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An examination of the key benefits of assigning stable or fluid crews within the Merchant Shipping Industry.

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Executive summary

The Effective Crew Project showed that stable manning strategies can be cost effective and demonstrated clear benefits:

- for safety outcomes – with improved accountability and responsibility, leading to better vessel maintenance and familiarity with vessel and equipment;
- for the well-being and competency of the crew – with higher retention rates, a greater sense of ownership, familiarity, trust and loyalty, and increased capacity for on the job learning and mentoring;
- for longer term financial savings – with improved inspection results, reduced training and recruitment, and improved operational costs.

However, the research also identified various factors that influence the success of stable crewing, including:

- the effectiveness of the leadership and management skills on board or ashore – which need to be current and sensitive to continuous crew development and efficient vessel operations;
- the expansion or reduction in fleet size – which means crew stability can be difficult to maintain;
- the ability to accurately measure the financial implications of different crewing strategies – for precise evaluation of a crewing strategy.

Shipping is the instrument of globalisation and the international community depends upon safe, efficient, sustainable and reliable transportation of commodities and goods to promote social well-being and economic health. Where the industry fails in one or more of these respects it can have a profound impact on communities, the environment and the economy. Given the demands on the industry and the consequences of failure it is important to understand the factors impacting the performance of those employed at sea in order to permit the creation of an optimum working environment where negative outcomes are less likely.

The merchant shipping industry in common with others maintains a constant focus on its cost base. As crewing is the largest controllable part of a vessel's operating budget it often receives a great deal of scrutiny in terms of salaries and associated costs such as travel. This narrow focus on cost, if taken in isolation, risks missing the contribution of crewing strategies to other value-added aspects of vessel performance, however little research has been conducted in this respect.

The Effective Crew Research Project, sponsored by the Lloyds Register Foundation and the TK Foundation, was a two-year study which examined the benefits and challenges of implementing stable and fluid crews within the merchant shipping industry. The focus was on vessels types with more than 20 crew including: tankers, car carriers, containers, bulk carriers and chemical carriers, although some additional data was collected. The research incorporated a review of literature and collected data from an industry wide survey and 29 interviews with experienced maritime stakeholders and experts from other industries, including healthcare and aviation.

The research has shown that the fluid nature of crewing within the sea-going area of the industry negatively impacts on crew welfare, crew and vessel safety, and does not encourage employment retention. Stable crewing, however, is shown to develop a greater sense of ownership and responsibility which promotes better safety outcomes including improved vessel maintenance and knowledge of specific equipment on board.

Team familiarity generated by stable crewing was also found to promote trust and good working relations, which can increase productivity and provide better mental health outcomes for the crew. Other benefits from stable teams included improved vessel maintenance and reduced maintenance costs as well as shorter handover times and recruitment costs. These outcomes have longer term financial benefits for vessel operations and the shipping company. However, those implementing stable teams, particularly for the top 4 senior officers, should be aware that this can mean fewer promotional opportunities and, over time, an increased risk of complacency. Although there are some clear benefits to stable crewing, the uniqueness of individual shipping companies means that one size does not fit every situation. It is therefore vital that crewing strategies are continuously and consistently evaluated and adjusted where necessary. Changes to a different crewing strategy, or combination of strategies within a fleet, should be considered if evaluation highlights this as the best option for maximising cost efficiency, safety and crew well-being.

Regardless of the manning strategy adopted, it is important to recognise the influence that leadership and management can have on on-board culture. Poor leadership, despite the crewing strategy implemented, can have a detrimental effect on crew wellbeing and safety and ultimately on the budget. Recommendations from this project therefore include greater support for the senior officers both from shore side personnel, and on-going leadership training and development.

It is paramount for the ethical and sustainable advancement within shipping, that the highest levels of on-board team working are understood and achieved. This in turn will promote efficient, safe and sustainable working practices that support the best outcomes for the crew.

Acknowledgements

Sponsors and Support

The Lloyds Register Foundation (LRF) was the primary sponsor of the Effective Crew Project. LRF is an independent global charity established in 2012 to protect life and property at sea, on land, and in the air. In order to achieve this, they offer grants and support in education, research and public engagement and promote scientific excellence. Their aim is to connect science, safety and society by supporting research of the highest quality and promoting skills and education.

The TK Foundation was the secondary sponsor of the Effective Crew Project. The TK foundation, established in 2002, is an independent foundation whose mission is to fulfil the legacy of their founder J. Torben Karlshoej, by enabling disadvantaged youth and promoting maritime education and safety. The foundation invests in programmes which capitalise on the capabilities of disadvantaged youth, as well as investing in activities which strengthen maritime safety and security.

InterManager and Captain Kuba Szymanski, Secretary General, have offered unwavering support to this project. They are dedicated to promoting the shipping industry as a positive place of work and are keen to encourage progressive and informed development within industry topic areas. InterManager advocates efficiency, quality and ethical ship management, encouraging the highest standards of ship operations.

Spinnaker Global and Phil Parry – co-founder & Chairman, kindly offered their endorsement of the research. Spinnaker Global was founded in 1997 and became the first recruitment agency specialising in shore-based shipping vacancies. The business has grown to see success in over 60 countries and diversified into new areas that complement their existing business.

The International Maritime Employer's Council (IMEC) and Adam Lewis, Manager (Operations and training) – gave their members a chance to participate in phase one of the research. IMEC (The International Maritime Employers' Council) is the only international employers' organisation dedicated to maritime industrial relations. Established over 50 years ago, they represent over 200 shipping companies worldwide, negotiating seafarer wages, conditions and welfare.

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Introduction

The Effective Crew Project was a two-year research initiative undertaken by Solent University, sponsored by the Lloyds Register Foundation and the T K Foundation. The project was established to examine the benefits and challenges of stable and fluid crewing strategies and their impact on safety, finance, competence and well-being. This research followed a pilot study funded and led by Solent University in 2016, which identified a range of criteria[2] thought to be a priority in selecting a crewing strategy. These criteria have been applied to this recent study as a basis for comparison.

This report presents the research aim and objectives, methods and data findings. It goes on to offer conclusions and examples of best practice to support the recommendations. Whilst a significant amount of research has been undertaken, it is not suggested that the treatment of the topic is exhaustive. It is believed the analysis which follows will allow those with an interest and/or a responsibility for crewing, to make more informed decisions.

Project aim

The aim of this research was to examine the benefits and challenges of stable and fluid crewing strategies and their influence on finance, safety, competence and well-being.

Project objectives

- Examine the stable or temporary nature of crewing and the impact this has on safety, efficiency, well-being and finance.
- Share best practice from other industries which apply stable and fluid teams.
- Develop best practice guidance on crewing selection and implementation for the shipping industry.
- Develop recommendations for those in the shipping industry instrumental to crew assignment.

The purpose of the research was to provide new data in an area where the current information was primarily anecdotal in terms of:

safety – managing the significant impact of the human element in safety.

cost - crewing is commonly the largest element of the vessel's operating budget.

efficiency – the drive to demonstrate increasing cost-effectiveness in a competitive marketplace.

The research explored these areas in detail through primary and secondary data collection which is detailed in the 'Research Methods' Section.

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[2] The criteria used for the pilot study were derived from a review of related literature and included: flexibility, logistics, vessel maintenance, charterer requirements, familiarity of vessel, technical operations, crew compliance, accountability, safety, vessel culture, interpersonal relationships, trust and communications. These criteria have since been refined and reported on in this research project report.

Background

The research highlighted a lack of information surrounding the impacts of operating different crewing strategies within the merchant shipping fleet. However, other industries provided more substantial data in this area which pointed to safety and well-being advantages of keeping teams together for a certain time period. The impact of stable and fluid crewing on seafarers and shipping companies were examined, with input from shipping managers, recruiters, insurers and seafarers.

Seafarer's employment

Seafaring employment varies considerably ranging from a stable environment where seafarers may return to the same shipping company and sometimes the same vessel, to those that are deployed onto different vessels and perhaps different vessel types, voyage after voyage (Walters and Bailey, 2013). The current employment norm for seafarers is one of a fluid nature and lacking in work-place specific familiarity. Leong (2012) suggests that this fluidity of employment means that the seafarer labour market is often considered to be of a homogeneous nature. The STCW contributes towards this position by enabling certified and trained seafarers to be employed at sea on any vessel type without the requirement to obtain further qualifications (Devereux, 2017). However, the ISM code provides familiarisation training to counter this issue, focusing on the actions to take in an emergency and the use of mandatory safety equipment.

Basic training is also required before commencing work on-board. Seafarers joining a ship for the first time are meant to receive vessel specific familiarisation to enable them to use the equipment on-board safely and become familiar with the vessel and operational standards. However, Devereux (2017) found that the practice of the ISM code and familiarisation guidance was not always followed on board, despite it often appearing to the shore office that the requirements had been met (Devereaux, 2017 and Bhattacharya, 2009). Often, there is little time for seafarers to have the required training as many will have to start work as soon as they join the ship. This can be compounded by the senior officers being particularly time pressured just before they leave port, making the familiarisation training, which generally occurs at a similar time, a lower priority.

Devereaux's research also highlights the point that despite SOLAS specifying mandatory equipment that needs to be held on board, the makes and models are not standardised. This means that even within the same fleet, there may be different versions of equipment, further emphasising the need for familiarisation of the vessel and its equipment before every voyage. Lack of workplace specific familiarity can therefore negatively impact on personal safety and the perception is that this is worse at the start of a voyage. The lack of specific vessel familiarity was thought to be an issue for all the crew, rather than just the individual concerned and something that could affect the operational safety of the vessel (Devereaux, 2017). However, it should be noted that shipping companies do not collect data concerning injured seafarers and their familiarisation with the vessel, despite Hansen et al (2002) demonstrating that seafarers returning to the same (familiar) vessel are less likely to be injured.

Crew management

As discussed above, crew familiarisation and therefore invested crew management, is key to safe ship operations. Powell (2015) noted that crew have a preference to work directly for the ship owner. Agency and manning only agreements, although frequently used, can distance the crew from this relationship. Powell defines a range of crewing options from owner employed and agency employed crew which include the following:

1. Owner employed and technically managed
2. Owned agency employed with owner sponsored benefits and bonuses and technically managed
3. Owner agency employed with owner sponsored benefits and bonuses and third party technically managed
4. Third party agency employed, combined with third party technical management with owner sponsored benefits and bonuses
5. Third party agency employed, combined with technical management
6. Third party agency employed with owner sponsored benefits and bonuses
7. Third party agency employed

(Powell, 2015)

Powell suggested that the further the distance from direct employment, the more potential there is for safety issues to occur.

Project definitions

Different definitions have been used to describe different crewing strategies. Following a review of published literature to determine the most common terms applied within the industry, this research uses the following definitions.

Stable crewing

The top four senior officers[3] returning to the same vessel for more than one voyage.

Fluid Crewing

The top four senior officers and the rest of the crew randomly assigned to any appropriate vessel.

Manning pools

The top four senior officers rotating around a fleet of ships, usually of the same vessel type, where they are likely to be reassigned to the same vessel over time.

Crew composition and assignment are an essential component of the efficient running of a ship but can vary considerably. In the merchant shipping industry, there are companies operating stable crewing strategies where the same senior officers (top four) operate on a back to back basis and return to the same vessel for several trips, with all four joining and leaving the vessel at the same time. More usually, companies operate a fluid system where

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[3] The top four senior officers relate to the Captain, Chief Officer, Chief Engineer and Second Engineer.

senior officers are assigned to any appropriate vessel and will sail with different senior officers every trip; the companies will generally avoid changing all four senior officers at the same time. In some cases, companies have opted for a hybrid approach where senior officers remained within a fleet of vessels, so that they regularly sail together but not necessarily on the same vessel. This is usually referred to as a 'manning pool' system.

Legislation and maritime safety

Shipping is governed and regulated by multiple organisations. The interaction between these and how they impact on vessel operation and management is complex, but the regulatory requirements dictate the way in which a vessel is operated and managed on a daily basis (Figure 1).

The International Maritime Organisation (IMO) is the UN Agency with responsibility for development of regulation relating to the safety of shipping and protection of the marine environmental impacts from shipping. These are commonly perceived as the 'regulators' for the industry. The four key pillars of international regulation for the maritime industry include MARPOL (International Convention for the Prevention of Pollution from Ships), SOLAS (International Convention for the Safety of Life at Sea), STCW (Standards of Training Certification and Watch-keeping) and MLC (Maritime Labour Convention, 2006) (ILO,2019). However, any proposed regulation that is drafted by the IMO has no legal standing until it has been embedded within the national law of the Flag state, where the ship is registered by the ship owner. Additionally, vessels must comply with Port State Control (PSC) requirements of any states' ports or waters they are operating in and with any additional regional regulation. There may also be further requirements that govern specific sectors such as OCIMF (Oil Companies International Marine Forum), International Oil Tanker and Terminal Safety Guide (ISGOTT) and International Marine Contractors Association (IMCA) that cover the oil, gas and offshore industries. Requirements concerning seaworthiness fall under the remit of the Classification Societies who issue class certification and conduct audits for both the class and on behalf of Flag states.

