INTERNATIONAL MARITIME ORGANIZATION

E

MARITIME SAFETY COMMITTEE
109th session
Agenda item 19

MSC 109/INF.3
23 September 2024
ENGLISH ONLY
Pre-session public release: ☒

WORK PROGRAMME

Study on the effectiveness and effective implementation of the International Safety Management (ISM) Code

Note by the Secretariat

SUMMARY

Executive summary:	Following the information provided at MSC 107 and in document MSC 108/INF.4, this document provides the report of the Study on the effectiveness and effective implementation of the International Safety Management (ISM) Code, commissioned by the Secretariat.
Strategic direction, if applicable:	6
Output:	Not applicable
Action to be taken:	Paragraph 12
Related documents:	MSC 107/20, paragraph 17.19; MSC 108/21, paragraph 16.26, MSC 108/INF.4 and MSC 109/19/7

Introduction

1 Quality standards, safety management, the human element and safety culture all have a high profile within the maritime industry and feature prominently in the work of IMO aimed at improving performance by focusing on people. The need for improvement in the management and operation of ships, together with the need to create a genuine link between companies and the responsibilities emanating from the operation of ships, including the management of seafarers, eventually led to the development and adoption, in 1993, of the International Safety Management (ISM) Code.

2 The adoption of a new strategic direction on "Address the human element" within the *Revised Strategic Plan for the Organization for the six-year period 2018 to 2023* (resolution A.1149(32)) in December 2021, highlighted, inter alia, the importance of the responsibility and authority of those involved in the management and operation of ships.

3 In this context, the Secretariat commissioned a Study on the effectiveness and effective implementation of the International Safety Management (ISM) Code (referred to hereafter as "the Study") in order to support any possible regulatory action of the Organization in the context of the ISM Code, with a view to responding to the needs of safe, secure, environmentally sound, efficient and sustainable shipping. The report of this Study is set out in the annex.

Objectives of the Study

4 The Study focuses on the assessment of the effectiveness and effective implementation of the ISM Code and its related instruments and associated provisions, with a view to obtaining objective evidence and drawing conclusions on the current relevance of, and difficulties, gaps, flaws or failures relating to, the implementation of the aforementioned instruments within their respective scopes of application, i.e. Governments, ships and ships' crews, and shipping companies.

5 The areas assessed in the Study include:

.1 the current structure of the ISM Code and its related instruments;

.2 the application of a risk-based approach, as part of the assessment to be conducted by companies, as provided in the ISM Code, including the usefulness and effectiveness of this assessment and the establishment of corresponding safeguards;

.3 the human side of management for both companies and seafarers, including:

.1 the linkage between companies and responsibilities emanating from the operation of ships, including the management of seafarers; and

.2 the way authority and responsibility are allocated, interpreted, and discharged by all parties within their respective scope, i.e. companies, Administrations, masters and seafarers, starting with the provision of the necessary resources to run ships effectively and efficiently, from the safety, environmental and operational points of view, taking into account that one of the first actions of management taken by companies is the proposal of their ships' minimum safe manning to the corresponding flag State Administration;

.4 linkage between companies and the discharge of responsibilities emanating from the operation of ships, including the management of seafarers;

.5 contributing factors to, or root causes of, very serious marine casualties, and their linkage with the implementation of ISM-related provisions; and

.6 verification and certification practices.

Arrangements of the Study

6 The Study was based on a multi-method approach and incorporates insights and perspectives from stakeholders representing different fields of the industry, through a combination of quantitative and qualitative data collection intended to ensure that the collective experience of all stakeholders linked with the ISM Code is considered. It should be emphasized that the role and willingness of the various stakeholder groups, including flag State Administrations, port State control regimes, recognized organizations, shipping industry and seafarer representatives, to provide relevant information has been fundamental for the conduct of the Study. In this context, all efforts have been made towards the collection and analysis of quantitative data, including those from analysis of accident reports, to examine trends and identify patterns, as well as insights of stakeholders with long-standing experience in the sector.

7 IMO's procurement procedures have been followed for the selection of the consulting services.

8 A phased approach was undertaken, with phase 1 of the Study commencing in April 2023. During this phase, data was collected, through a literature review, outreaching questionnaires, interviews, and preliminary analysis of some marine casualty investigation reports. Data sources were selected from stakeholders involved in the development, certification, implementation, and compliance monitoring of the ISM Code and Safety Management Systems, including:

.1 flag State Administrations;

.2 recognized organizations;

.3 port State control regimes;

.4 shipping companies, shipowners and their representatives; and

.5 seafarers and their representatives.

9 Following phase 1, a panel of experts carried out phase 2 of the Study. This phase of the Study included a further literature review, focused interviews, a detailed examination of marine casualty investigation reports, supplementary data collection and further quantitative data analysis, including port State control data (ISM-related deficiencies) and ISM Certification data (Safety Management Certificate and Document of Compliance findings).

10 As part of the Study, a peer review of the content of the draft report of the Study by key stakeholders was carried out, aimed at scrutinizing the Study and its results. In addition, a regional activity under IMO's Integrated Technical Cooperation Programme (ITCP), i.e. a regional workshop on the effectiveness and effective implementation of the ISM Code, was co-organized by the IMO Secretariat and the Australian Maritime Safety Authority (AMSA) in Brisbane, Australia, from 23 to 25 July 2024. This workshop gathered industry experts (representatives of shipping companies, classification societies, shipowners, seafarers, and ship managers) and State representatives, and provided additional input to assess the issues and challenges in relation to the effectiveness and effective implementation of the ISM Code. The outcomes of the workshop have been shared with the panel of experts, for their consideration and action.

The report of the Study

11 The final report of the Study is set out in the annex for the Committee's consideration. Whilst the Study was commissioned by the IMO Secretariat, the information contained in the report represents the views of the report's authors[*], the online survey participants, interviewees and the authors of the literature included in the literature review only; the recommendations and conclusions are based on the analysis and comparison of information from multiple sources and it should not be interpreted as representing the views of the IMO Secretariat, or the representatives of any Member States of IMO.

Action requested of the Committee

12 The Committee is invited to note the information provided in this document.

***

[*] A lunchtime presentation of the Study is planned on 3 December 2024.

ANNEX

REPORT OF THE STUDY ON THE EFFECTIVENESS AND EFFECTIVE IMPLEMENTATION OF THE ISM CODE

PANEL OF EXPERTS

Michelle Grech
Margareta Lützhöft
Birgit Pauksztat and
Jörgen Zachau

CONTENTS

PANEL OF EXPERTS

The panel of experts was led by Dr. Michelle Grech, and composed by Dr. Margareta Lützhöft, Dr. Birgit Pauksztat and Captain Jörgen Zachau.

Dr. Michelle Grech

Dr. Michelle Grech, a chartered engineer, has over 25 years' experience working in the maritime domain as a shipyard commissioning engineer, port State control inspector, marine surveyor, maritime human factors researcher and practitioner and now leading teams in maritime safety. She completed undergraduate and post-graduate studies in mechanical (Bachelor) and marine engineering (Masters), and a Doctor of Philosophy in human factors from the University of Queensland, specialising in fatigue and workload at sea.

Dr. Grech currently works at the Australian Maritime Safety Authority, responsible for activities spanning safe vessel operations including crewing determinations, safety management systems, seafarer welfare, marine incidents and safety engagement and education. She also holds the position of adjunct Associate Professor from the University of Queensland and is a frequent guest lecturer and presenter on human factors, systems safety and seafarer welfare in maritime having published extensively in this area.

Dr. Margareta Lützhöft

Dr. Margareta Lützhöft, Professor and master mariner with 13 years of sea time, has a BSc in cognitive science and an MSc in computer science. In 2004, she received a PhD in human-machine interaction. She has held academic positions at Chalmers University of Technology and the Australian Maritime College at the University of Tasmania and is presently holding a position as Professor at the Western Norway University of Applied Sciences (HVL). Her research and teaching interests include qualitative research methods, human-centred design and the effects of new technology, all with a bearing on maritime safety. She has taken part in fatigue at sea studies and teaching human factors to naval architects. She was project leader of HUMANE, a project on the human role in autonomous shipping, and a work package leader in the EU project OCEAN, led by HVL.

Dr. Birgit Pauksztat

Dr. Birgit Pauksztat is a Research Professor at the Nordland Research Institute and a Professor at Nord University in Bodø, Norway. She holds a PhD in sociology from the University of Groningen, the Netherlands (2010). Her research interests are in maritime sociology, social network analysis, and organizational behaviour. In her research, she uses quantitative and qualitative methods to examine how workers deal with job demands and adversities and the role of the social and institutional context in this. Over the last decade, her work has focused on seafarers on international cargo ships. Recent projects addressed seafarers' experiences and mental health during the COVID-19 pandemic, social support, workplace bullying, and SAR preparedness and training. She is a member of the editorial board of Marine Policy, and Vice Chair of the "RethinkBlue" EU COST Action.

Captain Jörgen Zachau

Captain Jörgen Zachau is a Master Mariner with more than 20 years of sea time in various deck officer roles, mostly on roro and roro passenger vessels. He has four years' experience working on floating rigs in the North Sea responsible for onboard safety. Jörgen completed a Master’s degree in system safety and human element from Lund University, Sweden. In 2001 he went ashore and became an analyst and accident investigator in the Swedish Maritime Safety Inspectorate, in which he also held a head-of-unit position and thus took part in the department management group. In 2013 he started as a senior investigator at the Swedish Accident Investigation Authority. Since 2007, Jörgen Zachau has taken part in the Working Group on Analysis of Marine Safety Investigation Reports within the IMO Sub-Committee on Implementation of IMO Instruments (III, previous FSI) and has since 2018 been the coordinator of the related Correspondence Group. He has also performed several international training programs in accident investigation on behalf of both Swedish authorities, the European Union, as well as IMO. Additionally, he has been active in Maritime Accident Investigator’s International Forum (MAIIF) since 2005 and held the chairmanship for the European division for several years.

