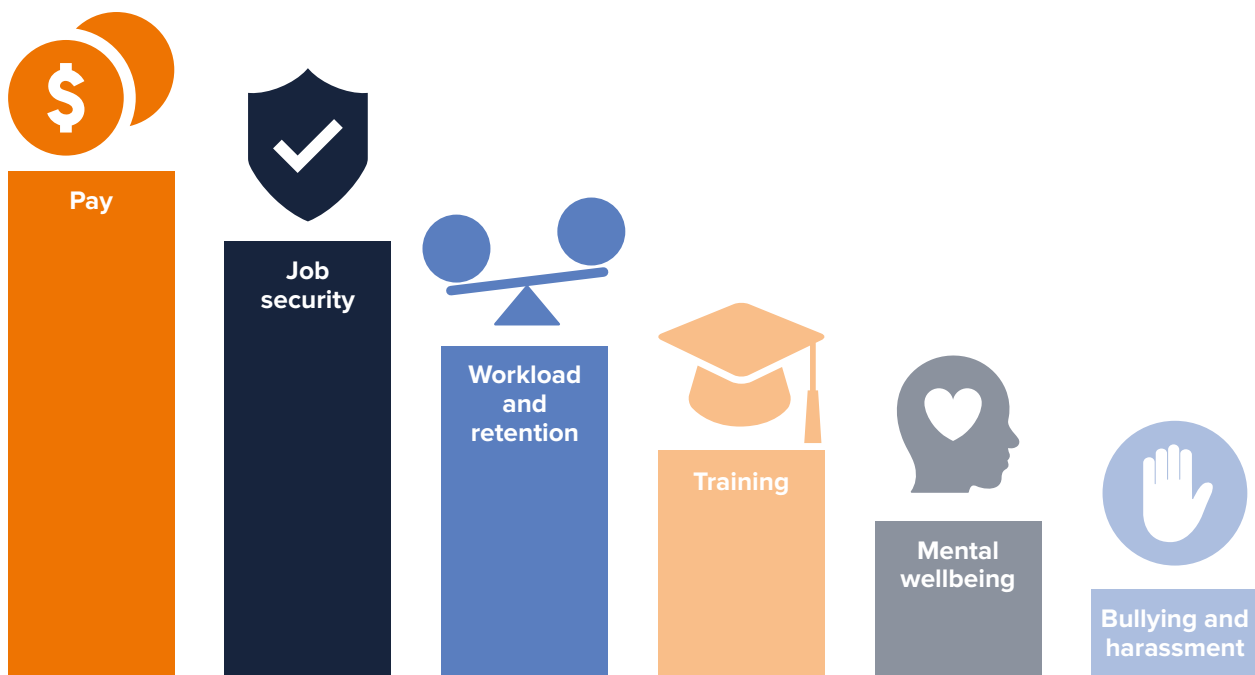
Of those maritime professionals willing to move to an emerging sector, reasons range from a belief that there are more jobs

and opportunities for progression, modern ships and more security, to being able to benefit from transferable skills.

Others are looking for more time at home with family and friends, flexibility, and better pay and conditions.

Employers can hold onto a highly skilled workforce – if pay and conditions are maintained

Please rank the following in terms of what needs addressing most across the industry



When asked to rank the current issues that respondents believe need addressing most urgently across the industry, pay, job security, and workload and retention are the top three concerns, followed by training, mental wellbeing, bullying and harassment.

More than four out of five (81%) respondents have worked in the maritime sector for more than 10 years, and 45% say they have no desire to leave. This could indicate an opportunity for good employers to hold onto a highly experienced

and skilled workforce if they continue to offer decent pay and conditions.

Nautilus Federation affiliates believe a key driver of weakening employment terms and conditions is the rise of 'flags of convenience' (FOCs) and social dumping – the practice of employing exploited labour from the global south and other developing countries.

If governments are committed to a truly 'just' transition to improve employment rights and protections, they must tackle FOCs.