Failure to comply with regulations can have serious ramifications for the safety and well-being of those on board, and for the environment, and may potentially lead to significant financial losses if a vessel is taken off hire for mechanical breakdown or compliance failure or possibly detained in port. Regulatory compliance is therefore the cornerstone of the safe management and operation of a vessel, which is directly linked to the knowledge and technical competence of those on board (and ashore), particularly that of the senior officers. The research findings clearly demonstrate how the competence and technical knowledge of senior officers on board impact on the safe management and operation of a vessel and the relationship with regulatory compliance.

IMO (International Maritime Organisation)
- Is the UN agency responsible for developing conventions and setting standards for safety, security and environmental perfomance of international shipping.

Flag State
- The country where a vessel is registered.
- Have representation at the IMO and are responsible for embedding any convention that they are signatories to within national law.

Port State Control
- Responsibile for ensuring all vessels visiting their ports comply with any IMO conventions that the country is signatory to.
- Enforcement of national regulations i.e. fiscal, sanitary, fiduciary, within the countries' waters as prescribed under UN Law of the Sea Convention or within the countries' own maritime framework.

ILO (International Labour Organisation)
- The UN Agency responsible for setting labour standards.
- Working with International Transport Workers Federation and the IMO to develop the Maritime Labour Convention (2006) which addresses all labour laws relating to shipping.

National & Regional
- Additional regulation pertaining specifically to shipping and maritime activities covering pollution, sanitary, fiscal and more.
- Enforced through Port State Control or regional organisations.

Classification society
- Verifies vessels' structural strength and integrity.
- Ensure the reliabilty and function of steering, propulsion and auxillary machinary.
- Verifies compliance with international and national/statutory regulations on behalf of Flag State.

Sector Specific
- Non State organisations that set standards for a specific sector of the industry i.e. OCIMF, ISGOTT, IMCA.
- Many have consultative roles at the IMO.

Charterer
- For a vessel which is contracted under a time charter and the vessel owner states the vessel is 'in every way fit for service'.
- Specific requiremenst with regard to level of crew competence, experience and training.
- Specific operational and regulatory requirements that must be met.
- There may also be restrictions placed on number of crew changes or location, in a given period of time.

Figure 1: Regulatory overview impacting maritime safety

Crewing strategies and well-being

The research showed that seafarers' well-being is improved by crew stability within a team. Well-being as defined by the Oxford dictionary is *"the state of being comfortable, healthy and happy"* (Oxford University Press, 2019). However, it should be recognised that well-being is a broad concept that should include a longer-term view of an individual's reality and satisfaction of life in total. Sense of purpose and the control that is felt in relation to being able to change circumstances is also a fundamental aspect of well-being (Mental Health Foundation, 2015). The New Economics Foundation (2012) has a more specific definition of well-being which states that *"Wellbeing can be understood as how people feel and how they function, both on a personal and social level, and how they evaluate their lives as a whole"* (New Economics Foundation, 2012). The Office for National Statistics (2019) offers 43 indicators to measure well-being, including[4]:

- Personal well-being (EG. Happiness, and mental well-being amongst others).
- Relationships (includes, loneliness, unhappy relationships and people to rely on).
- Health (EG. Healthy life expectancy and depression or anxiety and others).
- What we do (EG. Job satisfaction, unemployment rate and satisfaction with leisure time and others).
- Where we live (EG. Feeling safe, access to natural environment, belonging to neighbourhood and others).
- Personal finance (EG. Difficulty managing financially and others).
- Education
- Governance
- Environment

(The Office for National Statistics, 2019)

Crew stability within the Merchant Navy has been recognised as a way to improve seafarers' psychological well-being and reduce symptoms of mental health (Andrei *et al*. 2018).

The World Health Organisation defines mental health as a *"state of well-being in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community"* (WHO, 2014). The International Seafarers' Welfare and Assistance Network (ISWAN) adopts this definition. In their Psychological Well-being for Seafarers (2017) which is available in English and 6 other languages, they emphasise the importance of looking after your mental as well as physical health. Some of the suggestions to aid psychological well-being that are presented in this publication include socialising on board together and physical exercise. This research sought to understand how crew stability impacted on the crew's well-being as well as other components associated with seafaring.

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[4] Examples selected based on relevance to seafaring.

Research methods

The research applied a mixed method approach to the data collection, employing an extensive review of published literature, an industry survey, interviews with industry and non-industry experts, shipping company case studies and the project conference. The methodology sequence is summarised in Figure 2.
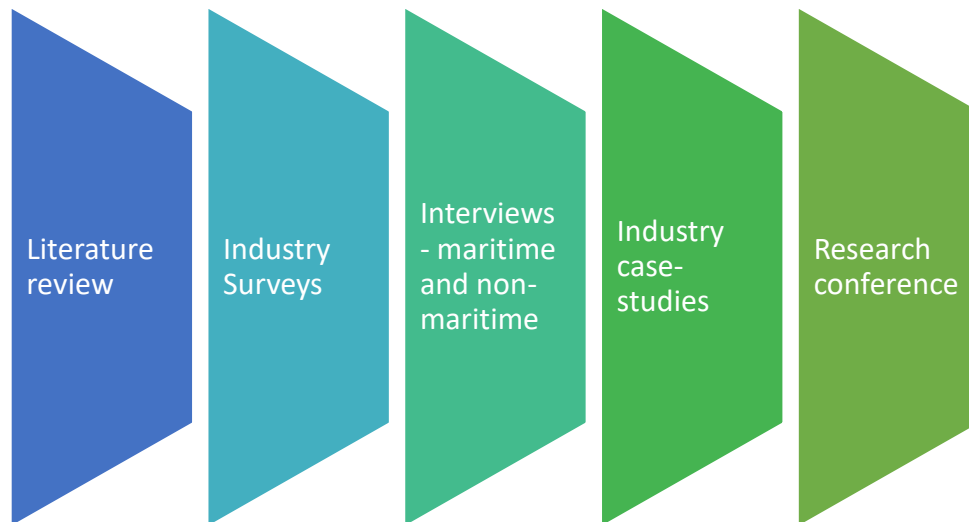

Figure 2: Sequence of data collection

Data sources and participation

- 91 questionnaires
- 25 maritime Interviews
- 4 other industry interviews
- 2 case-studies
- Input from the Effective Crew Conference (2019)

Literature review

Published literature was extensively reviewed to highlight the use of stable and fluid teams both within the Merchant Navy and non-maritime industries. The review focused on areas including the benefits and challenges of implementing these team formations and helped to highlight examples of industry best practice. The review additionally identified significant gaps in knowledge, particularly within the context of the Merchant Navy and informed the development of the questions used throughout the data collection phases of the research.

Industry Surveys

An anonymous, online survey was employed to capture the views and experiences of maritime stakeholders in relation to stable and fluid manning strategies. Anonymity has

been recognised to encourage respondents to be truthful (Patten 2014). Self-completion surveys offer greater anonymity due to the absence of an interviewer (Phellas *et al.,* 2012). Due to the global nature and distribution of the shipping industry an online survey was considered appropriate to the research. This enabled international dissemination and a fast and inexpensive mechanism for its delivery. The survey management software platform, Sphinx, was used to deliver the survey, as it is recognised for its ability to reach a large geographical audience (Lefever *et al.,* 2006).

A total of ninety-one responses were captured from four different stakeholder groups consisting of Ship Owners and Managers; Insurers; Seafarers; Recruiters and Agencies, as demonstrated in Table 1.

Category	Number of respondents
Ship Owners/ Managers	39
Insurers	6
Seafarers	36
Recruiters and Agencies	10
Total	91

Table 1: Number of survey participants

All Respondents were requested to answer an identical series of questions, ranking their answers in order of importance against pre-set criteria. The criteria were derived from several sources including preliminary findings from the literature review and the results collected as part of the three-month feasibility study for the research (Pike *et al.,* 2017).[5]

Interviews

A series of semi-structured interviews were undertaken with key maritime stakeholders. Like the surveys, the interview stakeholders included ship owners and managers; recruiters and agencies; seafarers and insurers. The interview questions were tailored to each stakeholder category to ensure their validity. For accuracy and with the respondent's permission, the interviews were digitally recorded, and anonymity assured.

Analysis

Part of the surveys were determined by the quantitative data collected from the Likert Scale[6] for the prioritising of criteria. Thematic analysis was applied to the data returned from the surveys and interviews. Thematic analysis allows for the identification of patterns within the data and can produce a rich and detailed description of the information collected

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[5] The pilot study was funded and led by Solent University and conducted by the same researchers.
[6] A Likert scale is often used in research to represent people's attitudes (of agreement or disagreement) towards a certain topic.

(Braun and Clarke, 2006). In this research, the personal narrative from the interview responses, as well as in-depth survey responses, supported the use of thematic analysis.

Research findings and analysis

The research findings presented here draw on anonymised quotes from both data sets (surveys and interviews) to illustrate certain points that confirm, contradict or add new evidence to existing published materials.

Demographics
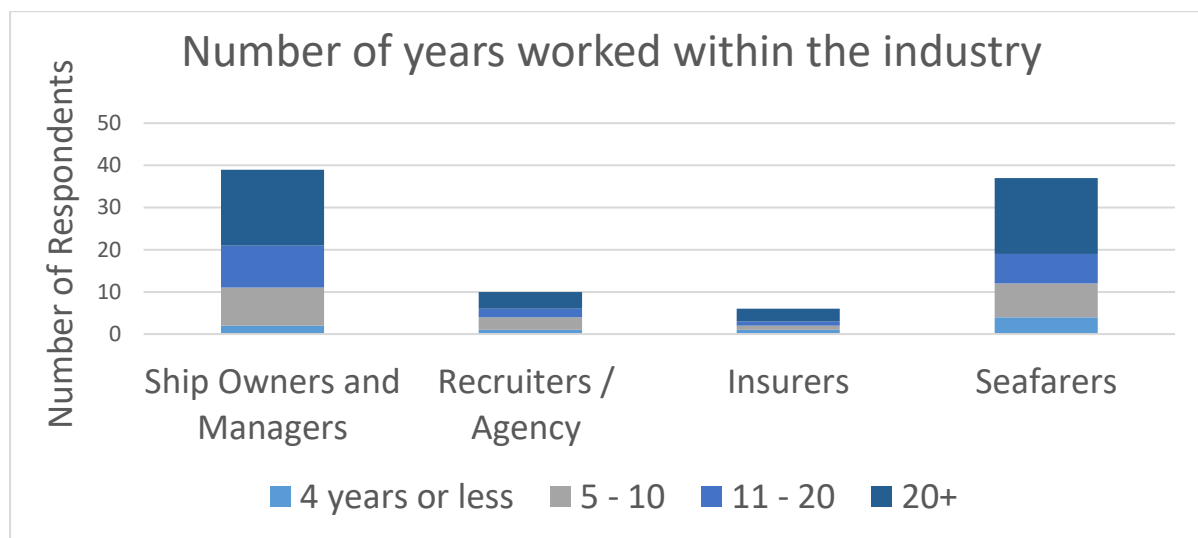
Figure 3: Number of years worked within the industry

Figure 3 shows the research respondent's high levels of experience working within the shipping industry; starting from a minimum of five years, to the majority who worked within the industry for over 20 years. This demonstrated that the respondents have been able to draw on experience based over a number of many years, providing a solid foundation for the data collection.

Vessel types

The research respondents had worked on multiple vessel types during their time at sea (Figure 4). They were asked to indicate all the vessel types they had worked on on-board and the multiple responses explain the 174 responses to this question. The two most commonly worked on vessel types were Tankers (41) and Bulk Carriers (37). Other types of vessel worked on included aggregate dredgers, cable layers, reefers, offshore, coasters, bunker ships, research vessels, naval and cruise ships.