LIST OF ABBREVIATIONS AND ACRONYMS

BRM	Bridge Resource Management
CEO	Chief Executive Officer
CSR	Continuous Synopsis Record
DOC	Document of Compliance
DPA	Designated Person Ashore
GISIS	Global Integrated Shipping Information System
IMO	International Maritime Organization
InterManager	International Ship Managers' Association
ISM Code	International Safety Management Code
ISPS Code	International Ship and Port Facility Security Code
KPIs	Key Performance Indicators
MLC, 2006	Maritime Labour Convention 2006, as amended
MoU	Memorandum of Understanding
MSMD	Minimum Safe Manning Document
NC	Non-Conformity
ROs	Recognized Organizations
SMC	Safety Management Certificate
SMS	Safety Management System
SOLAS Convention	International Convention for the Safety of Life at Sea
1978 STCW Convention	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
HTW Sub-Committee	Sub-Committee on Human element, Training and Watchkeeping
III Sub-Committee	Sub-Committee on the Implementation of IMO Instruments

EXECUTIVE SUMMARY

This report aims to provide objective evidence, conclusions and recommendations resulting from a study on the effectiveness and effective implementation of the International Safety Management (ISM) Code. The report sets out 6 recommendations based on the study's findings and the supporting literature. The findings are based on qualitative and quantitative data from multiple sources. The panel of experts has ensured that the views of stakeholders involved directly or indirectly in the certification, implementation and enforcement of the ISM Code were considered. Participants covered a global sample of the industry. They included flag State Administrations and recognized organizations (ROs) representing 30% and more than 50% of the world fleet, respectively, port State control regimes, companies and company representatives covering more than 80% of the global fleet, and the representatives of some 1.2 million seafarers. Additionally, the analysis included ISM verification data from ROs covering most of the global fleet as well as Tokyo Memorandum of Understanding (MoU) port State control data. The recommendations based on the key findings are set out below.

KEY RECOMMENDATIONS

Recommendation 1: the International Maritime Organization (IMO) should consider improving the implementation of the ISM Code, in order to ensure consistency in the uniform application and interpretation of mandatory provisions, as well as compliance and enforcement by Administrations and/or companies. It is recommended that consideration be given for a comprehensive review and revision of the guidelines on the implementation of the ISM Code by Administrations and companies, in particular resolution A.1188(33) on *Guidelines on the implementation of the ISM Code by Administrations* and MSC-MEPC.7/Circ.8 on *Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies*, with focus on:

.1 ensuring that seafarers are involved as part of the Safety Management System (SMS) development, review and implementation process, in order to gain end-user perspective and enhance crew members' sense of ownership of these systems;

.2 developing specific risk management guidelines suited for the industry, taking into account ISO 31000:2018 *Standard on Risk management*[1] as a reference, in order to provide a structured framework to support best practice for a systemic approach to risk management and enhance understanding among seafarers on board and personnel ashore;

.3 including provisions on occupational health and safety, in particular a framework for managing occupational health and safety risks, in order to ensure consistent application of organizational health and safety practices across the industry, taking into account ISO 45001:2018 *Standard on occupational health and safety management systems*[2] and other relevant maritime standards, noting existing requirements under the 1974 SOLAS Convention, the 1978 STCW Convention, the Maritime Labour Convention, 2006, as amended (MLC, 2006), and the mandate of the Organization;

[1] ISO 31000:2018 Risk Management – Guidelines, Edition 2, 2018 and ISO 31000:2018 Risk Management – A Practical Guide, Edition 1, 2021.

[2] ISO 45001:2018 Occupational health and safety management systems - Requirements with guidance for use, Edition 1, 2018.

.4 including provisions on continuous improvement, in particular to specify the importance of responses to non-conformities and deficiencies; corrective actions; analyses and evaluation of data and what constitutes a proper conduct of incident investigation and analyses, taking into account ISO 9001:2015 *Standard on Quality management systems*[3] and other relevant standards;

.5 developing further guidance on the importance and conduct of internal audits, taking into account ISO 9001:2015 *Standard on Quality management systems*[4] and other relevant guidance;

.6 including clarifications and details of the role and responsibility of the master to ensure consistency in the interpretation of the corresponding provision in the ISM Code concerning Master's responsibility and authority;

.7 reviewing the *Guidance on the qualifications, training and experience necessary for undertaking the role of the designated person under the provisions of the International Safety Management (ISM) Code* (MSC-MEPC.7/Circ.6)[5], regarding the function and responsibility of the direct person ashore (DPA). Additionally, consideration should be given to whether the DPA is a role or a function;

.8 including provisions that ISM-related documentation should be transferred and made available on board for the life of the ship, in particular when the company changes, taking an approach similar to the Continuous Synopsis Record (CSR);

.9 improving the provisions related to ISM verifications in order to ensure their effectiveness and quality, in particular consider including time frames for the conduct of ISM verifications; and establish minimum criteria for the number of personnel needed to carry out verification(s), noting that the verification process can vary based on organization size and complexity;

.10 including clear instructions that Safety Management Certificate (SMC) verifications must be carried out on board. Only under exceptional circumstances should remote verifications be permitted;

.11 including provisions for personnel conducting verifications to observe drills during SMC verifications;

.12 including provisions relating to the close-out of non-conformities to ensure that these are undertaken as per the intent and objectives of the ISM Code;

.13 for those flag States that delegate obligations emanating from SOLAS chapter IX and the ISM Code:

---

3 ISO 9001:2015 Quality management systems – Requirements, Edition 5, 2015.

4 *Ibid.*

5 MSC-MEPC.7/Circ.6. on Guidance on the qualifications, training and experience necessary for undertaking the role of the designated person under the provisions of the International Safety Management (ISM) Code (approved 19 October 2007)

.1 strengthening flag States' oversight of delegated entities (i.e. ROs), in particular consider including provisions on feedback and reporting, taking into account other relevant IMO instruments; and

.2 including provisions for the delegation to different ROs by Administrations of ISM and other statutory functions;

.14 reviewing the competence to carry out verifications in the context of the ISM Code, as set out in the appendix to resolution A.1188(33) on the *Guidelines on the implementation of the ISM Code by Administrations* – regardless of whether the personnel are from the flag State Administration or a delegated entity (i.e. ROs);

.15 strengthening aspects associated with risk management, hazard mitigation, considerations for appropriate manning, and continuous improvement (including the establishment of key performance indicators) by means of internal audits, root cause analyses and corrective actions; and

.16 implementing a usability[6] approach in the development and continued review of the SMS to ensure applicability, as well as safety and environment protection, including provisions aimed at ensuring that ship and operational procedures in SMSs are specific and reflect shipboard operations.

Recommendation 2: IMO should consider reviewing the port State control guidelines in relation to the ISM Code, in order to ensure that the provisions of the ISM Code are implemented consistently on all ships, with focus on:

.1 *Procedures for port State Control, 2023* (resolution A.1185(33)) to support consistency in the identification and coding of ISM Code-related deficiencies during inspections and across port State control regimes; and

.2 developing objective provisions to support the identification of levels of manning entailing that the ship may not be fit to proceed to sea without danger to the ship, the persons on board or the environment (as per paragraph 6.2.2 of the ISM Code). This should provide a second check with regard to ensuring that the flag State Administrations have applied due diligence to IMO standards in approving manning determinations as per resolution A.1047(27).

This recommendation should be pursued within the context of updating appendix 11 (Guidelines for port State control officers on certification of seafarers, manning and hours of rest) to resolution A.1185(33) on *Procedures for port State control, 2023* to include an evaluation of overdue maintenance, overall material condition of the ship, and follow-up actions when a ship is suspected of being inappropriately manned.

[6] Extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use (ISO 9241-11:2018 *Standard on Ergonomics of human-system interaction*).

Recommendation 3: IMO should consider reviewing elements of the ISM Code, in particular:

.1 updating the definition of "Company" to reflect modern company and management structures, including delegated or contracted responsibilities and centralized support, to ensure that responsibility and commitment to safety and marine environment protection are upheld across all parties involved. In addition to the definition, the following elements linked to the Company concept should be appropriately addressed and emphasized in the ISM Code:

.1 delegated and/or sub-contracted entities must provide access to all their relevant systems and documents to ensure full compliance;

.2 proper verification processes for crewing agencies must be established, integrated and maintained in the management systems;

.3 when a company delegates its obligations to other entities, the ISM Code should explicitly provide that the company retains the ultimate responsibility for all ISM-related duties.

.4 strengthening the commitment from all levels of management, highlighting responsibility and accountability in the ISM Code to bring it up to date with other international standards. This should align with relevant ISO standards such as ISO 9001:2015 *Standard on Quality management systems*[7], which sets out clear responsibilities for senior management;

.5 when the company is an entity other than the shipowner, the following should be considered for inclusion in the ISM Code:

.1 an obligation for the shipowner to provide enough resources for the safe and environmentally sound operation of the ship;

.2 requirements for the shipowner to designate a point of contact to liaise with the Company's DPA, as appropriate; and

.2 adding management of change in the ISM Code, taking into account the ISO 9001:2015 *Standard on Quality management systems,*[8] which provides for best practice on planning of changes, with consideration of other relevant standards. Associated guidelines should be developed in support of the implementation of this provision;

.3 strengthening section 5 on master's responsibility and authority, in order to ensure that the master is afforded the right protection and to allow the master to escalate ISM related relevant breaches directly to the flag or port States;

7 ISO 9001:2015 Quality Management Systems – Requirements, Edition 5, 2015

8 *Ibid.*

.4 introducing a new complaint procedure to report ISM non-compliance occurrences to relevant competent authorities, similar to what already exists as per the MLC, 2006 on complaint procedures (regulation 5.2.2);

.5 including safety culture in the ISM Code as an objective. This should be supported by a clear definition and guidelines to achieve it, as well as how it links with the concepts of continuous improvement and just culture, and the Company's commitment both on board and ashore;

.6 considering the following amendments to the ISM Code to improve clarity and usability:

.1 restructuring the ISM Code and its related guidelines to align it with other IMO instruments (integrating all provisions in different parts as in the STCW, Polar and ISPS Codes);

.2 using the term "shall" consistently as intended in SOLAS regulation IX/3; and

.3 harmonizing the definition of Company in SOLAS regulation IX/1 (definitions) and the ISM Code (at the moment there is one variation related to the word shipowner or owner of the ship);

.7 including the use of gender-neutral language (i.e. crewing instead of manning), in order to foster an environment that is inclusive, respectful, and promotes equal opportunities for all maritime professionals.