Countries without protections for

domestic shipping, such as the UK and Netherlands, should consider scope for cabotage, to protect local industries from unfair competition driving down wages and conditions. This is particularly important for emerging sectors such as offshore renewables, which can deliver good seafaring jobs.

It is also vital that the Maritime Labour Convention (MLC), which sets global minimums in employment and social rights for seafarers, is continuously improved to support sustainable and inclusive growth of the maritime industry.

Maritime professionals want good jobs, fair pay and conditions

Recommendations

1 Governments must help increase employment standards in the maritime industry, supporting collective bargaining as the primary means of strengthening employment rights and protections. This is particularly vital in areas of strategic importance and growth, such as offshore renewables.

2 Governments must commit to tackling the key drivers of poor working conditions – namely, flags of convenience and social dumping. Countries without protections for their domestic industries should commit to considering cabotage and push for a global review of ship-registration practices to enforce article 91 of the UN Convention on the Law of the Sea (UNCLOS), which requires a genuine link between owner and country of registration.

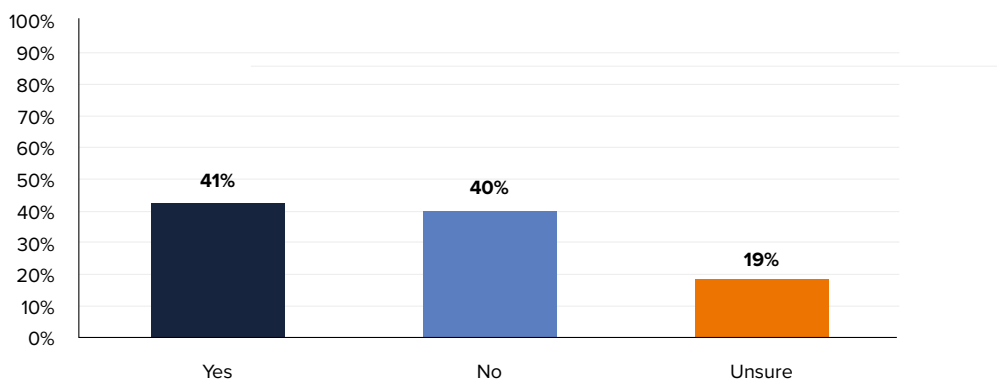
3 The Maritime Labour Convention (MLC) must be continually improved, raising standards of employment for seafarers globally.

A photograph of two maritime workers. In the foreground, a woman with blonde hair, wearing a white hard hat and an orange and grey safety vest, looks off to the side with a slight smile. In the background, a man with a grey beard, wearing a yellow hard hat and a green safety vest, looks forward. The background is blurred, suggesting an industrial or maritime setting.

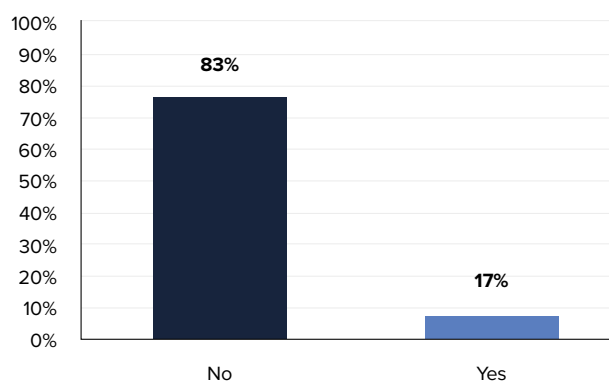
Future-proofing skills and training

More training and experience needed on alternative fuels

Do you feel you have enough information to understand the industry's transition to alternative fuels and new technologies?



Have you, or do you currently, work on a vessel powered by liquified natural gas (LNG), piped natural gas (PNG), bio-methane, hydrogen, electric or similar?