Vessel types worked on

Number of respondents

60				
50				
40				
30				
20				
10				
0				

Bulk Carriers   Containers   Tankers   Car carriers   Other types

■ Ship Owners and Managers   ■ Recruiters / Agency
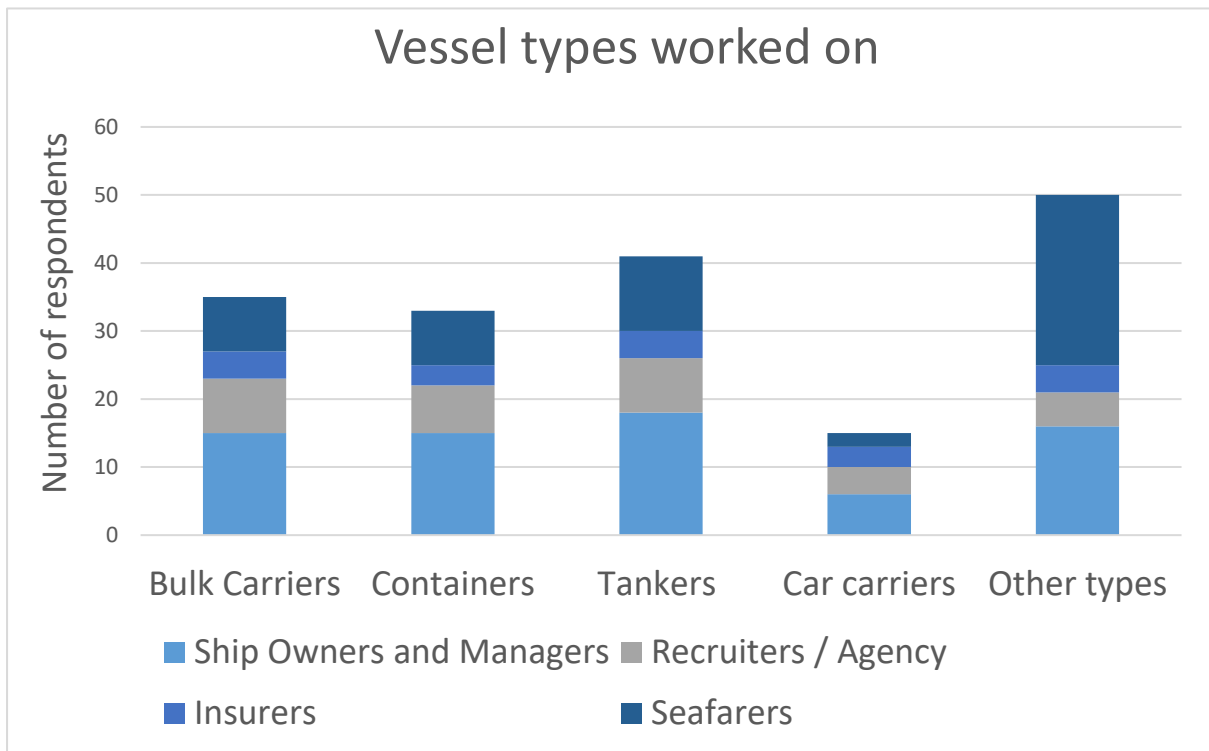■ Insurers   ■ Seafarers

Figure 4: Vessel types worked on

Finance

Financial viability is essential for the successful operation of any shipping company. Many costs are associated with vessel operations including primary ones such as fuel, maintenance, logistics and crewing costs. As we move into the digital age, it is even more important to have accurate measures to justify expenditure, and crewing costs are an essential component of this.

As highlighted earlier in the report, crewing costs represent approximately 50% of the ship's operating budget. Overall operating costs are beginning to increase further after a period of recent stability in the industry (Drewry, 2018). Therefore, many shipping companies are experiencing a sustained period of financial pressure and this has been reflected within the research findings.

> *"With such a long period of a poor market in shipping across the sectors, cost focus becomes more and more important."*

(Manager 26)

> *"Ship downtime = loss of earnings. All shipowners want to make a profit, it is not an altruistic form of employment."*

(Manager 23)

Vessels are considered long-term assets, which generally influence decisions that are made about ship operations. Financial sustainability requires a broad understanding of all the elements that influence ship operations for longer term cost benefits, including the safety and well-being of the crew. A manager interviewee made the following response in the research survey that sums this up.

> *"…[It's] Not just wages and repat. figures, but the long-term effect on ship performance of a well-integrated team on board"*

(Manager 2)

In terms of crewing, the associated costs identified from the research, stem from a number of areas which are displayed on Figure 5.
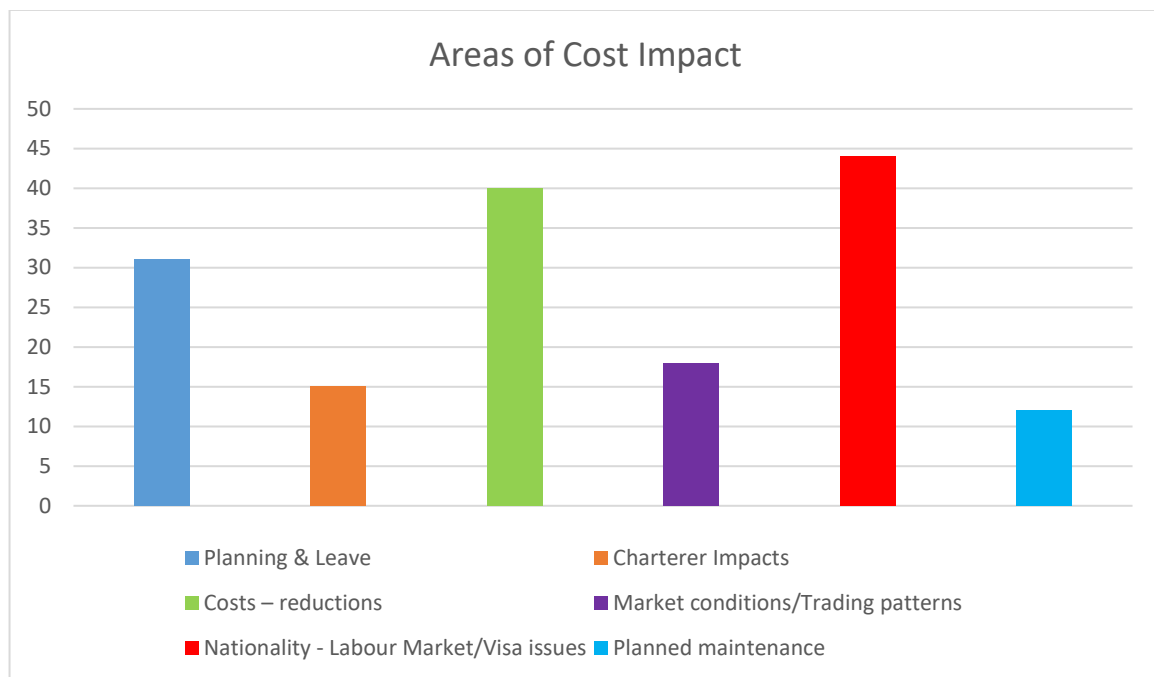
Areas of cost impact

Figure 5: Areas of cost impact

Market conditions

Market conditions make up one of the external factors that influence the crewing strategy selected by a company. The stability or volatility of the market can dictate whether a company decides to invest in more ships and expand their fleet or to sell ships on or even send them for scrapping. If the market is stable and fleets are not being expanded or reduced, then it is easier to maintain a stable crew. A volatile market favours fluid crewing, allowing for the rapid recruitment of seafarers with no obligation to re-employ if they are not required. This short-term approach has implications in many areas, not least crew well-being, as people become dispensable in declining markets. Thus, market conditions, vessel supply and availability of seafarers (including the specific skills required) will have an impact on the crewing strategy a company selects.

Recruitment

Stable crewing and improved crew retention have the potential to reduce recruitment costs over time. Fewer crew changes mean lower costs in areas such as the number of actual repatriations, visa applications, ID checks or in recruitment (including advertising, interviews and induction for example). Stable crewing also leads to a greater commitment from senior officers to the vessel they work on. Conversely, financial benefits have also been associated with fluid crews which may include deploying cheaper resources to reduce crew costs. However, the research indicated that this practice has in some cases been undermining experience and skills within the industry, as noted in the quote below.

> *" ….. a lot of the good experienced people have now been lost to the industry in favour of cheaper."*

<div align="right">(Seafarer 19)</div>

The data indicated that fluid crews would ultimately cost more in terms of management resources and vessel maintenance, due to the lack of stable employment of the top four senior officers.

> *"increased costs to maintain vessel, more management resource"*

<div align="right">(Manager 11)</div>

Charterer requirements

Charterers will hire ships from ship-owners for either a single voyage or for a given period. Within a time-charter agreement there may be very specific requirements in the way in which the vessel is manned. This could relate to experience, competence and training of the crew on board. There may also be specific restrictions with the number of crew changes, days available to undertake maintenance and costs associated with time 'off hire'. Additionally, in some sectors (most often oil, gas and offshore) the charterer may insist that the vessel owner ensures vessel compliancy with additional sector specific requirements.

There was a sense that charterers needed to be accommodated as,

> *" ….. they're the ones paying the bill and you need to keep them happy"*

<div align="right">(Manager 36)</div>

The charterer's decisions concerning the length and the type of charter, which is based around the best price for the vessel, was thought to have a strong influence over the general environment on board.

> *"The length and type of charter has a major bearing on the motivation on board and the money spent on board the vessel by the company chartering the ship."*

<div align="right">(Seafarer 18)</div>

Crew changes

The research respondents identified a range of criteria which can impact crew changes which included flexibility, logistics and crew travel. Crew changes refer to the frequency of crew joining or leaving a vessel at the start and end of a voyage; the regularity of which is determined by the crewing strategy that is in place. Although the regularity of crew changes may be influenced by the crewing strategy, the expected duration of voyages is set down within the contract of employment. This is usually a trip duration of between 3 and 6 months or 5 weeks on 5 weeks off.

Flexibility

Flexibility surrounding the scheduling of seafarers on board vessels, based on factors such as availability, rotational shift patterns, periods of leave and illness, was considered important by all respondents. Managers and ship owners assigned 5.8 out of 7 for this aspect and, unsurprisingly, recruiters assigned the highest value for flexibility at 6.3 out of 7.

Flexibility in relation to crew fluidity is key, as the quotes below demonstrate.

> *"Flexibility is extremely important; changes can occur at short notice & we need seafarers who are flexible [with] joining/leaving arrangements & this is partly reflected in the manning strategy."*

(Manager 1)

> *"There should be flexibility but within limits as continuity and ability for cooperation should also be taken in account".*

(Seafarer 36)

> *"Of-course this is important but there are also other factors [such] as costs and having enough seafarers [on] standby"*

(Seafarer 36)

Crew travel costs

Crew travel costs are a relatively small part of the ship's total operating costs but are significant in terms of the organisation required and present potential visa issues, which are discussed in the next section. The quote below makes the point that it will cost the same to transport a cheaper officer as it would a more expensive one.

> *"… less important than the quality of the officer, travel costs are [a] small element compared to wages and total crew budget. It is no good recruiting cheap people. They are often no cheaper to recruit and move from A to B than high quality crew. In certain markets where charter and vessel day rates are critical this would not hold when owners are operating on marginal profits."*

(Manager 31)

There was conflicting opinion on the issue of crew travel, with some people experiencing increased crew travel costs with stable crewing, and others experiencing reduced crew travel costs.

Where a vessel had an unpredictable trading pattern, crew changes may need to be made in remote and inconvenient locations and could lead to increased travel costs. Despite this, some companies attempted to continue with the planned crew change irrespective of the location of the vessel and made the arrangements centrally with little interaction with the officers concerned. In these cases, the crew travel costs tended to increase. Other companies involved the officers in the crew change discussions and even delegated the decision to the ship with the proviso that the overall crew travel budget was achieved. In these cases, the crew travel costs tended to reduce. This was another example of leadership

and decision-making being a significant influence on the impact of whichever crewing strategy was adopted (Case-study 2).

Visas and nationality

The nationality of a seafarer often has a bearing on a company's decision about crewing. Companies commented on a range of issues linked to nationality that they tried to consider when selecting crewing strategies. These included ease of obtaining visas, maintaining a balance of nationalities onboard, avoiding certain combinations of nationalities, taking into account perceived national preferences about fixed periods of employment and return dates.

> *"East European officers are placed on vessels calling in Europe, whilst Asian seafarers are connected at most cost-effective port[s] within Asia"*

> (Manager 11)

Visa issues are complicated, with some companies paying for visas and associated expenses such as crew working in certain locations or for staff joining a vessel in a specific country. Other companies expect these costs to be covered by the seafarer. To facilitate seafarers travel, the ILO108 Seaman's Card (ILO, 2017) was intended to be an internationally recognised document that enabled seafarers to join and leave vessels with less stringent visa requirements. Unfortunately, the cards do not have global recognition and countries operate many versions of the system. Therefore, obtaining visas for certain nationalities to operate out of certain ports can be problematic. Issues arising can increase the time and cost of employing certain nationals.

Logistics

Logistics, within the scope of this research, refers to the planning of a seafarer's availability and the physical placing of a seafarer on a vessel; this may involve international travel.