Recommendation 4: IMO should consider initiating a holistic review of its instruments dealing with resources and personnel, in particular:

.1 resolution A.1047(27) on *Principles of minimum safe manning* as referred to in the ISM Code (paragraph 6.2.2); SOLAS regulation V/14 (ship's manning), ISM Code (section 6 on Resources and personnel), hours of rest within the watchkeeping requirements set out in the 1978 STCW Convention, in order to ensure consistency by flag State Administrations in the assessment, approval and enforcement of safe manning determinations. MLC, 2006 should also be taken into account in order to ensure the systematic consideration of all manning related provisions;

.2 complementing the term "appropriately manned" in paragraph 6.2.2 by a requirement for the company to undertake a risk assessment in order to support the establishment of appropriate manning and the assurance that the ship is appropriately manned.

Recommendation 5: IMO should consider effective measures to promote the development of training guidance for non-technical skills to optimize the human contributions to organizational safety. This should specifically address human factors competency designed for shipping, and training should initially focus on risk assessment, decision making, incident analysis (including root cause analyses), open reporting, communication, handling non-conformities, task management and fatigue.

Recommendation 6: IMO should consider enhancing capacity building on the effective implementation of the ISM Code and its related instruments, in particular to:

.1 enhance the sharing of safety information to improve uptake by industry, in a simple and user-friendly manner. This should include lessons learnt developed by the III Sub-Committee and the reports in the Global Integrated Shipping Information System (GISIS) (Marine Casualties and Incidents), which should be readily available in a format that the industry can use as learning tools; and

.2 examine possibilities of organizing annual/biannual workshops/forums focusing on safety learning, such as capacity building activities, inviting relevant stakeholders to share best practice and continuous improvement in SMSs.

1 PURPOSE

1.1 This report details the outcome of a study conducted by a panel of experts appointed by the Secretariat of the International Maritime Organization to assess the effectiveness and effective implementation of the ISM Code and other relevant instruments.

1.2 The study included an analysis of the SMS implemented on board ships and in companies, as well as processes and responsibilities related to certification and monitoring. The aim was to identify difficulties, gaps, flaws or failures and strengths in current management structures as applied in the shipping industry. As a relevant component of safety management, the study also included analysis of section 6 of the ISM Code on *Resources and personnel* as well as other relevant instruments. This resulted in a broader analysis of the guidance and approval practices of flag State Administrations regarding minimum safe manning of ships, and their overall impact on safety.

1.3 On the basis of the study findings, the report proposes recommendations for improvements to the ISM Code and its overall implementation, with a view to ensuring that it remains fit for use by current and future shipping operations.

2 INTRODUCTION

2.1 The ISM Code and its purpose

2.1.1 It has been 31 years since the International Management Code for the Safe Operation of Ships and for Pollution Prevention, also known as the International Safety Management (ISM) Code, was adopted by the IMO; the Organization then made the Code mandatory in 1998. A series of serious casualties pointing to organizational shortfalls, specifically in how shipboard safety was supported and managed by companies, had cemented the need for the ISM Code. The Code requires ship management companies to implement a SMS that must be certified and enforced by the responsible regulatory bodies (i.e. flag State Administrations). Since its introduction, the ISM Code has undergone some, albeit limited, amendments. This begs the question whether updates or improvements should be made to ensure that the Code remains fit for purpose, given the considerable changes that the industry has experienced since the Code's initial adoption.

2.1.2 The primary intent of the ISM Code was to improve management standards and in doing so strengthen the link between the ship and the shoreside management company to ensure that ships are well supported in managing safety and pollution prevention. In order to account for the full variety of operations, the ISM Code has moved away from a one-size-fits-all prescriptive approach and adopted a holistic framework that allows ship management companies the flexibility to develop and implement their own SMS. The ISM Code introduced a goal-based model which represented a significant shift away from the existing prescriptive approach to maritime safety regulation. Under this approach, the ISM Code sets out the goals that companies are required to achieve, with the latter seen as best placed to identify the unique risks associated with their operations and manage them appropriately. In this way, the ISM Code allows the ship management companies freedom to develop and implement their own SMS, as long as they meet the requirements of the Code.

2.2 ISM Code stakeholder system

2.2.1 Multiple stakeholders are involved in the ISM Code system. As shown in figure 1, the IMO is responsible for setting the standard required and ensuring that the ISM Code remains fit for purpose. The flag State Administration, as regulator, is responsible for enforcing the Code's requirements among the companies operating ships registered under their flag. This is achieved through a verification, certification and monitoring process. Most flag State Administrations appoint duly qualified ROs to conduct the verification and certification processes on their behalf and under their direction.

2.2.1 The principal stakeholder responsible for developing and implementing the SMS is the company, which must develop effective measures in accordance with the ISM Code to ensure safe operations. Seafarers contribute to the effective implementation, execution and continuous improvement of the SMS on their ships.

2.2.2 Port State control is a measure intended to provide the last line of defence, as it entrusts States with the power to inspect ships coming into their ports. There are now internationally agreed standards, enforced under various MoUs, that guide the inspection process. Most port State control regimes today have adopted a targeting system linked to the MoU under which the port State control authority operates. The role of port State control is to inspect vessels visiting their ports. It is not as systematic, and certainly not as detailed or intrusive, as a flag State inspection should be; it is limited to providing a snapshot of vessel compliance at the time of inspection. Where cases of non-compliance are identified, port State control has the power to issue deficiency notices or detain vessels.

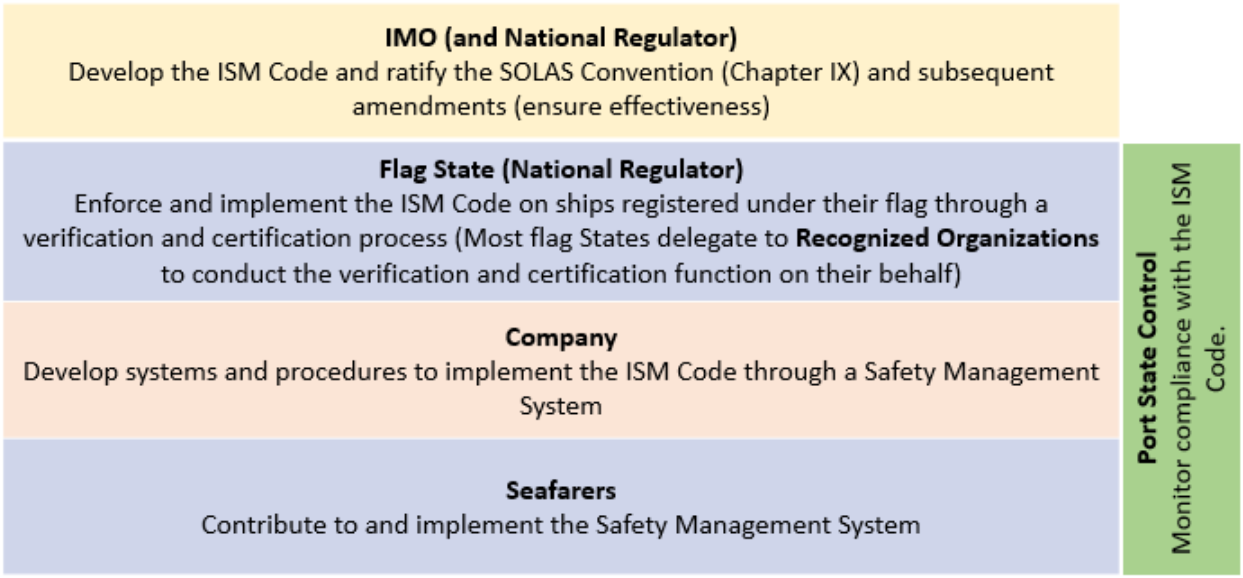

Figure 1: ISM Code stakeholder system

2.3 Resources and personnel[9]

2.3.1 As one of the cornerstones of international shipping regulations, the ISM Code intersects with other relevant legislative instruments and guidance. Hence, a review of the effectiveness of the ISM Code must take into account this relationship. The number, qualifications and competencies of crew members on ships has been an important issue for IMO, flag State Administrations and global shipping for many years. The requirement to ensure that ships are appropriately manned with qualified, certificated and medically fit seafarers is a critical aspect of the ISM Code (section 6.2) and is part of the management's responsibilities.

2.3.2 Paragraph 6.2 of the ISM Code includes the requirement for a company to ensure that ships are "*manned with qualified, certificated and medically fit seafarers in accordance with national and international requirements" (6.2.1)*. Furthermore, companies are required to ensure that each ship is "*appropriately manned in order to encompass all aspects of maintaining safe operations on board" (6.2.2)*.

2.3.3 Paragraph 6.2.2 of the ISM Code includes a specific reference to resolution A.1047(27) on *Principles of minimum safe manning* which was adopted in 2011. This resolution places responsibility on companies to propose an appropriate manning determination to the flag Administration. Resolution A.1047 (27) provides guidance for companies and flag State Administrations on the determination and approval of minimum safe manning arrangements. It requires that relevant safety factors and regulatory obligations be considered when determining the crew number, composition and competency on board a specific ship. Flag State Administrations may decide whether to apply the principles in this resolution.

[9] The panel would have preferred the use of gender-neutral language in the report (i.e. "crewing" instead of "manning"). However, to avoid any confusion, "manning" has been used and a note included on the current use of these gendered terms in IMO and the ILO and other relevant documents. A recommendation has been included in this report to ensure that such terms are changed into gender-neutral language when IMO undertakes a review of legislative instruments.