Training for maritime professionals is at the heart of the transition towards a new, greener shipping industry. The number of seafarers working on alternative-fuel vessels will rise sharply up to 2038, based on DNV projections. A fit-for-purpose and standardised training regime is critical to the industry

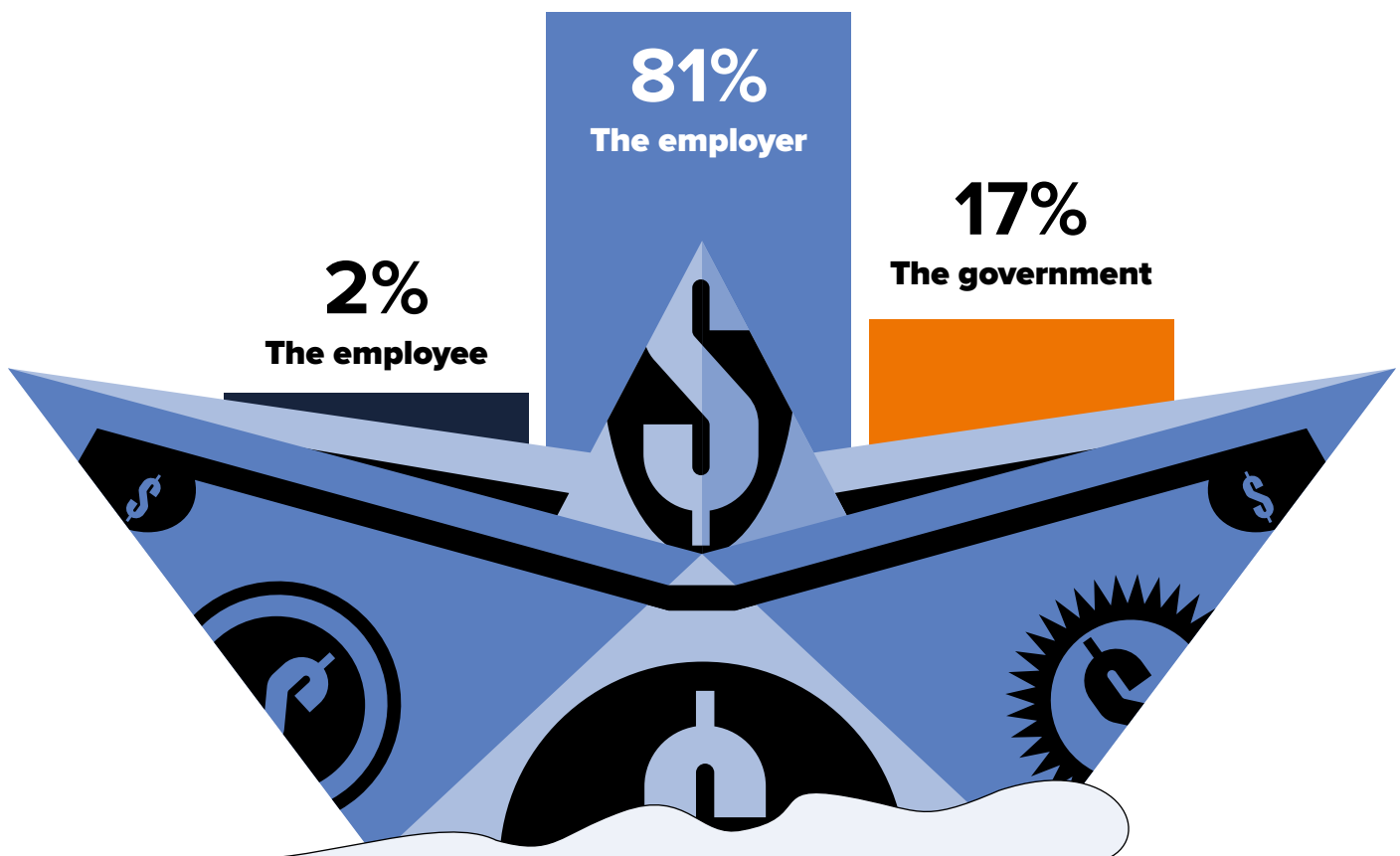
meeting net zero targets by 2050.