Recruitment and travel requirements for hiring and deploying a seafarer to a vessel are also part of logistics' planning. Different companies adopt different strategies which are influenced by how the cost items are identified in their budgets and detailed in their reporting systems. It can be suggested that the more visible the logistics and travel costs are, the more people feel the need to demonstrate that they have managed them effectively.

> *"We try to manage crew changes in key ports where we know costs can best be mitigated & fully reflected in manning procedures ashore."*

> (Manager 1)

> *"If there is the choice to deploy somebody whose place of residence implies less travel costs, we would prefer him/her, provided suitability for the Job."*

> (Manager 5)

> *"Money always has an impact, but we would reduce the number of nationalities/markets for sourcing and thereby compensate."*

<div align="right">(Manager 25)</div>

Flexibility surrounding the seafarer's ability to join and leave a vessel, providing more options in logistical planning, was highlighted as an important consideration in the recruitment process, which can be reflected in a crewing strategy. One respondent has noted that a fluid crew could

> *"allow for greater flexibility in the rostering of vessels and cost effectiveness in flights and agency costs"*

<div align="right">(Manager 26)</div>

Company loyalty

The research indicated that fluid crewing strategies do not foster company loyalty and often encourage seafarers that are looking for the highest remuneration over anything else. Additionally, some companies reported higher retention when they adopted stable crewing.

> *"Company loyalty is almost non-existent these days. Unfortunately, this now even seems to extend to the vessel and the other persons onboard. Many seafarers are only there to get paid, even if they do not admit it."*

<div align="right">(Seafarer 27)</div>

> *"The seafarer will always desire the best remuneration he or she can obtain. This is the mercenary element."*

<div align="right">(Seafarer 7)</div>

Vessel maintenance

Maintenance of a vessel has financial implications which are impacted by different crewing strategies. Vessel maintenance refers to the overall upkeep of the vessel, including routine, non-routine and proactive upkeep. As crews develop stronger relationships and greater knowledge of the vessel and its equipment over time, the accountability, trust and performance amongst the team increases leading to greater responsibility for one another and the vessel.

> *"So that means that he knows how the equipment is working so he will be more confident when he has to take [a] decision, he knows how things operate, maintenance should be higher and then we hope we can generate a higher feeling of belonging every time he comes back to the same vessel."*

<div align="right">(Interview 6)</div>

"They handle their stuff with care because they are well aware that they have to return."

(Manager 7)

"Depends on the requirements of the Client to run either a vessel at minimum costs or to properly maintain the asset, i.e. for selling purposes."

(Manager 5)

"This is as important in managing the cost-effective operation of the vessel as any other factor. Poor maintenance costs, and it costs a lot compared to high quality crew and effective PMS [Planned Maintenance System]."

(Manager 31)

"Of course, vessel maintenance is of utmost importance operationally as it ensures a vessel is able to keep up to its ETAs and good efficiencies."

(Manager 35).

A stable, engaged and motivated crew will keep the vessel operating in the best condition. This not only prevents mechanical failures, but also maintains the vessel to legislative standards and removes potential problems from the inevitable port state control inspections.

A slightly different perspective was offered from a seafarer.

"Much of the pride in a ship comes from the top down and this includes shore management making funds available to carry out this work (time, tools and materials)."

(Seafarer 18)

Measurements and decision making

It became apparent (particularly from Case-study 2) that although many shipping companies have sophisticated measurement systems in place to monitor a wide range of performance areas, some of the relevant measures were not always included when making business decisions about which crewing strategy to adopt. In some cases, the decision to move to a new crewing strategy was based on only one main area of operation, for example, the technical performance of the vessel or the ease of being able to provide suitably qualified crew for the vessels (Case-study 2).

Use of key performance indicators (KPIs) and measurements

The use of KPIs and regular performance reviews, based on a range of pre-defined measurements was found to be widespread among the shipping companies contributing to

the research. It was also common for the impact of the crewing strategy decision not to be formally reviewed against any agreed measurements to enable the business to assess the impact of the strategy selected.

One of the companies involved in the case studies shared two years of data comparing measurements for vessels that had changed from fluid to stable crewing. Analysis of the data identified several areas that appeared to have been impacted by the change in crewing strategy. When this was discussed with the company it transpired that there were several other factors that affected the vessel's performance which were not shown in the standard measurements used to review performance every month. This raised questions about the value of the large amounts of data being collected, analysed and presented in regular management meetings. It also highlighted the need for any measurement system to be carefully designed and reviewed to provide comparable and consistent data on which to base crewing strategy decision making (Case-study 2).

Summary of financial implications of stable and fluid crewing

The research identified financial implications associated with stable and fluid crewing. Crew stability promotes investment in people and sees it pay back over time in terms of reduction in recruitment costs, shorter hand-over times, and the greater sense of well-being and ownership that crew feel when valued. Fluid crewing offers increased flexibility around recruitment and provides access to wider labour markets with shorter term cost benefits for fleets in rapid expansion or decline. Various viewpoints were offered on some key cost areas, however, there was little evidence of a systematic, measurement-based, decision-making process being consistently applied.

Financial benefits
- Reduced maintenance costs.
- Improved compliance with Planned Maintenance System (PMS).
- Improved quality of maintenance.
- Reduced breakdowns and rework.
- Fewer port problems.
- Fewer cargo problems.
- Improved audit and inspection results.
- Reduced handover times.
- Greater knowledge of the vessel and equipment leading to improved performance and faster problem solving when problems occur.
- Increased sense of ownership and accountability from senior officers.
- Improved communication between the ship and the office.

> *"So, we know that our stable crew is slightly more expensive .. but we know on the other side that in costs including shipyard periods, in water survey periods and normal spare part procedures and [the] like, that we are less expensive than outsourced vessels. And on the other side, on the safety side, we know we have less accidents on our vessels."* (Interview 14)

Financial challenges

The research identified certain, predominantly financially driven circumstances where stable crewing can be less attractive to shipping companies. These include:

- rapid changes in the size or make-up of the fleet, resulting in the need to employ new crew or move crew to vessels in which they had relevant competence.
- the need to rapidly introduce new vessels or new technology.
- specific charterer requirements, particularly concerning the need to comply with various matrices; this can create the need for crew to be allocated to specific vessels to fulfil the specification of certain matrix requirements, even if that means disturbing an existing team.
- the lack of good leadership and team building skills amongst the top four senior officers.

Other challenges with stable crewing include:

- Reduced flexibility for deployment of crew.
- Issues with travel and visas for some nationalities.
- Complacency amongst crew if a team is kept together for too long.

Due to the distinctive nature of each shipping company it is not helpful to offer a standard solution for an optimum crewing strategy. Rather, there are many different solutions that can be adopted depending on the individual circumstances of the company, such as the company size, growth projections, geography (in view of applicable legislation and proximity to supply of seafarers for example), age of the fleet and vessel types. These factors are primary when considering the best crewing strategy to implement and the financial bottom line affecting the company.

Safety and competence

Regulations and compliance cover both the ship and shore operational procedures and the overarching regulatory environment as detailed previously in Figure 1. It identified the complex landscape of the many different organisations that dictate procedures and processes that vessels are required to comply with.

Within the industry qualifications and associated training are dictated by the International Convention of Standards of Training, Certification and Watch Keeping for Seafarers (STCW Convention and Manilla Amendments 2010) (IMO, 2019) designed, among other things to promote safety of life at sea by establishing in common agreement international standards of training, certification and watch keeping for seafarers. STCW identifies the 'minimum' level of competence and knowledge required. Quality of standards of qualifications is of concern, particularly in relation to Certificates of Equivalent Competency (CoEC) that arise relating to level, type and quality of training undertaken.

Additional, specific training may be required by the company either ashore or supported on board through mentoring. However, this is down to individual companies who are prepared to invest in training and the 'willingness' of senior staff on board to engage in mentoring of fellow crew. Within more specialised areas of the industry the level of qualifications linked with experience of staff on board may form part of a charterers requirements (i.e. Offshore, Oil & gas etc). Where there is a sector specific matrix requirement for quality and conformity of vessel and crew competence, the concept of stable crews can be seen to be highly beneficial.

> *"For specialised vessels such as DSV's [Dive Support Vessels], PSV's [Platform Support Vessels] and construction vessels as a whole charterers usually want to know the length of time each officer and engineer has spent onboard that particular vessel to judge the vessels overall experience of the task at hand."*

(Manager 22)

> *"Tanker charterers require certain time in rank. Some other charterers require experience in certain operations and carriage of certain cargoes. Also, if [a] vessel [is] trading into areas with expected sea ice, experience of operating in iced conditions required."*

(Seafarer 6)

> *"A stable top team understands the charterers' needs and normally leads to a good relationship."*

(Seafarer 28)

> *"…maintaining the senior officer core for the life of the charter is essential for maintaining safety and operational efficiency"*

(Manager 20)

Understanding issues and processes of compliance and the ability to complete audits and paperwork for Port State Control (PSC), Flag State or Class inspections, are key to ensuring productivity, efficiency and safety on board. Where stable teams have been implemented, these processes should become easier to complete as the senior crew are already familiar with the vessel.

> *"It is essential that ship staff know the systems that need to be followed; there are so many Audits these days."*

(Manager 2)

> *"Crew compliance should be driven from the senior officers on board."*

(Manager 23)

Over time however, it was noted that some crew are prone to being less vigilant about complying with regulations and there is a tendency for selectivity to creep in.

> *"Staff become selective in their attitude to compliance, following rules they like/believe in and ignoring those they don't."*

(Seafarer 27)

> *"Compliance is individual specific, those individuals that choose not to comply will do so on any vessel regardless if returning or not"*

(Seafarer 10)

Impacts on safe practice

The research showed that there are five primary areas impacting safe practice on board which include: nationality, shore management, on-board culture, technical competence and accountability (Figure 6). These primary areas are discussed in more detail in the following sections.
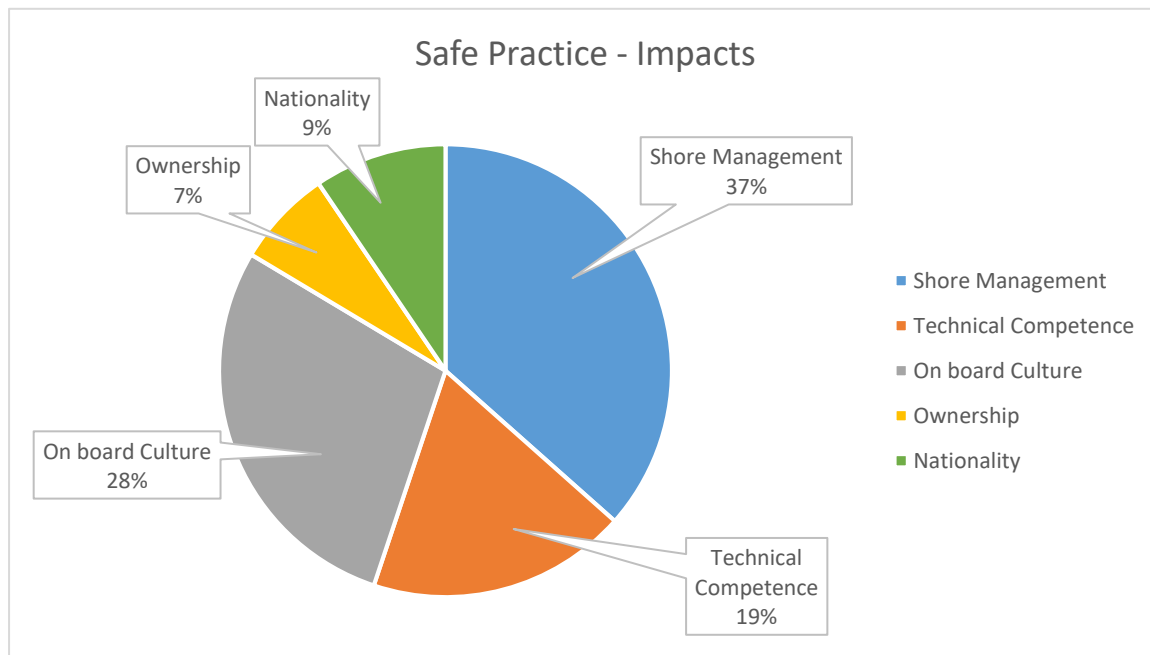

Figure 6: Safety impacts

On board culture and shore management

Both the shore office management and the culture set by the leadership of the top four senior officers on-board have significant repercussions for seafarers and the ship itself.

Figure 7: Ship and shore relationship

"Safety culture is enforced by the crew and stays with the crew. If you change the crew you instantly lose the safety culture on-board until it is re-established."