2.3.4 The same resolution is also referred to in the 1974 International Convention for the Safety of Life at Sea (SOLAS) chapter V, regulation 14 (Ship's manning) which requires flag State Administrations to adopt measures to ensure that ships are sufficiently and efficiently manned. The resolution also incorporates a reference to other legislative instruments within IMO and the ILO which should be considered in general terms when applying the principles set out in the resolution. Other aspects referred to include watchkeeping, hours of work and rest, and safety management.

2.4.5 Further regulatory requirements related to manning include chapter VIII of the 1978 STCW Convention, which specifies requirements for watchkeeping arrangements and hours of work or rest; and regulations 2.3 and 2.7 of the MLC, 2006, which incorporate requirements for hours of work or rest and manning levels as well as requirements for consideration of fatigue. Fatigue, although directly linked with resourcing and personnel, is not explicitly mentioned in paragraph 6.2 of the ISM Code or in resolution A.1047(27). It features only in the MLC, 2006 requirements and, to a limited extent, the 1978 STCW Convention. The IMO's *Guidelines on Fatigue (MSC.1/Circ.1598)* were only approved in 2019 following a comprehensive review. However, their provisions are not mandatory.

2.4.6 Figure 2 provides an overview of the regulatory requirements related to manning.

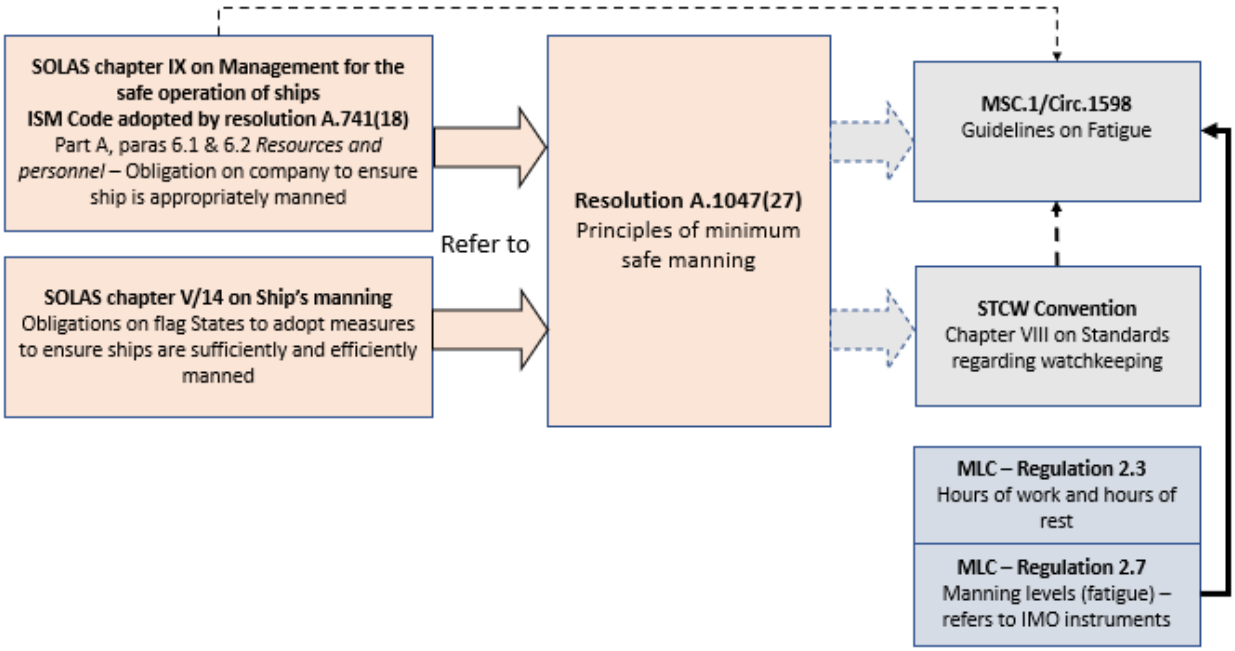

Figure 2: How manning in the ISM Code intersects with other legislative instruments

3 BACKGROUND

3.1 Trends in incident data

3.1.1 The effectiveness of the ISM Code is a matter of significant interest that has attracted considerable attention in recent years. Since the introduction of the Code, safety levels in the maritime industry have generally improved. For instance, while 30 years ago the global shipping fleet reported losing some 200 vessels over 100 GT per year, by the end of 2023 such losses had fallen to 26, constituting a record low[10].

3.1.2 Given the difficulties in drawing any definitive conclusions about the impact of the ISM Code, most studies[11] to date have been inconclusive about its specific benefits, while others have reported mixed findings. Certain other studies have demonstrated that the Code's actual implementation does not reflect its character and purpose and therefore have questioned its effectiveness[12,13,14]. These are supported by data showing that while ship losses have declined over the years, the number of reported serious shipping casualties has gradually increased (refer to figure 3) over the last 10 years (2,773 in 2014 compared with 2,951 in 2023, a rise of 6%)[15]. The reported serious incidents reported in the Allianz review include machinery breakdowns/failures, collisions, groundings and fires/explosions, contact, and others.

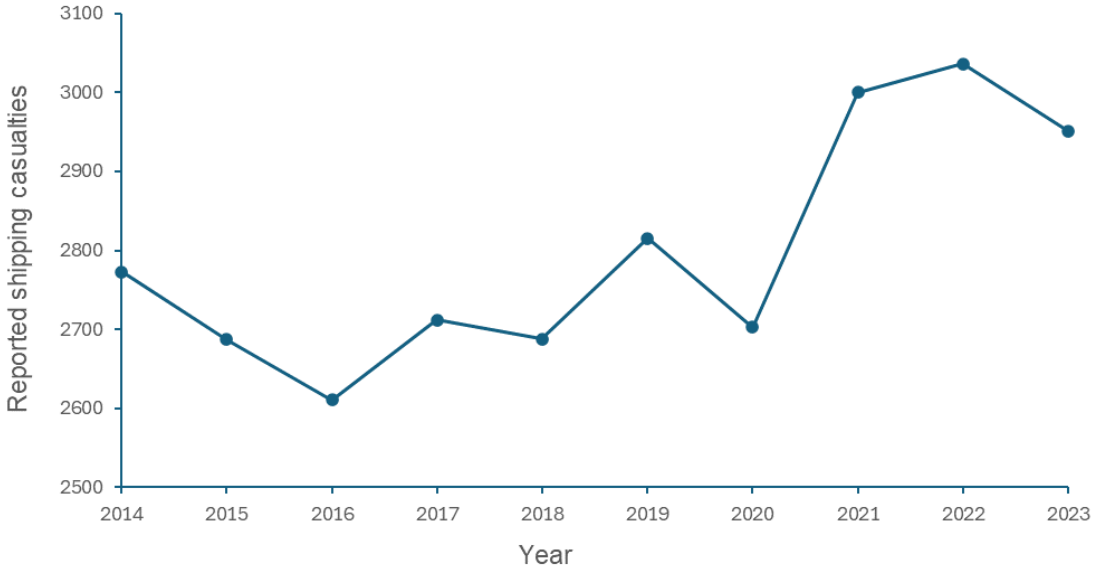

Figure 3: Reported ship casualty data (2014-2023)

10 Allianz. (2024). *Safety and shipping review 2023: An annual review of trends and developments in shipping losses and safety.*

11 Thomas, M. (2011). *A systematic review of the effectiveness of safety management systems* (Cross-Modal Research Investigation No. XR-2011-002). Australian Transport Safety Bureau.

12 Bhattacharya, S. (2012). The effectiveness of the ISM Code: A qualitative enquiry. *Marine Policy*, *36*, 528-535.

13 Lappalainen, F. J., Kuronen, J., & Tapaninen, U. (2012). Evaluation of the ISM Code in the Finnish Shipping Companies. *Journal of Maritime Research*, *IX*(1), 23–32.

14 Mok, I., D'agostini, E., & Ryoo, D. (2023). A validation study of ISM Code's continual effectiveness through a multilateral comparative analysis of maritime accidents in Korean waters. *The Journal of Navigation*, *76*(1), 77-90.

15 Data sourced from Allianz Safety in Shipping Reviews (2015-2024) Safety and Shipping Review 2024 | Allianz Commercial.

3.1.3 Occupational accidents continue to be a concern in the maritime industry[16]. An InterManager analysis of work injury and fatality data associated with trips and falls, enclosed spaces and lifeboats over a 10-year period (2013-2023) shows no noticeable decrease in the number of crew fatalities and accidents related to those categories[17]. Such serious injury rates raise questions about the proper implementation of SMS on ships, which should include provisions for ensuring seafarers' continued health and safety.

3.2 Literature review on the ISM Code

3.2.1 The aim of the literature review is to present an overview of the existing research on the ISM Code. Rather than draw conclusions based on a single study, in this section and in subsequent parts of the report we analyse and compare information from multiple data sources.

3.2.2 In 2003, Anderson[18] identified issues with excessive paperwork, voluminous documentation, irrelevant checklists and procedures – all developed to support SMS implementation. Other issues identified in the same author's early work included low levels of seafarer involvement, vessels' lack of resources and insufficient training. Later, other studies identified similar as well as additional issues[19,20,21].

3.2.3 An evaluation of the ISM Code conducted by IMO in 2005 also recognized the burden of paperwork on board; however, no concrete recommendations were presented at the time[22].

3.2.4 Lappalainen and colleagues[23] collected data from Finnish seafarers, shipping companies and other maritime stakeholders showing that most participants emphasized the benefits of the ISM Code, in particular the improved cooperation and communication between shore-based and shipboard personnel and the heightened safety awareness among maritime personnel overall. However, issues similar to those identified by Anderson continued to be evident, including the burden of bureaucracy and complicated SMS documentation. Their findings suggested that, in the companies they studied, the SMS had been made too complicated, with documentation that did not correspond to actual onboard practices. Apart from these SMS implementation issues, there were broader concerns such as non-uniform interpretation of the requirements, lack of guidance in the application of the ISM Code and a lack of suitable safety performance indicators.