However, more work needs to be done to educate and inform seafarers about the industry's transition to net zero, with 51% of survey respondents reporting that they do not have, or are unsure whether they have, enough information to understand the alternative fuels and new technologies that will be coming into use.

This is perhaps not surprising, given that only 17% of respondents to the survey have worked on a vessel powered by an alternative fuel, such as liquefied natural gas (LNG), biofuels, methanol, ammonia, hydrogen, or electric – and, of these, only 60% have received training from their company (so, less than 9% overall).

Cost of training should be borne by the employer

As and when companies move to alternative fuels, if retraining and re-skilling is required, who should pay for it?



Access to training in new fuels and technologies is clearly crucial for achieving environmental goals. The vast majority (81%) of respondents to the survey believe the cost of upskilling and retraining should be paid for by the employer, with another 17% believing that governments should help fund this training.

Furthermore, respondents believe that employers must give their maritime professionals adequate time to participate in training, and that this should not be done during hours of rest or shore leave.

At present, nearly 40% of respondents report that training took place in their own time or during rest hours onboard or ashore,

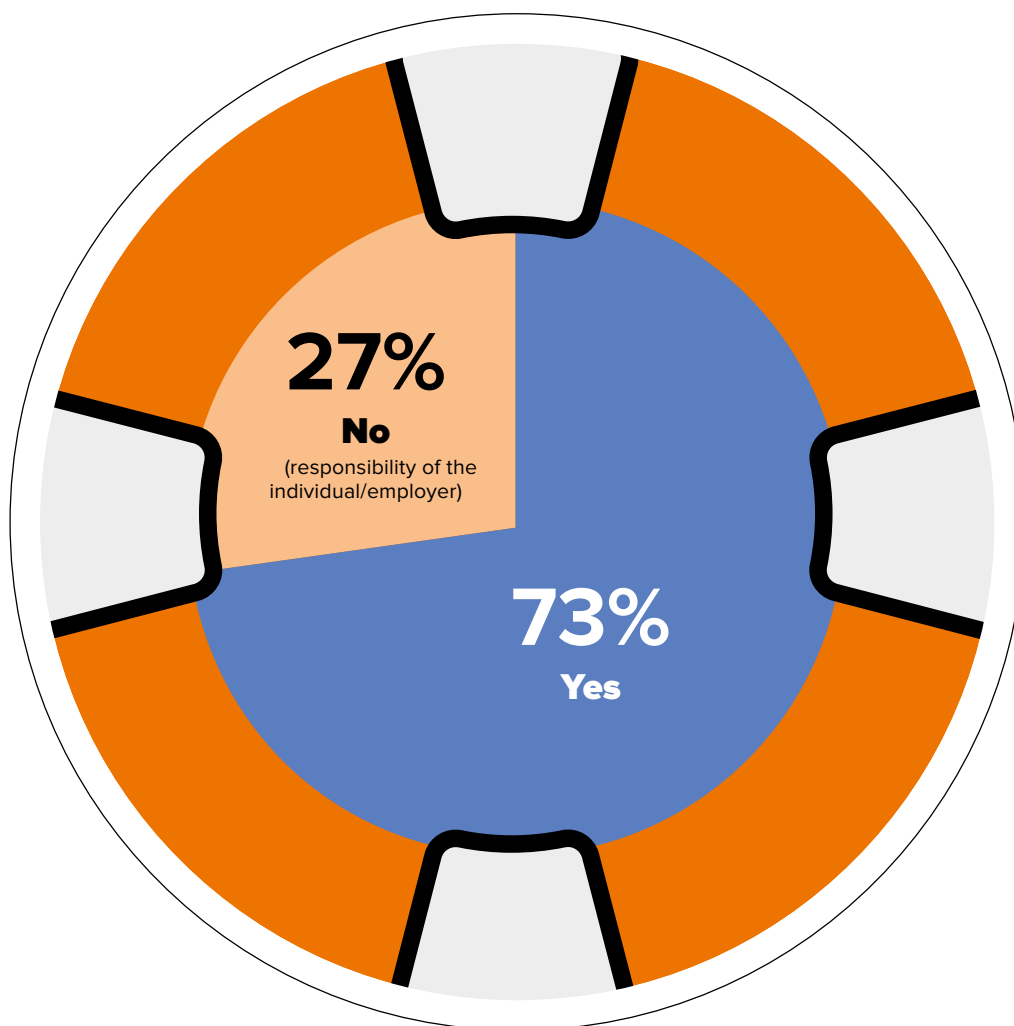
which research from the World Maritime University³ has shown can lead to fatigue and unsafe working practices.