(Interview 15)

"A good strong top team will breed a good safety culture onboard. A weak team will not."

(Seafarer 27)

Accountability

Accountability and ownership can relate to an individual or a team taking responsibility for their own actions; accountability is being aware that any actions taken affects others. On-board a ship, accountability can impact greatly on safety culture as well as the way in which a vessel is maintained and operated.

There is evidence from the research that stability within crews helps to engender a feeling of ownership and accountability towards both the vessel and the company. When crew know that they will be returning to the same ship and working for the same company a sense of ownership develops alongside the associated responsibility. Additionally, when crews are working with the same people on a regular basis, trust can develop and the sense of being part of a team. In addition, working for the same company can engender the same attitude

of ownership and accountability. The topic of accountability is explored in more detail in the well-being research findings section.

> *"The level of knowledge and experience are increased as the top four take ownership not least knowing that they will be returning."*

<div align="right">(Seafarer 26)</div>

> *"Dedicated crew are much more loyal and supportive of company management. It works both ways."*

<div align="right">(Management 20)</div>

> *"Trust the people, trust your processes, support them appropriately and let them act like professionals and they will accept accountability."*

<div align="right">(Management 31)</div>

> *"Much of the pride in a ship comes from the top down and this includes shore management...."*

<div align="right">(Seafarer 18)</div>

Technical competence

Safety and technical competence are closely linked, with knowledge of a vessel alongside qualifications and training of seafarers and cannot be disaggregated. There is no argument that appropriate standards of training underpin safe shipping and vessel operation, which is further supported and improved by familiarity and knowledge of the vessel. This research defined the concept of safety to link both operational and daily running of the vessel and encompassed good housekeeping, ongoing maintenance, operational procedures, emergency drills and the response to them. Technical competence related directly to levels of crew training, technical skills and qualifications.

> *"A high level of understanding and control from senior officers can greatly help crew carrying out their emergency procedures"*

<div align="right">(Seafarer 44)</div>

Safety and multicultural crews

Safety impacts were discussed in terms of multicultural crew environments on board and the interplay of stable and fluid crewing. The key areas raised by the research were cultural relationships, inexperience and language and communication barriers (Figure 8).
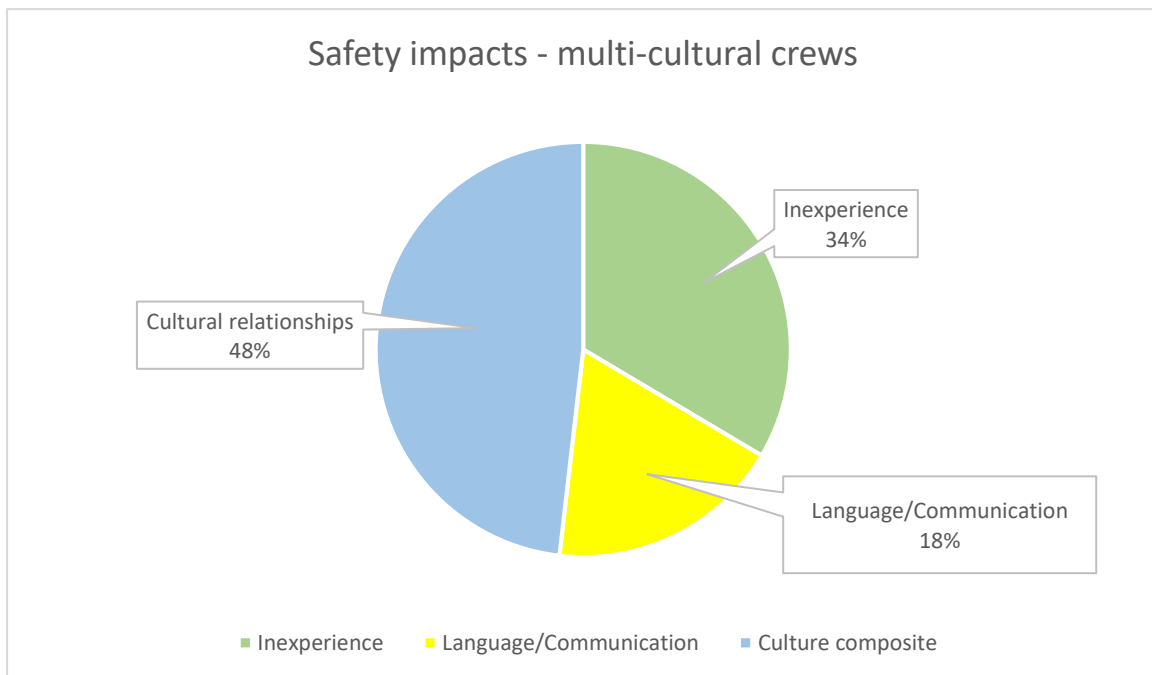
Figure 8: Safety impacts - nationality

Cultural relationships

Respondents reporting on the impact of stable and fluid crewing related to nationality generally. They recognised incompatibilities between different nationalities, which did not always foster conducive relationships necessary for teamwork and safe on-board practice. This concern distilled down into an issue of trust (or lack of trust) about someone of a different nationality and their ability to do the job. The following quote provides an example.

"*This is totally depending on the person involved, some you trust, some you don't believe. I had Filipino officers on board and also Polish engineers, which I would have to check, as the first ones did not comply and the second ones, I was not sure if they completely understood the English instructions.* Filipinos *say yes, because they believe that's what you want to hear and have to be told everything what to do, the same is for East-Europeans who are not used to act[ing] without specific command.*"

(Manager 28)

Vessel specific knowledge

Vessel specific knowledge and skills are maintained and further developed from work experience on board. Stable crewing develops familiarity and understanding of a specific vessel type and the equipment and procedures needed to maintain it (and the vessel) are honed over time.

Maintenance

There is significant documented evidence from accident investigation reports that poor maintenance and procedures directly impact on the safety of personnel and the vessel itself. According to Lloyd's casualty statistics (2007-2017) machinery damage and engine failure are consistently in the top five causes for total loss maritime casualties. Further, there are regular reports of accidents and incidents involving both personnel and vessels where procedures have not been followed, either through lack of knowledge or poor practice.

The use of stable crews familiar with their vessels was seen as a major benefit with respect to the way in which a vessel is maintained. Stable crews can improve ongoing maintenance, alongside developing a good understanding of the company and shipboard planned maintenance systems. Knowing what needs doing, which jobs are outstanding, and the processes required to complete tasks are key to ensuring continuity and safe practice.

Maintenance was seen to improve and become more consistent when a stable strategy was in place, providing there was good leadership. The downside was the potential for one rotation team to be more proactive and invested in their responsibilities where the other had little interest beyond doing the bare minimum.

> *"A stable top team should result in better upkeep of the vessel as the team will know the history of the vessel and its maintenance issues."*
>
> (Seafarer 27)

> *"Vessels are very individual and complicated.......knowing that this is 'your' vessel means that maintenance is less likely to be left for the next guy as you'll be the one running into the consequences of poor workmanship. Also, knowledge of a vessel can speed up maintenance tasks many [times] and increase productivity hugely."*
>
> (Seafarer 29)

Motivation

A key point raised by many respondents, was the need to consider the optimum time spent working on the same vessel (ranging from two years to five years) following which complacency may set in. Further consideration of potential personality and nationality conflict was highlighted as it could result in demotivation of crews and potential for poor working practices and in turn safety standards.

> *"Persons on a stable ship appear to be more focused on the maintenance as they treat it like their home and know they can't just go to another ship that they need to maintain the upkeep."*
>
> (Management 24)

However

> *"… if a team remains in place for a long time, complacency sets in and deep-rooted problems can develop. New blood is often useful at identifying issues that a long-established team may have overlooked/ignore."*

(Seafarer 27)

> *"….remaining on one vessel for a period breeds familiarity and laziness."*

(Seafarer 29)

Communication

STCW 95 identifies that communication and language skills are of great importance for maintaining both safety of life and property at sea. Within the ISM Code there is also a requirement for a common language of communication on board a ship. Where there is a large multicultural crew, English is often used as the common language on board. However, within multinational crews, sub-groups may form amongst people who share the same native language. Understandably when these crew members are working together, there is a tendency to revert to their own language. This tendency can exclude relevant people from important discussions, thereby compromising safety through lack of full disclosure. It has also been noted that in crisis situations, people will panic and revert to their native tongue (Pike *et al*, 2016).

Various reports from the investigation undertaken after the Costa Concordia disaster, showed that the crew, which comprised of 46 different nationalities, used Italian as the 'common language' on board. Communications during the incident were deemed 'chaotic'. The fact that the Indonesian helmsman struggled to understand orders given in Italian may have resulted in a delay of orders being followed, leading to the subsequent catastrophic grounding. Poor communication can also go beyond issues pertaining to safety and can lead to crew members feeling isolated and even ostracised as they cannot engage in everyday discussions with their fellow crew members.

Other communications issues may be based on cultural norms. Some nationalities have a tendency to say 'Yes' no matter what, because they feel it is a failure to admit they do not understand an instruction. Others may appear to be belligerent and will question every instruction, when this is just a trait of their nationality or even personality.

From a safety perspective, knowing your crew well and being able to communicate clearly in order to account for nationality differences, is a major benefit.

> *"Cheap foreign labour often creates massive language barriers……… and conveying instructions to them can become difficult and often impossible. Ship owners don't care about this. Money over safety."*

(Management 22)

"Cheap labour and poor English can be fatal or disastrous."

(Management 22)

"Good crew 'pairing' works well when each member knows how the other will behave and react."

(Seafarer 24)

"Common working languages are easy to put in place on paper"

(Seafarer 17)

It is also vital that good communications exist between the shore and ship to enable clear understanding by both parties of any issues and requirements. Smooth communication between both ship and shore can help engender greater understanding of the issues facing each other, which in turn helps to avoid possible conflict and misunderstanding.

Shore side management needs to be fully cognisant and supportive of crew competence and training requirements. Sadly, today much of the onus for undertaking training courses falls to the seafarer. Safety and technical competence come at a cost, but failure is a greater cost.

"Communication is important and the empowerment to intervene and speak up is also very important."

(Management 24)

A relatively new phenomenon in this digital age is the issue of 'over communication'. Information overload is common on board and may occur for example, through the multiple cc'ing (carbon copying) of emails from the office, with information which may not always be relevant to the job. This can put an additional administrative burden, on the top four senior officers in particular, where prioritising what is essential to the job becomes another pressure of ship operation.

"I believe that the ship staff suffer from information overload from the office. Every day they are receiving emails with industry updates and new company procedures."

(Management 16)

Safety and competence summary

When considering stable and fluid crews there are many influencing factors, with some vessels and trades seeing very clear benefits to implementing stable crewing. Evidence from the research clearly indicates that from a safety and technical perspective, the benefits of stable crewing outweigh the burdens for both the vessel and the crew on-board.

Benefits	Challenges
Provides familiarity with procedures enhances operational efficiency.	Complacency – can set in if *'familiarity breeds contempt'*.
Provides better environment for knowledge and understanding of a vessel to be developed and improves the continuity of vessel maintenance.	Time on ship and rotation requires careful management. A & B team may not be equal and could approach the 'job' differently.
Encourages smoother communication and increases familiarity of crew behaviour. Particularly beneficial in high stress situations.	Nationality conflict and communication issues with different native languages on board can occur.
Develops stronger relations with shore side counterpart.	Creates open dialogue and trust may not occur, if a particularly hierarchical / or a 'tight' senior crew are isolated.
Fosters ownership of the vessel and helps creates a safety culture environment.	Creating and maintaining a safety culture on-board can be challenging.
Supports a team spirit and company loyalty.	Potential for personality conflicts (from more than one voyage with the same people).

Table 2: Benefits and challenges of stable crewing

Well-being

Crew well-being is essential not only for the individuals concerned but for the impact it can have on safety and vessel performance. Indirectly, these outcomes will have positive financial implications. As discussed in the 'Background' section of this report, there are many contributing factors to positive mental health and crew well-being. The research highlights a number of these in the section below.

Mental health

Andrei *et al*. (2018) state that crew stability within the Merchant Navy is recognised as a strategy which improves seafarers psychological well-being and can reduce symptoms of poor mental health. The World Health Organisation includes the concept of resilience within its definition of mental health and being able to contribute to 'his or her community (WHO, 2014). The following quote supports this.

> *"Crews that [are] more well known to each other tend to have better working and social environment on board."*

(Interview 20)

Crew wellbeing & mental health

Mental health is currently a global topic of interest and concern with growing numbers of individuals identifying with mental health issues. This current focus is also recognised within the shipping industry. Crew well-being is essential for the individuals concerned and has an impact on safety and the vessel performance; Indirectly, these outcomes will have positive financial implications.