16 Çakır, E. (2019). Fatal and serious injuries on board merchant cargo ships. *Int Marit Health*, *70*(2), 113–118. https://doi.org/10.5603/IMH.2019.0018

17 May 2024 Stats review - InterManager accessed 20 June 2024

18 Anderson, P. (2003). *Cracking the Code: The Relevance of the ISM Code and Its Impact on Shipping Practices.* London, U.K: Nautical Institute.

19 Lappalainen, F. J., Kuronen, J., & Tapaninen, U. (2012). Evaluation of the ISM Code in the Finnish Shipping Companies. *Journal of Maritime Research*, *IX*(1), 23–32.

20 Bhattacharya, S. (2012). The effectiveness of the ISM Code: A qualitative enquiry. *Marine Policy*, *36*, 528-535.

21 Andrei, D., Grech, M., Crous, R., Ho, J., McIlroy, T., & Neal, A. (2015). *Assessing the Determinants and Consequences of Safety Culture in the Maritime Industry* (Research No. LP130100215).

22 International Maritime Organization. (2005). *Assessment of the impact and effectiveness of implementation of the ISM Code* (No. MSC 81/17/1).

23 Lappalainen, F. J., Kuronen, J., & Tapaninen, U. (2012). Evaluation of the ISM Code in the Finnish Shipping Companies. *Journal of Maritime Research*, *IX*(1), 23–32.

3.2.5 Bhattacharya's research[24] has continued to question the actual effectiveness of the ISM Code. Having conducted case studies of two tanker companies which included interviews with crew members and shore-based managers, Bhattacharya found a disparity between the two groups' perceptions. While management claimed that their SMS were robust and well-suited to maintaining safety, seafarers claimed that it was their expertise and experience that helped to make them safe, rather than the generic, non-ship-specific procedures. The shore-based managers' approach to SMS implementation left little room for seafarers to participate in the management of shipboard health and safety.

3.2.6 Another issue arising from the perceived mismatch between procedures and daily work was that companies failed to ensure that seafarers were properly qualified, trained and familiarized with their assigned or expected tasks[25]. This issue was identified through an analysis of 95 maritime investigation reports, which also found that lack of teamwork, poor communication between the bridge and the engine control room, and failure to conduct familiarization for new crew members were causal factors in the incidents under analyses. Several other studies[26] [27] [28] [29] observed similar outcomes, suggesting that the culture of the ship management companies did not support the safety-oriented culture that is required for a successful implementation of the ISM Code.

3.2.7 Seafarers' perceptions of SMS implementation have resulted in what Vandeskog[30] describes as a "legitimacy crisis". Following ethnographic fieldwork on eight ships over 2.5 years, Vandeskog found that the majority of participating seafarers held negative views of the SMS on their ship, and that many perceived these as "an imposition". Overall, this led to a lack of acceptance and trust by seafarers towards the SMS mainly due to their perceived disconnect between the outcomes and benefits that the SMS was intended to achieve (i.e. health and safety) and the specific rules and procedures forced upon them.

[24] Bhattacharya, S. (2012). The effectiveness of the ISM Code: A qualitative enquiry. *Marine Policy*, *36*, 528-535.

[25] Batalden, B.-M., & Sydnes, A. (2013). Maritime safety and the ISM code: A study of investigated casualties and incidents. *WMU Journal of Maritime Affairs*, *13*(1), 3–25.

[26] Xian, L. A. (2024). *Assessing the burden of an excessive SMS size on the effective Implementation of the ISM Code* [Master Theses]. World Maritime University.

[27] Lappalainen, F. J., Kuronen, J., & Tapaninen, U. (2012). Evaluation of the ISM Code in the Finnish Shipping Companies. *Journal of Maritime Research*, *IX*(1), 23–32.

[28] Pun, K.; Yam, R. and Lewis, W. (2002): Safety management system registration in the shipping industry, International Journal of Quality & Reliability Management; Volume 20, Issue 6.

[29] Kongsvik, T. O., & Storkersen, K. V. (2014). The relationship between regulation, safety management systems and safety culture in the maritime industry. In *Safety, Reliability and Risk Analysis: Beyond the Horizon*. Taylor & Francis Group.

[30] Vandeskog, B. (2015). The Legitimacy of Safety Management Systems in the Minds of Norwegian Seafarers. *The International Journal on Marine Navigation and Safety of Sea Transportation*, *9* (March 2015). https://doi.org/10.12716/1001.09.01.12

3.2.8 Similar findings are evident in other studies,[31] [32] with participating seafarers generally regarding the SMS as being too rigid and the procedures as not reflecting how work is actually carried out on board. The many reasons identified as underlying these perceptions related to:

- a lack of understanding of where seafarers fit into the whole scheme of the SMS;
- the complexity and sheer volume of the processes and procedures;
- a lack of attention to seafarer input, resulting in procedures that reflect "work as imagined" rather than work as "actually done" on board; and
- low safety culture maturity leading to a reluctance among seafarers to report incidents.

3.2.9 Lappalainen and colleagues[33] showed that the process of continuous improvement was not working well, due to reporting culture not being well embedded in the industry to ensure continuous learning. This lack of safety culture in the industry has been pointed out many times, with seafarers reluctant to report hazardous occurrences for fear of being blamed for the mistake, thus impeding continuous improvement of SMS[34,35,36].

3.2.10 While investigating the reporting practices within companies operating vessels in Norway, Christensen identified a wide disparity between the way that companies handled accident reporting and the actual reporting requirements. Seafarers' reporting of incidents and hazardous occurrences was found to be linked to their perception of the usability and applicability of safety policies and procedures (related to SMS) and the management's level of commitment[37,38].

3.2.11 Similarly, another aspect considered critical is the need for a better understanding of human factors across the industry through non-technical skills training, which is seen as a critical component for the management of risk[39].

---

31 Kongsvik, T. O., & Storkersen, K. V. (2014). The relationship between regulation, safety management systems and safety culture in the maritime industry. In *Safety, Reliability and Risk Analysis: Beyond the Horizon*. Taylor & Francis Group.

32 Bhattacharya, S. (2009). *Impact of the ISM Code on the management of occupational health and safety in the maritime industry* [PHD Theses] Cardiff University.

33 Lappalainen, F. J., Kuronen, J., & Tapaninen, U. (2012). Evaluation of the ISM Code in the Finnish Shipping Companies. *Journal of Maritime Research*, *IX*(1), 23–32.

34 Sagen, A. (1999). The ISM Code in practice. Oslo: Tano Aschehoug.

35 Lappalainen, J., & Salmi, K. (2009). Safety Culture and Maritime Personnel's Safety Attitudes. Turku

36 Kerr, A. R. (2013). *Exploring Hazards, Priorities, and Safety Climate in a Maritime Context* [Dissertation]. University of Queensland.

37 Christensen, M. (2013). *A qualitative study of the review and verification process of the Safety Management System within companies servicing the Norwegian Continental Shelf* [Master Thesis]. Vestfold University College.

38 Lu, C. S., & Tsai, C. L. (2008). The effects of safety climate on vessel accidents in the container shipping context. Accident Analysis and Prevention, 40(2), 594-601.

39 Andrei, D., Grech, M., Crous, R., Ho, J., McIlroy, T., & Neal, A. (2015). *Assessing the Determinants and Consequences of Safety Culture in the Maritime Industry* (Research No. LP130100215).

3.2.12 While the ISM Code was originally effective in contributing to higher safety standards in the shipping industry, in later years its effectiveness has declined[40]. According to Almklov and Lamvik, this is partly due to globalization and practices such as outsourcing, flagging-out and complex ownership structures, that, to some extent, may be intended to avoid regulation. This has left flag State Administrations caught in a dilemma between the financial interests and ambitions involved in maintaining a large maritime fleet on the one hand, and the task of enforcing safety standards on the other. In some cases, this predicament may have led some flag State Administrations to adopt more lenient approaches to compliance and enforcement, thus accepting comparatively lower standards[41].

3.2.13 To some extent, the issues with the ISM Code's effectiveness became more evident when supply chain organizations such as oil companies developed their own safety and pollution prevention standards for the ships they charter, rather than relying on ISM Code verification and certification process as proof of safety demonstration[42]. One reason behind the introduction of standards such as the Tanker Management and Self-Assessment (TMSA), was charterers' lack of confidence in the certification process under the ISM Code, including the application of continuous improvement. The latter, embedded within the ISM Code, was seen as being too weakly implemented and as having a tendency to rely on reactive measures and containing only limited proactive approaches, unlike the TMSA[43,44].

3.2.14 Initiatives such as the TMSA have led to some positive outcomes, with Almklov and Lamvik[45] suggesting that some companies are operating above regulatory safety requirements. The pressure may not necessarily be stemming from the regulatory regime but from the nature of the particular industry (e.g. oil, aquaculture) and its need for assured transparency along the supply chain. At the same time, other segments of the industry do not necessarily have this level of scrutiny. Ultimately, this does not resolve the issue with the effectiveness of the ISM Code, but rather raises questions about how the ISM Code can remain effective in ensuring safety and pollution prevention.

3.3 Challenges with resources and personnel

3.3.1 Discussion on the ISM Code cannot be complete without examining the manning and fatigue aspects. Several studies indicate that seafarers, being in the lower tier of the subcontracting chain, absorb many of the implementation issues associated with the SMS and thus incur longer working hours and higher levels of fatigue[46]. A report on safety and culture in Norwegian shipping found that the crew were mostly satisfied with the safety culture but not

40 Almklov, P. G., & Lamvik, G. M. (2018). Taming a globalized industry – Forces and counter forces influencing maritime safety. *Marine Policy*, *96*, 175–183.

41 Almklov, P. G., & Lamvik, G. M. (2018). Taming a globalized industry – Forces and counter forces influencing maritime safety. *Marine Policy*, *96*, 175–183.

42 Singhal, N. S., & Dev, A. (2016). Offshore Vessel Management and Self-Assessment. *Proceedings of the 6th International Conference on Technology and Operations of Offshore Support Vessels*, 36–40.