More than 80% of those who have received training say it has given them the skills they require, and the preferred methods of learning are formal training in an educational setting or online training.

³ A culture of adjustment : evaluating the implementation of the current maritime regulatory framework on rest and work hours (EVREST). commons.wmu.se/lib_reports/66/

No-one should be left behind

Should national governments create a fund to support those who cannot re-train or upskill?



A comprehensive review into the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) is under way at the IMO, and national governments must play an active role to ensure technological change does not outpace minimum training standards.

Nautilus Federation affiliates believe there must also be recognition that, as with any major change, there will be some who cannot make the transition. More than 70% of respondents agree that national governments should set up a fund to support those seafarers who cannot retrain or upskill.

Governments must support those workers by assisting them to find new careers or to enter retirement. The Kolenfonds, in the Netherlands, is a good example of how governments can support maritime professionals who may otherwise be left behind as the industry transitions.

Future-proofing skills and training

Recommendations

1 Employers must provide training for seafarers on new and emerging technologies and alternative fuels. Employers should cover the cost and ensure training does not take place during rest periods.

2 Governments must play an active role in the STCW review, and push for a swifter amendments procedure to ensure global standards do not lag behind the pace of technological and fuel change.

3 Governments should establish a fund, such as the Kolenfonds in the Netherlands, to support those who cannot make the transition, assisting them to establish a new career or enter retirement.

Conclusion

Nautilus supports efforts to decarbonise shipping, but the technological and fuel changes required to bring this about cannot be to the detriment of seafarers' livelihoods, working conditions and wellbeing.

This report highlights, in the starkest terms, that there is currently a disconnect between policymakers and the maritime professionals who must implement the measures needed for global shipping to reduce its impact on the environment.

Nearly half of the seafarers who responded to our survey believe net zero is not achievable by 2050, and they have clear concerns about the impact of new technology on their pay and working conditions.

While automation of vessels and investment in alternative fuels is set to gather pace in the coming decades, many survey respondents say they lack the information, training and skills to operate this new generation of ships safely.

If there is to be a truly Just Transition to net zero – one that is fair and inclusive for our members and leaves no-one behind – maritime industry decision-makers must engage and consult with seafarers more effectively.

This report will ensure our members' voices are heard as Nautilus campaigns for an environmentally sustainable shipping industry that values decent work, pay and conditions for those onboard its vessels.

**This report will
ensure our members'
voices are heard**

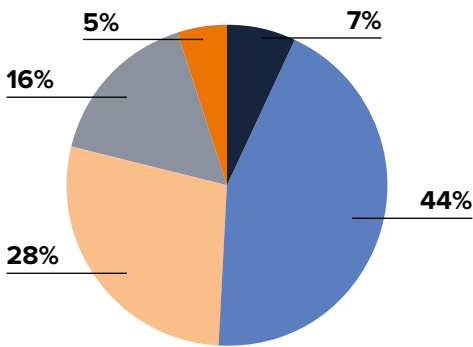
Methodology

This report is based on a survey of nearly 1,000 maritime professionals. The survey was launched at the Nautilus Federation board meeting in October 2023.