As discussed in the 'Background' section of this report, there are many contributing factors to positive mental health and crew well-being. Figure 9 shows the key areas that the survey respondents identified as areas that had a negative impact on mental health. Elements of the shore management of seafarers and the on-board culture set by the leadership of the top four officers, contributed heavily to both positive and negative mental health outcomes.
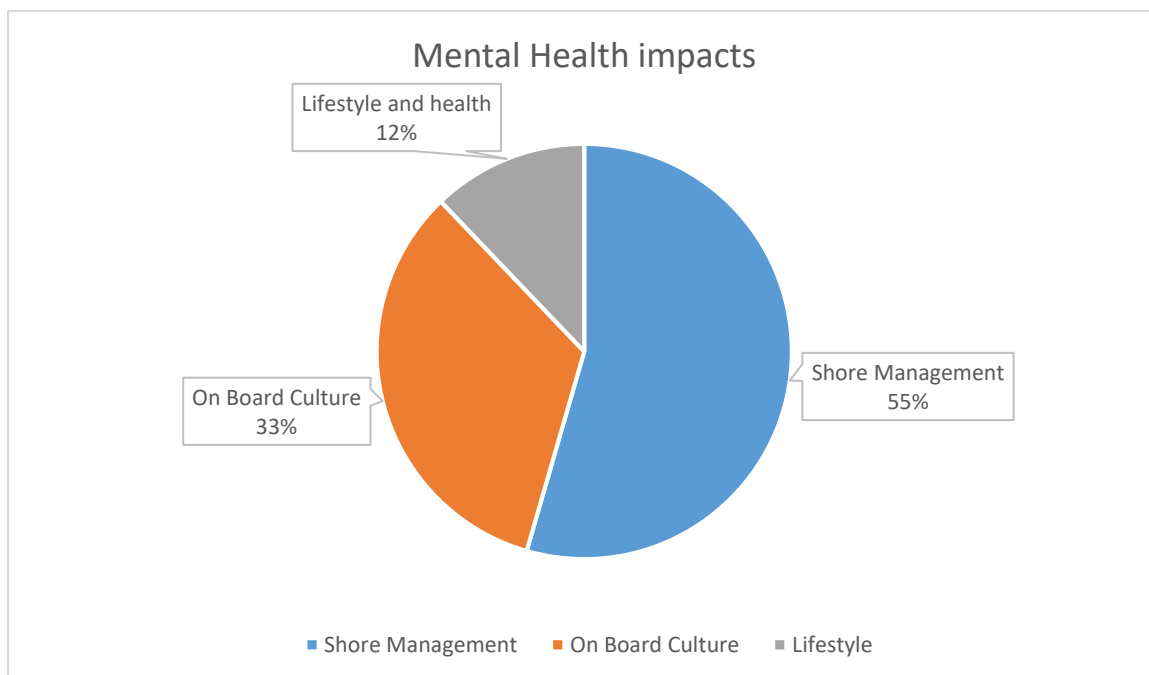
Uncertain dates – joining and leaving a vessel

The research showed that one of the key contributing factors affecting seafarers' mental health is the movable dates that often surround shore leave. This can be particularly difficult for those with family or other key events to attend. Lack of commitment to a shore leave date can be highly demoralising and can significantly impact on the seafarer's attitude and performance whilst still on-board. For example,

> *"Fleet morale. Knowing when you will be joining and leaving a vessel well in advance is of huge importance for morale."*

Shore leave uncertainty has repercussions for crew morale on-board; with crew unable to make fixed plans. The uncertainty of travel plans, income and the general support from the seafaring family member, can also negatively affect family relations.

> *"Predictability of employment, particularly when planning family events."*
>
> (Seafarer 23)

Although stable crewing does not completely eliminate the unpredictability of shore leave dates moving, there is less chance of it happening, as back to back manning schedules can be planned well in advance. When crew are unsure of what is expected of them due to the constant change of senior crew and the different ways in which these individuals influence the on-board culture, it can be immensely stressful. Additionally, when your fellow crew are frequently changing, you are less likely to take time to get to know each other or spend time together, further increasing the social isolation that seafarers now experience.

> *"People develop a bond between each other; they know the working style of each other."*   (Seafarer 3)

However, some seafarers find the flexible nature of contract dates can suit them, particularly if there are no family commitments and/ or a need to work for significant periods of time in between short trips home. If money is short, the opportunity to reduce leave, increasing time at sea and the ability to earn more, may be preferred.

> *"Seasonal issues, seafarers wanting to have flexible contracts."*
>
> (Survey 11)

On board culture

On board culture (or way of life) is defined by the established hierarchy on board and the actions and expectations of those primarily occupying the top four senior positions[7] on a vessel. It is those with senior roles, whose leadership and management styles have the primary influence over the culture on board. The positive and negative behaviours which they demonstrate directly influence the standards, motivation, attitudes and performance of the crew (Pike *et al.,* 2019). There are many demands on senior officers on board to supply a constant information flow to shore based stakeholders (demonstrated in Figure 10). This puts additional pressure on the daily management of the crew and ship operations whilst at sea, which affects effective leadership and management.
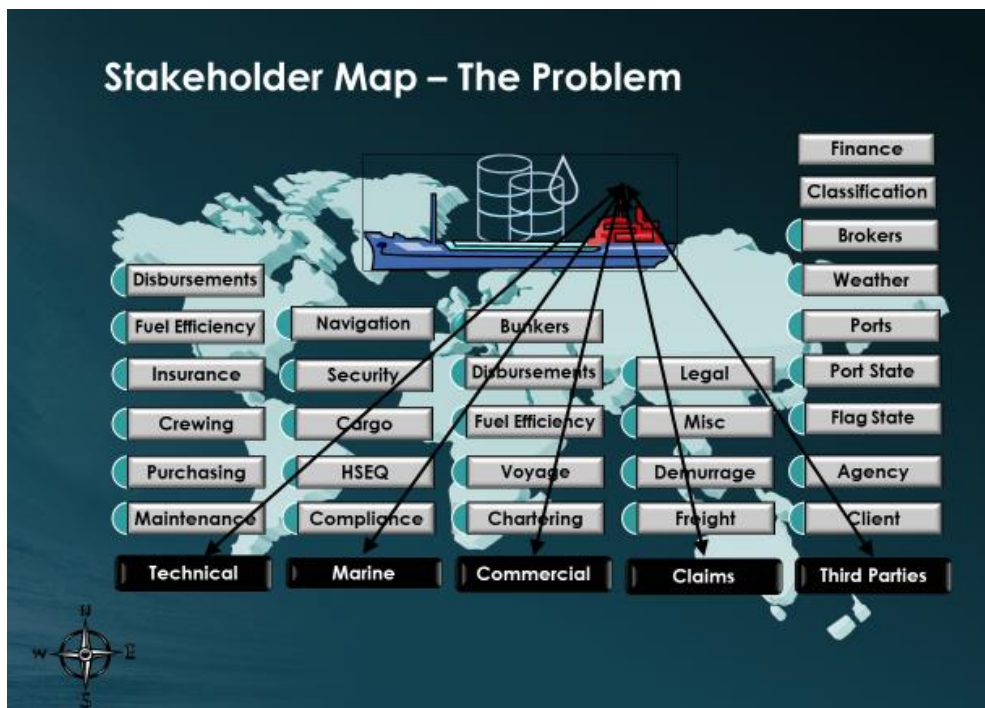

Figure 10: Pressures on senior officers

(Cardinal Point Marine, 2019)

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[7] The top 4 senior positions refer to the Captain, First officer, Chief engineer and the Second engineer

Whilst recognising these pressures, leadership determining the on board culture needs to be conducive in creating an environment where safety and well-being can be maximised. The shore management team has additional influence over the on board culture and the greater the involvement from shoreside, for example, through the induction process, the greater the impact on the culture on board. Ultimately, if the on-board culture is not appropriate, the beneficial impacts of either stable or fluid crewing will be negated. The following quotes support this.

> *"If the messages from the senior leadership are consistent and there is no allowance for poor behaviours or attitudes and not following the rules, then slowly but surely people get it."*
>
> (Case-study 1)

Effective leadership and management of multi-cultural teams onboard is often lacking in modern seafaring and is necessary in order to promote a developmental culture and reinforce training. This on-going development is demonstrated in other industries, such as aviation and the National Health Service, where proficiency in both technical and non-technical ability is a requirement for leading teams within safety critcal environments.

> *"Stability of top 4 can bring a good culture on board, but it does depend on the command."*
>
> (Seafarer 27)

> *"A poorly motivated Master or C/E [chief engineer] will cause grief in either scenario [fluid or stable]."*
>
> (Seafarer 34)

One of the benefits of having a stable top four is that they become familiar with each other and gain an understanding of one another's strengths and weaknesses. This is helpful in emergency response situations and familiarity with the vessel positively impacts safety. Strengthened understanding and familiarisation of a vessel can lead to shorter hand over times.

> *"you know the ship, you've got some buy in, you want to keep your ship looking good, you know you are coming back…."*
>
> (Case study 1)

> *"People develop a bond between each other they know the working style of each other."*
>
> (Seafarer 3)

> *"Know each other's strengths and weaknesses, able to rely on each other and trust that the outcome of any situation will be a positive one."*
>
> (Seafarer 31)

Optimum time for stable crewing

The research indicated that the optimum time respondents recommended to keep the top four officers on board together varied depending on the stakeholder group, with seafarers putting forward the highest time, averaging 2.5 years, followed by ship owners and managers averaging two years (Figure 11). Variations in the data responses were subjective and depended on the length of the average voyage time experienced in relation to the top four officers' rotation pattern, and the respondent's own experience of how this played out. It was also acknowledged that

"[optimum time is] Very subjective and fully depends upon the 4 individuals [top 4 senior officers]. Companies should carry out annual interviews with senior officers and their views on this should be sought (as well as on other matters)."

(Seafarer 18)

Some respondents offered different optimum times depending on different job roles. For example,

Respondent, Manager 32, thought that the Captain, Chief Engineer, Bosun and the Cook should work together for a minimum of five years on board with no maximum time limit. Respondent, Manager 1, felt that the optimum time was two to three years but only for the Master, Chief Engineer and Electrician. Other respondents were more specific about the stable rotation patterns for the senior top four officers, for example:

"They should be together as much as possible, preferably rotating on a 1:1 basis. Then, after 18-24 months changes should be made ensuring the senior officers are paired with other senior officers..."

(Manager 17)

Implementing an optimum time for stable crewing was thought to provide adequate time for the following:

"… [the] development of relationships, understanding of work ethics and preferences. Additionally, allows for implementation of practices and sufficient time to observe results of that. The maximum time then allows for bits of good practice to be disseminated across other ship in the fleet"

(Manager 23)

Another respondent has added that working within an optimum time limit can help engender familiarity and trust which helps to promote trust between crew and officers and more efficient ways of working.

"Over a year leads to huge familiarity on the vessel meaning other crew can ask and get an accurate answer easily."

(Manager 36)

However, from the seafarer's perspective there was one train of thought that suggested there was no optimum time limit and that working together should rather depend on productivity on board.

"...as long as the team work well together and continue to do so."

(Seafarer 31)

Another seafarer indicated that circumstances beyond their control, such as sickness, will mean that it would be difficult to implement an optimum time on stable crewing.

"No limit [for an optimum time] as promotion, sickness, personal circumstances, ship disposal etc. will cause a split but it would normally be one at a time giving the replacement chance to fit into the team."
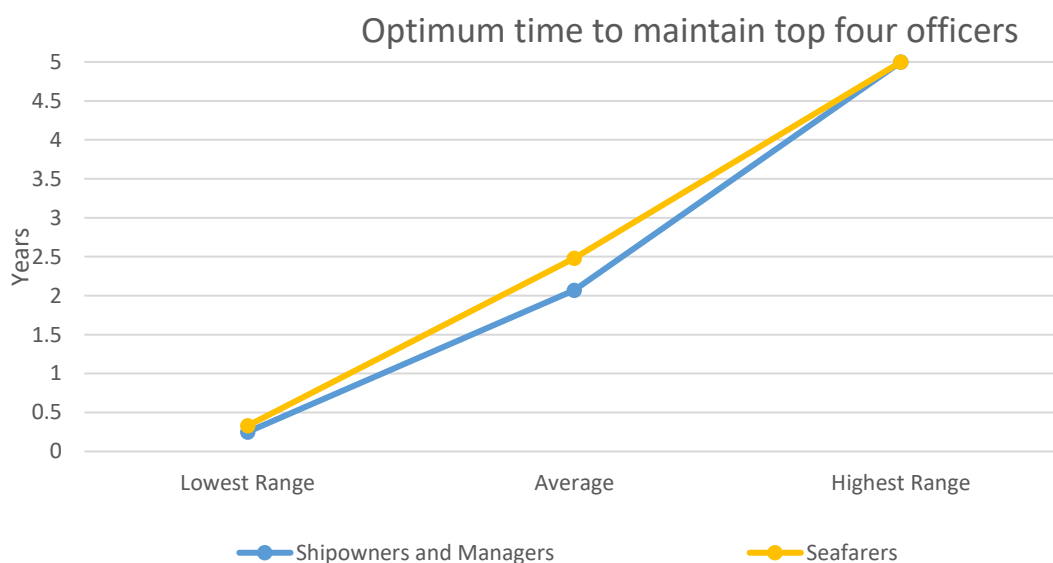
(Seafarer 26)

Figure 11: Optimum time for stable crewing, top four

Complacency

The research data showed clear evidence that if team stability exceeded an optimum time, negative impacts would start to take place, with complacency setting in.