43 Albaseet, R. B. (2009). *Comparative assessment of the ISM Code and the tanker management and self-assessment impact on the tanker industry* [Master's Thesis]. World Maritime University.

44 Tsilioris, D. (2020). *An enquiry into the importance of soft skills for shipping with regards to oil tanker companies international marine forum's (OCIMF) tanker management self-assessment (TMSA)* [Master Thesis]. University of Piraeus.

45 Almklov, P. G., & Lamvik, G. M. (2018). Taming a globalized industry – Forces and counter forces influencing maritime safety. *Marine Policy*, *96*, 175–183.

46 Bhattacharya, S., & Tang, L. (2012). Fatigued for safety? Supply chain occupational health and safety initiatives in shipping. *Economic and Industrial Democracy*, *34*(3), 383–399.

with manning or hours of work and rest[47]. Several studies identified issues with excessively long working hours and fatigue experienced by seafarers, including evidence of increased risk of accidents as well as negative impacts on mental and physical health[48,49,50,51]. The literature points to major shortfalls in the approval and enforcement of manning determinations by flag State Administrations[52,53]. Limited flag State Administration regulatory oversight together with commercial pressure in the industry have led to deteriorating working conditions and lower manning numbers, which is leading to poor implementation of SMS. Seafarers often have no choice but to accept an increased workload and longer working hours[54], leading to widespread falsification of hours of work and rest records[55,56].

3.4 Success factors for implementation of the ISM Code

3.4.1 A comprehensive review of the published literature on the effectiveness of SMS programmes across multiple industries, including the maritime, noted that the effectiveness of SMS relies on the level of effort applied across the system as a whole[57]. For systems such as the ISM Code to work as intended, there must be a concerted effort by all stakeholders, which include IMO, the flag State Administrations as regulators, the companies responsible for implementation, and the seafarers implementing and executing the company SMS as part of their work. Additionally, port State Control plays a key role in providing another layer of defence that can capture non-compliant vessels.

47 https://www.oceanspacemedia.com/files/2023/04/13/sjofartsdirektoratets-arbeid-med-a-fremme-gode-arbeids--og-levevilkar-til-sjos.pdf

48 The Behavioural Insights Team and Transport Research, & Laboratory. (2023). *Understanding seafarer roster patterns and fatigue on vessels*. www.gov.uk/government/organisations/department-for-transport

49 Andrei D M, Griffin M A, Grech M and Neal A (2020). How demands and resources impact chronic fatigue in the maritime industry. The mediating effect of acute fatigue, sleep quality and recovery. *Safety science, 121, 362-372.*

50 Mansyur M (2021). Long working hours, poor sleep quality, and work-family conflict: determinant factors of fatigue among Indonesian tugboat crewmembers. *BMC Public Health, 21, 1832.*

51 Zhao Z, Wadsworth E, Jepsen J R and Van Leeuwen W M (2020). Comparison of perceived fatigue levels of seafarers and management approaches in fatigue mitigation: Case studies from two Chinese and two European shipping companies. *Marine Policy, 116, 103897.*

52 Pathak, K. S., & Bhardwaj, S. (2024). Safe Manning: Workload assessment of deck officers. *Journal of Maritime Research*, *XXI*(1 (2024)), 106–113.

53 Suppiah, R. ISPS and manning issues. *WMU J Marit Affairs* **8**, 89–103 (2009). https://doi.org/10.1007/BF03195155

54 Bhattacharya, S., & Tang, L. (2012). Fatigued for safety? Supply chain occupational health and safety initiatives in shipping. *Economic and Industrial Democracy*, *34*(3), 383–399.

55 World Maritime University (2020). *A culture of adjustment: evaluating the implementation of the current maritime regulatory framework on rest and work hours (EVREST).* Malmo: World Maritime University.

56 Bhatia, B. S., Carrera-Arce, M., Baumler, R., & Grech, M. R. (2024). Seafarers vs. Port State Control: Decoding Work/rest Compliance Data Disparity. *Marine Policy*, *163*, 106105.

57 Thomas, M. (2011). *A systematic review of the effectiveness of safety management systems* (Cross-Modal Research Investigation No. XR-2011-002). Australian Transport Safety Bureau.

3.4.2 Previous studies have identified several factors that contribute to the successful implementation of the ISM Code. Anderson[58] was one of the first to identify the success factors of a properly functioning SMS, highlighting aspects such as leadership and commitment from the senior management and a sense of ownership of the SMS among seafarers. Indeed, the importance of this aspect is recognized in preambular paragraph 6 of the ISM Code: "The cornerstone of good safety management is commitment from the top…".

3.4.3 Other follow-up studies demonstrate that the application of quality management system principles to existing SMS could lead to the successful implementation of the ISM Code[59,60,61,62]. These include specific references to continuous improvement and senior management commitment, which are principles embedded in quality management systems[63,64]. Some suggest that the ISM Code should be implemented jointly with a quality management system such as ISO:9001 on *Standard on quality management systems*. This aspect of the ISM Code has been investigated against the principles underlying ISO:9001's effectiveness, drawing on evidence from a sample of 163 shipping companies located in Greece[65]. The findings showed stronger performance with regard to ISM effectiveness among ISO-certified companies than in non-ISO certified companies. In particular, the continuous improvement dimension was found to be associated with better performance.

3.5 Summary of literature review

3.5.1 Overall, the literature suggests that a review into the effectiveness of the ISM Code is timely. Recent studies indicate that the ISM Code and other safety-related standards, such as those related to manning, should be reviewed if they are to remain relevant[66].

3.5.2 While the evidence from the literature provides some level of understanding of the problems, the study presented in this report goes beyond previous studies by taking a holistic approach that considers the whole stakeholder system of the ISM Code. Its aim is to investigate whether the issues identified in previous studies continue to be relevant, to identify additional issues that might arise from more recent developments and to identify areas for improvement.

---

58 Anderson, P. (2003). *Cracking the Code: The Relevance of the ISM Code and Its Impact on Shipping Practices.* London, U.K: Nautical Institute.

59 Pantouvakis, A., & Karakasnaki, M. (2016). An empirical assessment of ISM Code effectiveness on performance: the role of ISO certification. *Maritime Policy & Management*, *43*(7), 874–886.

60 Celik, M. 2009. "Designing of Integrated Quality and Safety Management System (IQSMS) for Shipping Operations." *Safety Science* 47 (5): 569–577. https://doi.org/10.1016/j.ssci.2008.07.002.

61 Grabon-Chalupczak, M. (2020). Information Flow in Maritime Safety Management Systems. *TransNav, the International Journal on Marine Navigation and Safety of Sea Transportation*, *14*(3), 637–640. https://doi.org/10.12716/1001.14.03.15

62 Karakasnaki, M. (2018). ISM Code implementation: an investigation of safety issues in the shipping industry. *WMU Journal of Maritime Affairs*, *17*, 461–474.

63 Lappalainen, F. J., J. Kuronen, and U. Tapaninen. 2014. "Evaluation of the ISM Code in the Finnish Shipping Companies." Journal of Maritime Research: JMR 9 (1): 23–32.

64 Karakasnaki, M. (2018). ISM Code implementation: an investigation of safety issues in the shipping industry. WMU Journal of Maritime Affairs, 17, 461–474.

65 Pantouvakis, A., & Karakasnaki, M. (2016). An empirical assessment of ISM Code effectiveness on performance: the role of ISO certification. Maritime Policy & Management, 43(7), 874–886.

66 Mok, I., D'agostini, E., & Ryoo, D. (2023). A validation study of ISM Code's continual effectiveness through a multilateral comparative analysis of maritime accidents in Korean waters. *The Journal of Navigation*, *76*(1), 77-90.

4 METHOD

This report presents a comprehensive review of the research evidence relating to "the effectiveness and effective implementation of the ISM Code". On this basis, the report examines the benefits and gaps in the ISM Code and what improvements may be necessary to ensure that it continues to be relevant.

As outlined in the previous sections, the implementation of the ISM Code is complex, involving a multitude of actors and processes related to legislation, implementation, verification, certification and inspection. Relevant expertise and information are fragmented, held by different individuals and organizations. Consequently, to obtain a good picture of the current situation and identify the challenges related to implementation, this study takes a multi-method approach. This involves the collection and analysis of multiple types of data from different sources: quantitative data are used to examine trends and identify patterns in ISM verifications and port State control deficiency notices and detentions, while qualitative data provide insights based on accident reports as well as the perspectives and insights of stakeholders with longstanding experience in the sector.

4.1 Literature review

4.1.1 A comprehensive review of the literature was undertaken to identify and examine the available scientific evidence in relation to the study findings and recommendations. The literature search mainly focused on keywords related to the terms "International Safety Management Code", "safety management system", "crewing (manning)" and "fatigue", with the emphasis on studies specifically concerning the maritime domain. The databases searched included Scopus, Research Library, Open Research Library (open access), Ovid, Medline, Google Scholar, Social Science database and Web of Science. The search was limited to peer-reviewed journal articles and supervised theses (masters and doctorate).

4.1.2 The quality of these articles was appraised to identify papers for further analysis. To this end, the abstracts of the 82 articles found in the literature search were read and 44 articles were identified for further analysis and inclusion in this report. Additionally, IMO documents related to ISM were retrieved from the IMO online library and included as part of the review. This resulted in a further eight articles being included.

4.2 Data collection

The study adopted a holistic approach to the data collection process. Stakeholder groups directly or indirectly involved in the ISM Code stakeholder system (figure 1) were included. Qualitative and quantitative data were collected by the following methods (figure 4):

- surveys and interviews with stakeholders;
- analyses of marine accident investigation reports;
- ISM verification data; and
- data on ISM-related deficiencies and detentions identified by port State control authorities reporting to the Tokyo MoU.