It consisted of 39 questions on decarbonisation, net zero, pay and conditions, training, skills and automation.

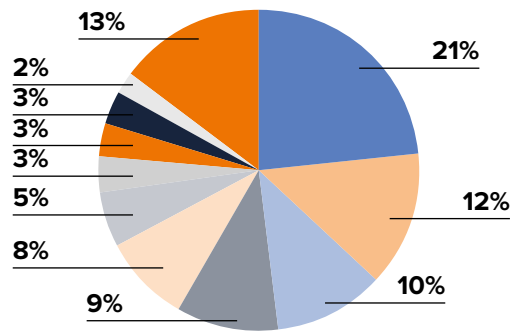
Demographics

Age



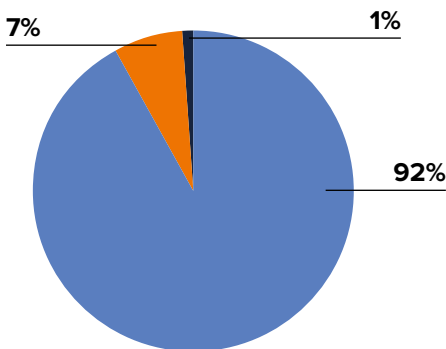
7% aged 65+; 44% 50-65; 28% 36-49; 16% 26-35; and 5% 18-25

Sector



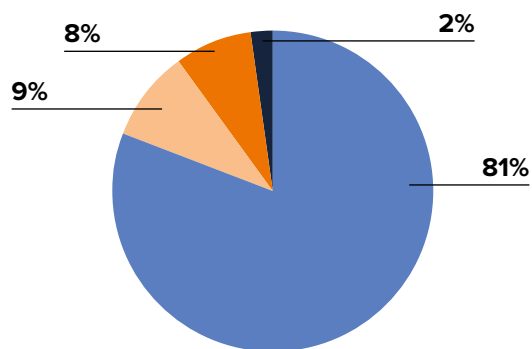
21% work in deep sea cargo; 12% ferries; 10% cruise; 9% offshore oil and gas; 8% superyachts; 5% dredging; 3% offshore renewables; 3% inland waterways; 3% shore-based; 2% pilot; and 13% other

Gender



92% male; 7% female; and 1% preferred not to answer

Experience



81% have worked in the maritime industry for more than 10 years; 9% for 5-10 years; 8% for 1-5 years; 2% for less than 1 year

Acknowledgements

With thanks to the affiliates of the Nautilus Federation:

- **ACV-Transcom** (Belgium)
- **Australian Institute of Marine and Power Engineers**
- **Australian Maritime Officers' Union**
- **FGTE-CFDT** (France)
- **Finnish Engineers' Association**
- **Finnish Ship's Officers' Union**
- **International Organization of Masters, Mates and Pilots** (USA)
- **Marine Engineers' Beneficial Association** (USA)
- **Merchant Navy Officers' Guild – Hong Kong**
- **Nautilus International** (CH)
- **Nautilus International** (NL)
- **Nautilus International** (UK)
- **New Zealand Merchant Service Guild**
- **Norwegian Union of Marine Engineers**
- **Officers' Union of International Seamen**
- **Seafarers' Union of Croatia**
- **Singapore Maritime Officers' Union**
- **Singapore Organisation of Seamen**
- **Sjöbefälsföreningen – Maritime Officers' Association** (Sweden)
- **Søfartens Ledere** (Denmark)
- **Unión de Capitanes y Oficiales de Cubierta** (Panama)
- **Unión de Ingenieros Marinos** (Panama)

About the Nautilus Federation

The Nautilus Federation is a group of like-minded trade unions in shipping and inland waterways transport that have come together to improve and expand the services they offer to their members.

Our mission is to foster the development of a strategic partnership between member unions with relationships that are ongoing, focused on mutual respect, trust and a shared vision for the success of our common understanding of progressive trade unionism, organising and professional support to our respective members.

www.nautilusfederation.org