"a couple of years, after that time [optimum time] the team becomes stale and also people begin to get on each other's nerves."

(Seafarer 6)

An attitude of 'this is how we've always done it' can set in. This increases risks and can compromise safety.

> " ….they've always done it their way, and don't like the inevitable changes if there's a better way."
>
> <div align="right">(Seafarer 11)</div>

> "[The crew can become too] resistant to change and accepting [of] the status quo."
>
> <div align="right">(Seafarer 13)</div>

The research indicated that by keeping teams together for too long there was also a risk of normalising deviance. For example, taking a safety risk could become the norm on a vessel if dangerous behaviour becomes accepted or unchallenged. This may happen

> "Localised deviation from company standard procedures."
>
> <div align="right">(Seafarer 23)</div>

The element of complacency was one of the key components that research respondents noted in favour of fluid crewing, indicating that a pair of 'fresh eyes' was important in keeping or raising safety standards and challenging behaviours that had become the norm because they had not been challenged.

> "…avoid blindness to technical faults of the Engine installation (like it has always been like this….??!!) So rotating and fluid interchange of personnel, also to avoid fall outs."
>
> <div align="right">(Seafarer 28)</div>

Although the data showed that the optimum time to keep a stable top team on board varied, the on board culture, determined by leadership and management of the top four senior officers could make the vital difference to a good or bad voyage and highlighted the on-going requirement to adequately train senior officers in leadership skills.

Work relationships

Vessels are manned by groups of seafarers who are required to perform as teams. Team working is often defined as:

> "A group of individuals working collaboratively to achieve the common goal."
>
> <div align="right">(Business dictionary, 2019)</div>

Understanding the stages a team goes through as it develops and progresses to high performance is especially important in the context of team fluidity and frequently changing

crew (within a team). According to Bruce Tuckman's Team Development Model (1965), there are four fundamental stages that a team will go through as it evolves to high performance: Forming, Storming, Norming and Performing.

At the outset a group of individuals come together; Tuckman called this the 'Forming' stage. People are typically a little anxious, reserved and polite until they work out what is expected of them. The next stage is called 'Storming', as individuals get to know each other, there is a vying for position, pushing against the boundaries and conflict often occurs. Differing working styles can cause friction within a team and this phase can feel uncomfortable with some team members left feeling stressed. Individuals may not feel that there is anyone they can speak with, particularly as they will not have had time to develop strong relationships with colleagues during this stage. If the team remains together and differences are resolved, the team moves into the 'Norming' phase, where appreciation for one another's strengths, socialising together and supporting each other will occur. Finally, reaching the 'Performing' stage, structure and processes are in place and the team members work seamlessly together. Work appears to require less effort and it can feel like you are part of the 'dream team'.

Tuckman suggests that when a team member leaves and another joins, the team reverts to the first stage of 'Forming' and the cycle repeats. Therefore, it is possible for example, that with a previously high performing team, with a change of command and different leadership style and culture, that this can cause the team to become stuck in the 'Storming' phase, perhaps struggling to find common understanding on the previously agreed ways of working together.

Tuckman's model shows that if a team is stable for long enough and reaches the 'Performing' stage, a supportive, 'team spirit' environment is developed alongside a sense of belonging. Tuckman's model highlights the following points which are meaningful for stable and fluid crewing. These points are directly supported by the research.

- Forming relations at work can provide a seafarer with someone to talk to, in turn this can reduce stress and risk of isolation.
- Trust develops between crew once they have passed the 'Storming' phase and they are more able to focus on the tasks and look to improve efficiencies.
- If relationships break down between, for example, the top four senior officers, the crew may dread going back to the vessel knowing the friction they will have to face, in turn putting stress on the junior crew.
- It is recognised that breakdown in communications are the most common causes of conflict and tensions in the workplace and are often seen during the 'Storming' phase. Frequent changes of crew will put the team back to forming and storming.
- As relations on board improve, so will the communications.
- If crew know and trust their leader, they are more likely to communicate upwards, which engenders improved safety outcomes.
- However, if the top four become a clique, they can 'distance themselves' and reduce the upward flow of communications.
- Some leaders may lead through fear, which tends to prevent crew from speaking up; this includes the shoreside staff.

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Communication

Le Goubin (2012) recognised the importance of good communication between the master and officers and the need for effective leadership in taking charge of their teams. Good communication and trust, which develops over time, are key elements in promoting safe practice and crew well-being on board. It also takes time for crew to feel that a senior officer is approachable and for a good working relationship to develop. Having a stable top four officer team in place alongside strong leadership skills, is more conducive to the development of good working relations and a better reporting culture where safety concerns can be aired without the fear of recriminations. The relationship between the master, shore and charterer also needs to be developed over time and good communication is, again, vital to this process.

> *"It is important to maintain authority and respect however, also important that you are approachable, and crew can come to you with concerns."*

(Manager 24)

> *"Communication is important and the empowerment to intervene and speak up is also very important."*

(Manager 35)

Accountability, performance and trust

The research showed that accountability, trust, increased crew ownership and responsibility are developed within a stable crew environment, often meaning that greater care is taken over maintaining the vessel, as the top four senior officers will be returning to it. Individual accountability is also likely to improve, which means that standards, and consistency of applying them, are raised.

> *"A sense of ownership of the vessel and pride in their work".*

(Seafarer 27)

> *".. our employees get a special feeling with their working environment, with their vessels, with the tools they are using… they handle their stuff with care because they are well aware that they have to return…".*

(Interview 20)

> *"And when things go wrong crew can't blame someone else, because they were the ones on board previously too."*

(Case-study 1)

With the knowledge that the top four senior officers are returning to the same vessel and handing over to the same opposite number, the time required for handovers is significantly reduced, as demonstrated by the quotes below.

"… if you get the same crew on the same ship and they know the ship, they're going to make fewer mistakes, they're going to care about the ship and I think the standard of maintenance and, literally the condition of the fabric of the vessel, is going to be better with crews who think of it as home."

(Interview 9)

"..you can reduce the hand over periods, so if the two Masters are changing over, it's not like a new Master is coming and you have to give him time to familiarise himself which could require an overlap of 7 days …."

(Case-study 1)

Mentoring and progression

Investment in the crew has positive implications for retention within the industry. Crew stability promotes this investment in people and sees it pay back over time in terms of reduction in recruitment costs, shorter hand-over times, and the greater sense of well-being and ownership that crew feel when valued. Mentoring, supporting training and personal development should be part of the investment made by shipping companies, and is particulary beneficial within a stable crew environment which lends itself to the development of work relations and a safer on-board culture (Pike *et. al*, 2019).

Where mentoring schemes or management and leadership training have been successfully implemented, organisations have been able to reduce expenditure related to safety, health, well-being and crew turnover. Cost savings where, for instance, fewer off-hire and vessel damage instances occur, can be made. Mentoring can be a long-term investment which ideally works best within a stable crew environment where mentor and mentee relationships have time to develop and flourish.

Stable crewing may provide greater opportunities to develop relationships, and the desire to invest time and energy into training. However, the data showed that there may be a risk associated with this investment where individuals may be held back from leaving as they have become too much of an asset to let go.

> *"..the Captain's desire not to lose the chief officer or second officer that he or she really likes is going to breed a degree of selfishness, so bizarrely it could hinder career development….by the same token you're going to care more about them so you're more likely to mentor them…"*

(Interview 7)

On the positive side, investment of time and resources into mentoring can provide demonstrable benefits to safety on board and crew welfare (Pike *et al.*, 2019).

Promotional opportunities

A key area of concern regarding stable crewing relates to promotional opportunities when the top four officers are working back to back. There tends to be less movement between jobs in this situation, as the opportunity to move up the ladder is significantly decreased.

The opposite may be expected within a fluid crewing environment, as one recruiter mentioned as a benefit of fluid crewing.

> *"Room for promotion and improvement."*

<div align="right">(Recruiter 4)</div>

One company spoke about promotions ideally taking place on a vessel that the individual was already familiar with.

> *"…they get promoted on the ship that they are already on – you've been Chief Officer on the ship, so you know the ship and then they get promoted….. he knows the ship, he knows the people and you know he has got less to worry about as a Master"*

<div align="right">(Case study 1)</div>

However, it can be hard to find the opportunities for promotion in a stable crewing environment. This points to the use of manning pools within a fleet, so that officers and crews can be mixed within a wider pool, offering greater promotion prospects, but with an element of stability of working within the same fleet and vessel types.

Impact of nationality

Nationality was frequently mentioned in conjunction with different leadership styles and culture. The mix of nationalities on board needs to be carefully considered for the impact it can have on the crew and on-board culture, stemming from varying leadership and communication styles.

> *"There are certain styles of management which stem from national upbringing, often these do not fit well with other nationalities."*

<div align="right">(Survey 38)</div>

Potential language barriers were also mentioned, as was the risk of isolation when there is only one person of a certain nationality on board.

> *"Mixed nationalities often equal social isolation. I've often been the only Brit onboard and it gets very lonely. I'd often be completely unaware of what was going on as I didn't speak Norwegian. Very, very frustrating."*

<div align="right">(Survey 22)</div>

Well-being summary

The research has shown that stable crewing supports an environment where time and investment in people will produce the most benefit for individual well-being and that of the entire crew by increasing standards and performance.

> *"If you've got a stable team, you've got plenty of time to invest in management, leadership, team development, because if you know there's a very good chance you're going to be working together for two or three years or longer, then it's worth investing that time and effort into developing the team into the most effective it can be."*

<div align="right">(Interview 16)</div>

It is evident that there are significant benefits to crew wellbeing when there is team stability for the top four senior officers on board. A stable working environment can provide opportunities to build effective work relations, best practice and high standards. However, regardless of the manning strategy adopted, the significant influence the leadership has on the culture aboard cannot be underestimated. Poor leadership whether fluid or stable can have a detrimental effect on crew wellbeing. Organisations, recruiters and the wider industry need to provide greater support to the leaders afloat.

External factors

Figure 12 shows the various external factors that shipping companies need to be aware of when considering their crewing structure. These factors include global and country specific regulations, charterer impacts and the global market conditions at the time of consideration. Crew availability, nationality and the agency costs and recruitment process, all have a part to play. Figure 12 highlights the number of times these external factors were mentioned by survey respondents in relation to stable and fluid crewing, with compliance and regulation noted to have the greatest influence on the crewing strategy.
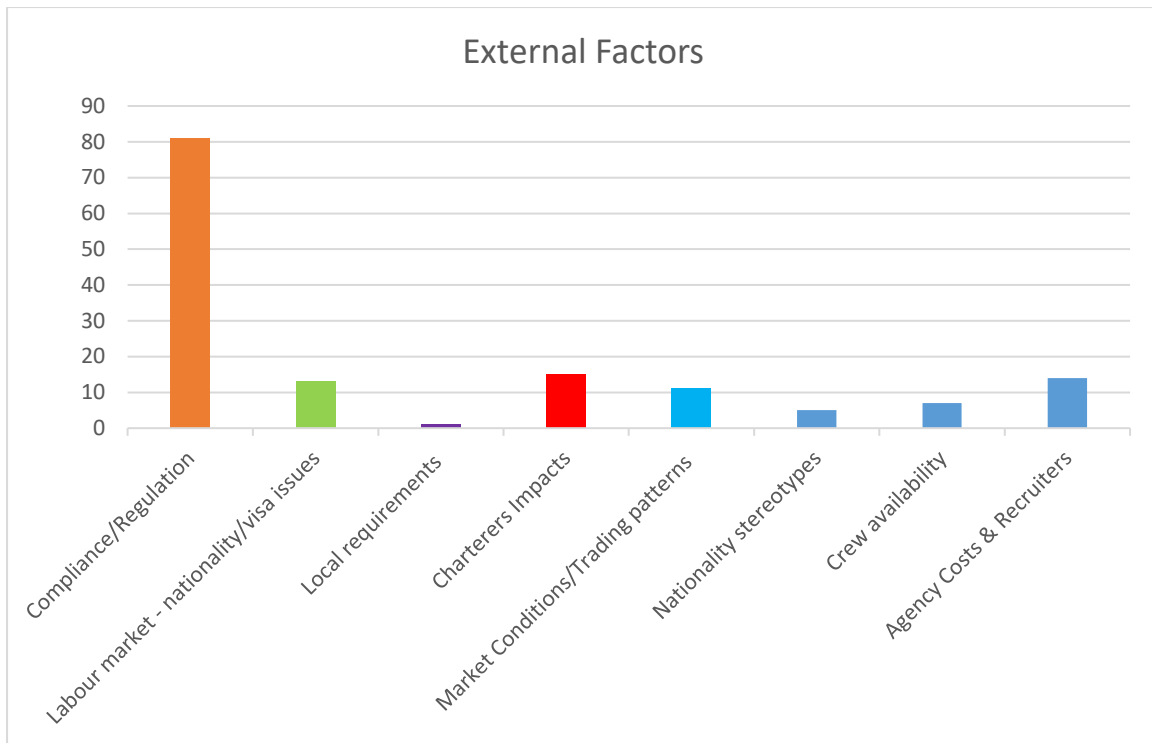
Figure 12: External factors

Some of the external impacts (Figure 12) such as audits and TMSA *[Tanker Management Self-Assessment]*, associated with compliance and regulation, were mentioned by a ship owner/manager as underlying causes for having to terminate their stable crewing strategy.