The cooperation and willingness of flag State Administrations, ROs, port State control regimes, companies, seafarers and other shipping industry stakeholders (e.g. vetting organizations) to provide relevant data and/or agree to be interviewed as part of the data collection process was key to successfully conducting this analysis. Given the diversity and global scope of the

industry, throughout the study careful consideration was given to geographical representation, fleet profiles and the types of ships managed by participants.

The following sections provide detailed information on each type of data collected.

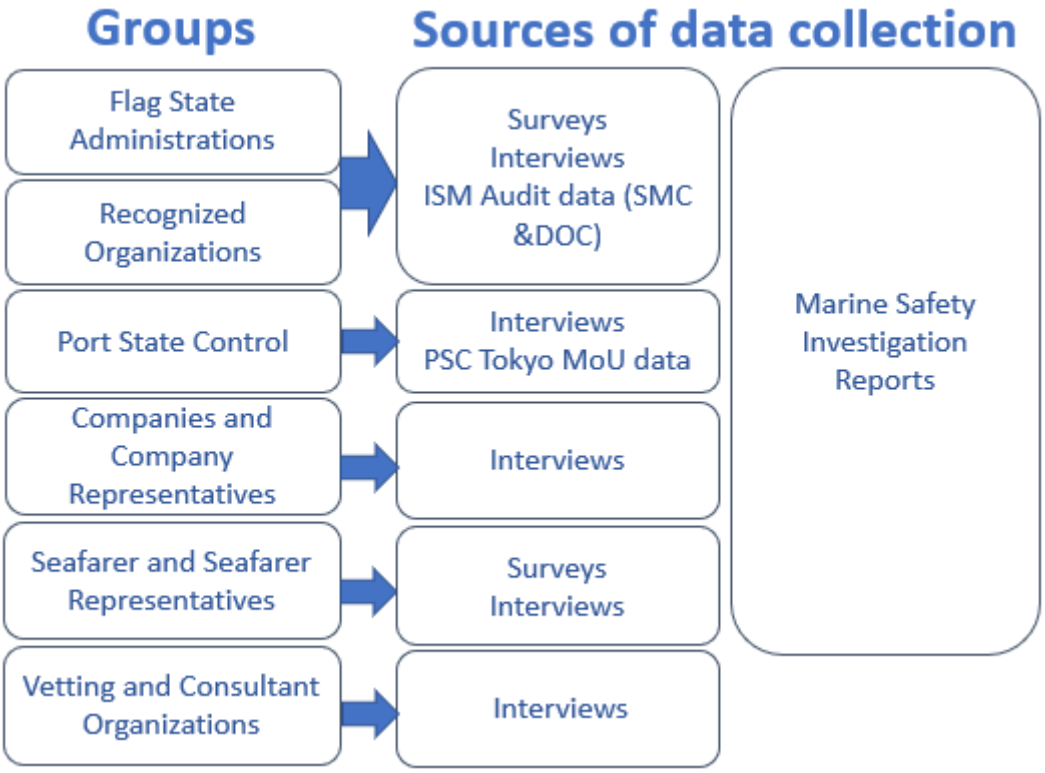

Figure 4: Stakeholder groups and sources of data collection

4.2.1 Interviews

4.2.1.1 To obtain detailed information on stakeholders' experiences and perspectives regarding the effectiveness and implementation of the ISM Code, semi-structured interviews were conducted with 30 stakeholders. Interviewees were selected from each of the main stakeholder groups, notably flag State Administrations, ROs, shipping companies, port State control, seafarer representatives, and consultancy and vetting organizations. Geographical spread and diversity regarding fleet profiles and vessel types were also considered as part of this selection process.

4.2.1.2 The contact information for interviewees was obtained from the IMO Secretariat and other sources. In all, 51 stakeholders were invited for interview. A total of 30 agreed to participate, including seven flag State Administrations, one recognized organization, four port State control regimes, 10 shipping companies, three organizations representing shipping companies and three organizations representing seafarers. Two interviews were conducted with vetting and maritime consultancy organizations. In addition, four ROs provided written responses through a survey (see section 4.2.3.2).

4.2.1.3 The interviewees had extensive experience in the maritime sector, and most of them worked in areas related to ISM/SMS implementation. Taken together, the interviewees represented stakeholder groups covering Africa, Asia, Asia Pacific, North America, South America and Europe, with representation from 14 different countries. Annex A provides further details on participant location and interview dates.

4.2.1.4 The flag State Administrations that participated in the interviews accounted for a total of around 670,000 DWT, approximately 30% of the world fleet[67]. The participating companies covered the majority of the world fleet, and the seafarer representatives a total of around 1.2 million seafarers worldwide. The ROs represented in the interviews and surveys accounted for most of the world's fleet.

4.2.1.5 A semi-structured approach was used for the interviews. Figure 5 provides a general overview of the framework used to generate the questions, which were designed to capture relevant aspects of the ISM Code as well as issues related to the implementation, verification, certification, monitoring and enforcement tasks and responsibilities in the ISM stakeholder system (see section 2.2 for an overview). The interviews started with a general question about the benefits and issues related to the ISM Code. This was followed by more specific questions concerning implementation, company structure, verification and certification, port State control inspections, resources and personnel in relation to manning, and suggestions for improvements.

Although the general framework was similar for all stakeholder groups, some adjustments were made to ensure relevance and to gain more detailed insights on stakeholders' experiences and views concerning their own tasks and responsibilities in relation to the ISM Code.

All interviews were treated confidentially to allow participants to candidly share their observations, experiences and viewpoints. In this way, the interviews contributed valuable insights and perspectives.

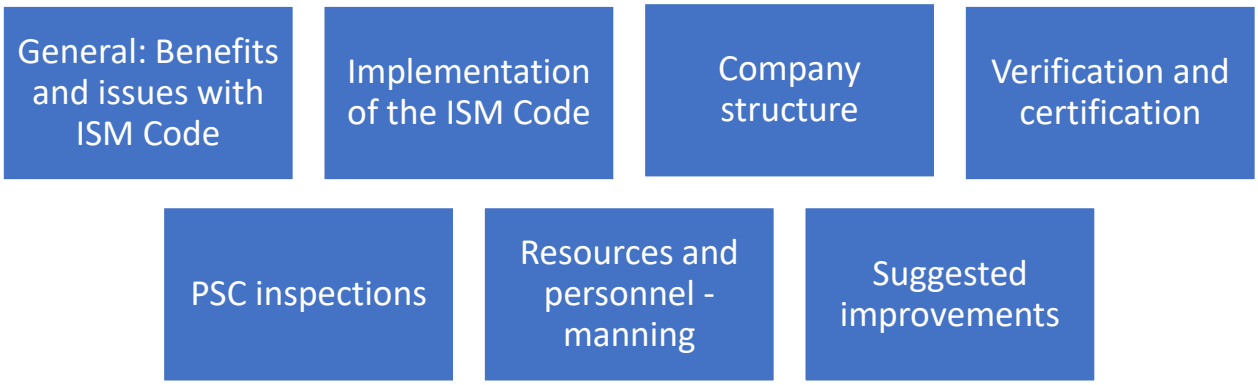

Figure 5: Framework used for interview questions

4.2.1.6 The interviews were conducted in April and May 2024 (annex A). Most took around 75 minutes. Wherever possible (time zone permitting) two members of the panel of experts conducted the interview.

[67] United Nations Conference on Trade and Development. (2024). *Review of Maritime Transport 2023: Towards a green and just transition* (No. UNCTAD/RMT/2023). https://shop.un.org/

4.2.2 Marine accident investigation reports

4.2.2.1 Marine Safety Investigation Reports were extracted from the IMO's Global Integrated Shipping Information System (GISIS), using the following parameters:

- incident date on or after 1 January 2010; and
- either the "Event and consequences" section containing the phrase "International Safety Management" or "Safety Management System"; or the "Issues raised/lessons learned" section containing one of those phrases.

4.2.2.2 These data were originally selected for discussion by the Working Group/Corresponding Group on Casualty Analysis in the Implementation of IMO Instruments (III) Sub-Committee and thus form part of IMO document III 9/4 (annexes 4 and 5). In total, 62 relevant reports were found through GISIS, with three further incidents added later in the process, bringing the total of reports analysed as part of this study to 65.

4.2.2.3 Forty of the 65 cases involved bulk and general cargo vessels. The following types of accidents made up the total:

- fire/explosion (12 cases);
- collision (10 cases);
- stranding/grounding (10 cases);
- person [man] over-board (eight cases);
- enclosed space (six cases);
- fall from height (four cases);
- mooring/anchor handling (four cases);
- handling lifting devices (three cases); and
- other (eight cases).

4.2.2.4 As part of the investigation report analyses, two main aspects were examined. The first was whether the analysed investigation reports identified SMS as a contributing factor, and the second related to whether ISM deficiency could have been identified during an inspection or audit or verification prior to the accident.

4.2.3 Surveys

4.2.3.1 Seafarer survey

4.2.3.1.1 Seafarers' perspectives were included in this study in two ways. First, representatives from seafarers' interest organizations were among the stakeholders interviewed (section 4.2.1). Second, to supplement this, responses were sought from active seafarers through an online survey issued between October 2023 and January 2024, which received 1,501 responses from individuals who were active seafarers at the time of the survey (see annex B for information on respondents' characteristics).

4.2.3.1.2 The survey included an open question asking respondents to identify "any specific areas of the ISM Code that you believe require improvement or revision". This question received 273 individual responses, which were coded and analysed for this report. Of these 273 respondents, seven (2.6%) were women. Most respondents were between 26 and 35 (29.3%) or between 36 and 45 (37.4%) years old. Their length of experience at sea varied: 30.8% had up to 10 years' experience, 37.7% had 11-20 years' experience, and 31.1% had more than 20 years' experience. Almost all respondents were officers (3.3% were ratings or did not indicate their position), with the most frequently mentioned positions being master (33.3%), chief officer (20.9%), as well as second officer and chief engineer (10.6% each). Almost all respondents (92.3%) reported that English had been the working language (or one of the working language) on their current or most recent voyage. The results of the seafarer survey are integrated and discussed in section 4.5 (general findings).