> *"Unfortunately, there are a lot of factors which destroyed our stable team policy such as: demands of different inspections: oil majors, different standards, TMSA, etc... Recommendations not to replace the crews at once, in spite of the fact that [the] crews [were] working on board this vessel for years."*

> (Manager 3)

Another manager/ship owner responding to the survey noted that there were other external factors that needed to be considered when conducting crew changes within a stable crew. These included

> *"…duration of voyages, trades, availability of crew, rotation scheme, unexpected circumstances as illness/family issues/crew matrix etc."*

> (Manager 6)

The main advantages of stable crewing are summarised in Figure 13, with the high-level conclusions, including crewing influencers such as external factors, summarised in Figure 14.

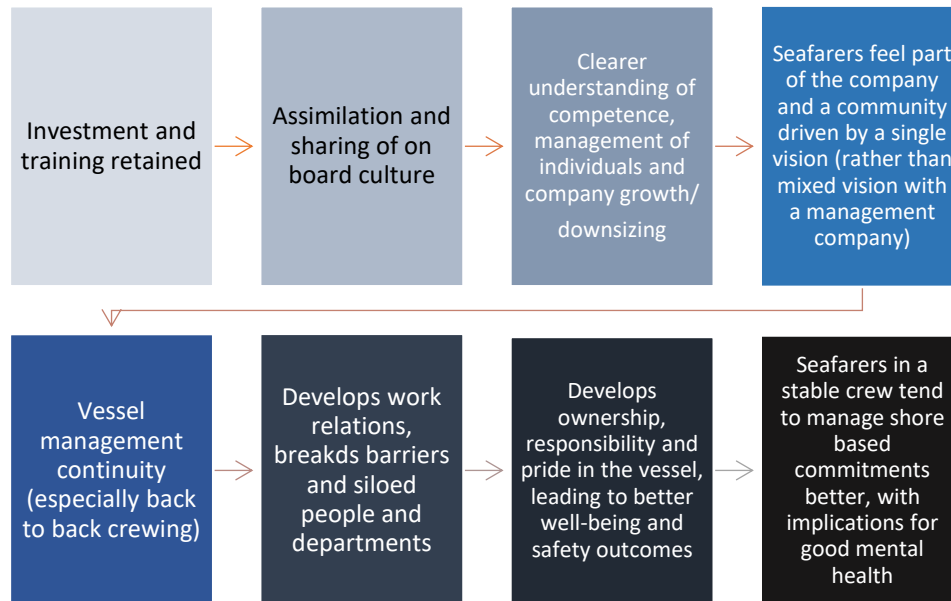# Summary of advantages of stable crewing

Figure 13: Adapted from Payne, 2019: Summary of stable crewing advantages

Figure 14 summarises the high-level conclusions from the research and the primary influencers of crewing strategies which can be followed from external factors through to outcomes that impact on finance, well-being, safety and competency.

External factors are those that shipping companies have less control over but nevertheless are influenced by. These factors include market forces, the labour market, the local regulations in a particular country including Port State Control, the charter's requirements and the trading patterns that a vessel operates within. Legislation and border control affect whether seafarers require certain visas to enter countries.

Two other significant influencers, which have been previously discussed, include the on-board culture set by the top four senior officers and nationality which influence many areas on-board. Figure 14 shows that these influencers of crewing strategies then have the following four high level outcomes which affect finance, wellbeing, safety and technical competence.
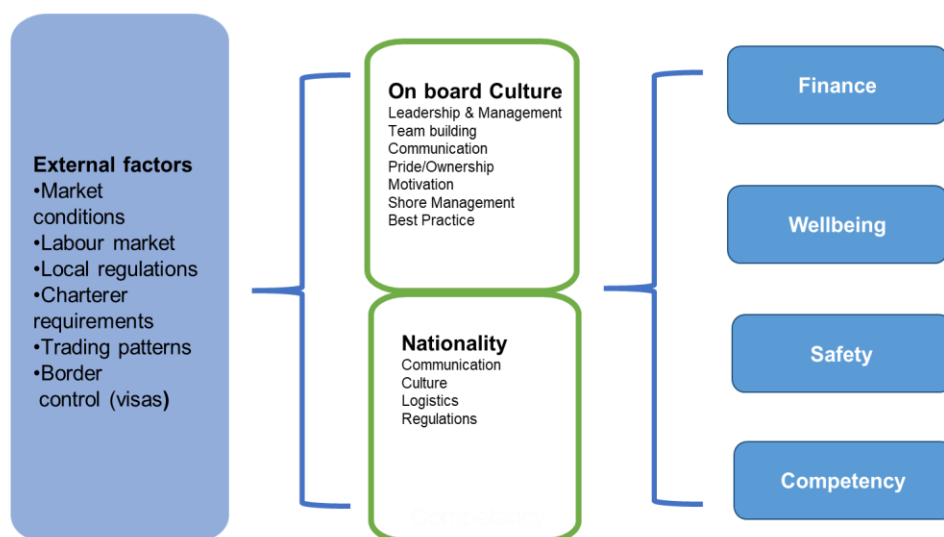
Framework of research findings

Figure 14: Framework of research findings

Crewing strategies

The research has shown that crewing strategies can vary substantially and that there are many influencers of these which include:

- Multi-national crews
- Multiple vessel types
- Different employment contracts
- Different client requirements
  - Matrixes
  - Charter's requirements
- Changes in fleet size
- Different contract lengths
- Crewing costs – largest single operating cost

The Best Practice section of this reports highlights these areas for consideration when determining the most appropriate strategy for a company to adopt.

Best practice

This section identifies the best practice highlighted by the data in two areas: firstly, to support decision making in selecting an appropriate crewing strategy; secondly, in how to effectively implement a crewing strategy.

Best practice: selecting a crewing strategy

- Review the market conditions for vessel type and availability of crew, to assess the practicality of adopting a specific crewing strategy.
- Define the objectives for adopting the crewing strategy and identify valid measurements that will enable success to be accurately and consistently measured.
- Involve all the relevant areas of the business in the strategy decision, to obtain a balanced view and to understand the implications of the decision.
- Consult relevant crew to assess the potential response to the strategy and identify potential implementation issues.
- Consider implementation options, for example, testing the strategy with a pilot group of ships; implementation by fleet or vessel type and other areas of concern.
- Involve the top four officers in planning the implementation of the crewing strategy.
- Involve the top four officers in finance decisions affecting the ship in order to gain buy-in and commitment, and ownership of the strategy.
- Strengthen the leadership and team-building skills of the top four officers.
- Consider the impact of the proposed crewing strategy on the change in relationship between the office and the vessel and how this can be managed for the best transition.

Best practice: implementing a crewing strategy

- All departments within an organisation should be involved for maximum buy-in and the ultimate success of the strategy's implementation. Communicate the purpose, objectives and details of the implementation plan to everyone involved in crewing.
- Consistently use the defined measurements to assess the impact of the chosen strategy.
- Involve all relevant areas of the business in reviewing and interpreting the data related to the crewing strategy so that informed changes can be made if necessary.
- Assess the performance of the top four officers over a number of voyages to identify trends and issues and areas for development or change and sharing of best practice.
- Identify any additional leadership skills required by senior officers and ensure training is provided to address the necessary areas.
- Monitor communication between the ship and the office to assess the impact that changing the strategy has on working relationships and cooperation. Issues should be addressed immediately as the office and shore relationship, and the management

and leadership of the two, were identified as key factors impacting on the success of any crewing strategy.

- Conduct a review of the impact of the crewing strategy and provide feedback to everyone involved.
- Develop a culture of mentoring and on the job training to support communications and standards on board and improve relationships.
- Obtaining crew feedback after each voyage was a procedure implemented by one of the research respondents in their shipping company. This allowed regular assessment of the company culture and the organisation's procedures to be examined against the well-being of the crew and the safety outcomes of each voyage. Crew were contacted immediately after leaving the ship to ask for anonymous feedback which was then assessed and acted upon to improve the on-board operations or issues that the crew were having. Best practice was shared amongst the fleet. This could be a role conducted by the superintendent who could sail on board for several days to observe both good practice and areas for improvements. This initial investment would provide long-term benefits including crew retention, morale and the reduction of incidents, which significantly outweigh the initial costs.
- Maintaining a stable four top officer team within a fleet manning pool could provide the solution for combatting complacency and ensuring that a 'fresh pair of eyes' are brought into the team mix. This still allows the crew the opportunity to develop good working relationships that engender familiarity, trust and ownership.

Conclusions

The following conclusions have been made based on the research findings.

1. The research shows that there are some clear, measurable benefits to stable crewing for safety outcomes, crew well-being and long-term financial performance, although this is not applicable to every shipping company. One size does not fit all, and each shipping company will have their own set of conditions to consider when planning the best crewing strategy, based on their specific requirements such as vessel type, fleet size and trading patterns.
2. The use of consistent data and metrics is necessary to evaluate the success of changing manning strategies. Without these it is difficult to accurately measure cost savings.
3. Many companies are not collecting reliable data over time to inform their crewing strategies. The metrics used may be consistent, but the research has shown that unexpected events, such as unscheduled engine maintenance, can impact the statistics and generate unreliable data.
4. Stable crewing often means that new relationships between ship and shore are developed. Crew going back to the same vessel have an increased sense of ownership and responsibility, which can promote better communications which is reflected in their relationship with the office. The value of the 'sense of belonging' has positive repercussions for crew wellbeing.

5. Stable crewing reduces handover times and increases crew retention however, promotion opportunities maybe restricted by the lack of 'movement' amongst the top four senior officers and especially if stability extends beyond this to other ranks.
6. Stable crewing can reduce recruitment and training costs.
7. Familiarity with procedures on board was shown to strengthen the on-board safety culture.
8. Reducing staff turn-over through maintaining stable crews offers opportunity to develop stronger mentoring relationships on board, build trust and extend support networks.
9. Complacency associated with stable crewing has been shown to become an issue over time if stable teams exceed their optimum time to stay together. The optimum time, suggested by the research, was approximately two and a half years, beyond which can lead to complacency, the normalisation of deviance and compromise to safety standards.
10. The benefits of implementing a stable or fluid crewing strategy were directly linked to leadership behaviour among the top four senior officers This has significant impact upon the on-board culture, with repercussions greatly influencing crew welfare and safety.

Recommendations

Further to these conclusions, the research team make the following recommendations:

1. Work is needed to develop measures that accurately assess the overall performance of a vessel and the impact of the crewing strategy adopted, so that decisions concerning crewing are better understood, implemented and evaluated.
2. Investment in on-going leadership and management development for all those responsible for leading teams on board and ashore is recommended to help establish the best working and safety cultures for whichever crewing strategy is in place.
3. Collaboration, between industry leading shipping companies that are operating stable crewing and working to improve safety and well-being standards, is recommended to share information and best practice to others.
4. The research offers conclusive evidence that stable crewing can improve safety, well-being, and over time, financial outcomes. However, as the report mentions putting hard figures against the cost benefits has been problematic due to inconsistent data sets provided by the case-studies and measurements taken over time. Future research, using shipping companies that operate both fluid and stable crewing and carefully defined comparative metrics, should be conducted within the same fleet to generate data of the cost benefits of different crewing strategies.

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