4.2.3.2 Recognized organizations survey

4.2.3.2.1 At the request of the organizations, a survey was used to collect information from ROs. The same question structure used for the interviews described in section 4.2.1 was emailed to seven ROs. Four of these returned the completed survey.

4.2.4 ISM verifications and port State control inspection data

4.2.4.1 ISM verification and port State control inspection data

4.2.4.1.1 ISM verification data was provided by six ROs (all members of IACS) and one flag State. The latter provided data from eight ROs concerning verifications of companies and vessels registered under its flag. The data included findings from DOC and SMC verifications over a five-year period (2019–2023) as well as information on the nature of the findings (i.e. minor and major non-conformities) and the sections of the ISM Code to which the non-conformities related.

4.2.4.1.2 The above-mentioned data varied in their level of detail. For example, some provided references to the ISM Code only at the highest level (e.g., section 1), one provided information on individual paragraphs (e.g. paragraph 1.2), while others presented further details (e.g. 1.2.2, 1.2.2.1). Some provided aggregate data that combined information on minor and major non-conformities, while others distinguished between those two categories. The data varied in respect of the variables provided (e.g. some provided additional information such as vessel type) and how variables were coded or categorized.

4.2.4.1.3 These data variations partly reflected the type of data that are routinely extracted from verification reports by a particular RO or flag State, and which were therefore available for analysis. In addition, the data reflected the limitations imposed by different confidentiality considerations. For instance, IMO numbers, which would have made it possible to link different datasets, were not generally available in the data sets provided.

4.2.4.1.4 Another challenge was the format of the data provided: some were presented in aggregated form in summary tables, others as spreadsheets, sometimes with inconsistencies between them. Additional information was provided in email correspondence. Some data were presented at the verification level and others at the outcome level, thus necessitating comprehensive recoding.

4.2.4.1.5 This situation made systematic comparisons across the datasets difficult, other than the basic analyses reported below. Given the variation in the data provided by different organizations, this report, for each analysis, used the data from those organizations (ROs and flag State) where that data was available. The sources of data are indicated for each table and figure, using anonymized IDs for ROs ("A"-"F" for ROs, "FS" for the flag State).

4.2.4.2 Port State control inspection data

4.2.4.2.1 Port State control inspection data was sourced from the Tokyo MoU database and the Tokyo MoU annual reports for 2013–2023[68]. The Tokyo MoU covers 22 member authorities from the Asia-Pacific region, who together conduct a significant proportion of global inspections. To provide context, in 2023, 27,544 individual ships visited the ports in the region,[69] and Tokyo MoU member authorities carried out 30,887 inspections involving 18,298 individual ships registered under 101 flag State Administrations.[70] The Tokyo MoU database was selected because its deficiency code includes a general part for ISM-related deficiencies but also identifies sub-categories of those deficiencies (see table 1), thus allowing for a more detailed understanding. For this report, data on ISM-related deficiencies and detentions for the period 2013–2023 were analysed.

Table 1: Tokyo MoU deficiency codes for ISM-related non-compliance

Code	Description	Category
15100	**15100 – ISM**	
15101	15101 – Safety and environment policy	ISM
15102	15102 – Company responsibility and authority	ISM
15103	15103 – Designated person(s)	ISM
15104	15104 – Master's responsibility and authority	ISM
15105	15105 – Resources and personnel	ISM
15106	15106 – Shipboard operations	ISM
15107	15107 – Emergency preparedness	ISM
15008	15108 – Reports of NC, accidents and hazardous occurrences	ISM
15109	15109 – Maintenance of the ship and equipment	ISM
15110	15110 – Documentation-ISM	ISM
15111	15111 – Company verification, review and evaluation	ISM
15112	15112 – Certification, verification and control	ISM
15150	15150 – Multiple elements of the ISM Code	ISM
15199	15199 – Other (ISM)	ISM

[68] Tokyo MoU Annual Reports 2013–2023, available at https://www.tokyo-mou.org/publications/annual_report.php. Accessed 26 June 2024.

[69] Tokyo MoU Annual Report 2023, p. 10. Available at https://www.tokyo-mou.org/doc/ANN23-web.pdf.

[70] Tokyo MoU Annual Report 2023, available at https://www.tokyo-mou.org/doc/ANN23-web.pdf. Accessed 8 August 2024.

4.3 Data analysis

4.3.1 Interviews

4.3.1.1 All interviews were recorded and automatically transcribed in Microsoft Teams. The transcripts were read and corrected where appropriate. The responses from each participant were collated into a joint document for each stakeholder group (e.g. shipping companies, port State control, etc.). Within each stakeholder group's document, the responses were thematically sorted. Two members of the research team cross-checked the coding to enhance its consistency and quality. All the themes were then entered into a spreadsheet and the thematic responses of each stakeholder group were added. The responses for each theme were then summarized across all groups. The summaries were used in the report for each thematic discussion, illustrated by a selection of verbatim quotes. In the report, after each quote, the source of the quote is indicated with the following abbreviations: Co = Company, PSC = Port State Control, FS = Flag State, RO = Recognized Organization, V = Vetting, SR = Seafarer Representative, CI = Consultant (Maritime SMS). For reasons of readability and space, the number of quotes for each theme is limited to three or four. Additional supporting quotes are included in annex C. Quotes are presented here as provided and have not been "corrected" by the panel.

4.3.2 Surveys of seafarers and recognized organizations

4.3.2.1 Two sets of survey responses to open-ended questions were analysed. Seafarers' responses to an open-ended question from an online survey were coded thematically, using the coding framework developed on the basis of the stakeholder interviews (section 4.3.1). A few additional codes were created where necessary.

4.3.2.2 The survey responses from the ROs were coded and analysed together with the responses from the RO interview, using the same coding framework as for the other interviews (section 4.3.1). The data from the RO survey was then entered in a spreadsheet with the other data and summarized accordingly.

4.3.2.3 In the report, the results from the analyses of the responses from the seafarer survey and the RO survey are presented together with the interview data in section 5.4 (general findings). Direct quotes are included as examples. After each quote, the source of the quote is indicated (i.e. "seafarer survey"; "survey RO"). Some language or grammatical errors may be present in the quotes, because they are presented here as provided and have not been "corrected" by the panel.

4.3.3 ISM verification data

4.3.3.1 Depending on the type, detail and structure of the data, the data provided by the ROs and the flag State were recoded to ensure comparability.

4.3.3.2 For the analyses in this report, only minor and major non-conformities were considered and observations were excluded. Furthermore, ISM-related non-conformities were defined as those referring to Part A of the ISM Code.

4.3.3.3 Where possible, the data were set up in a spreadsheet, with variables indicating type of certification (DOC, SMC), year of verification, verification type and outcome (minor non-conformity; major non-conformity), and references to the relevant sections or paragraphs of the ISM Code.

4.3.3.4 Each analysis was carried out using data from those organizations (ROs and flag State) where the relevant information was available. The sources of the data are indicated for each table and figure, using anonymized IDs for the ROs (i.e. A-F) and the flag State (i.e. FS).

4.3.3.5 The data provided by the flag State comprised verifications performed on vessels registered under its flag; these verifications had been carried out by eight ROs, which were not identified in the dataset. Because of the potential overlap between the data provided by the flag State and those provided by the six ROs, the two sets are presented separately in this report.

4.3.3.6 Figures 5.1-5.4 and annex D present descriptive statistics on the number and percentage of non-conformities overall and those relating to particular sections of the ISM Code. Throughout, percentages were rounded to the nearest decimal, and thus may not add up to 100.

4.3.4 Port State control inspection data

4.3.4.1 The information on the total number of port State control inspections conducted by Tokyo MoU member authorities, and the deficiencies and detentions issued, for the period 2013–2023, was obtained from the Tokyo MoU database and the Tokyo MoU annual reports covering that period[71]. The latter were used as a baseline for comparison with the data obtained from the Tokyo MoU database on ISM-related deficiencies and detentions during the same period.

4.3.4.2 Figures 5.5 to 5.10 and annex E present descriptive statistics concerning the frequency of ISM-related deficiencies and detentions between 2013–2023. Throughout, percentages were rounded to the nearest decimal, and thus may not add up to 100.

4.3.5 Marine accident investigation reports

4.3.5.1 The primary questions posed in the analysis of each of the marine safety investigation reports were:

.1 does the report identify SMS as a contributing factor?

.2 in your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?

4.3.5.2 The first question does not necessarily only refer to the SMS as the sole active contributor to an accident, but also includes circumstances where the lack, or incompleteness of, for example, the SMS or a specific procedure, may be a causal factor[72]. It should be noted that the second question is dependent on the individual analyst, since another analyst with a different background and other experiences may have delivered a somewhat different conclusion. To reduce subjective bias as much as possible, two analysts were involved in the process. The analysts involved have a seafaring background, are experienced analysts in maritime authorities, and participate in the IMO Casualty Analysis Working Group.

[71] Tokyo MoU Annual Reports 2013–2023, available at https://www.tokyo-mou.org/publications/annual_report.php. Accessed 26 June 2024.

[72] IMO Resolution MSC.255(84), Annex, Chapter 2.2: A causal factor means actions, omissions, events or conditions, without which: .1 the marine casualty or marine incident would not have occurred; or .2 adverse consequences associated with the marine casualty or marine incident would probably not have occurred or have been as serious; or .3 another action, omission, event or condition, associated with an outcome in .1 or .2, would probably not have occurred.

4.3.5.3 A full list of summarized outcomes of the analyses for each investigation report is included in annex F. Additionally, as part of the present report, three cases from the investigation reports have been included and used as concrete examples. The details of each of the three case studies are included in annex G. They include a fatality on a cement carrier, the grounding of a car carrier and a fire on board a multipurpose vessel. All these cases point to SMS shortfalls, and provide detailed information on the causal factors.

4.4 Research ethics

4.4.1 Participation in the study was voluntary. All participants were informed about the study and agreed to participate. Interview participants received and signed an information consent form. All collected data were treated, managed and stored in accordance with the EU General Data Protection Regulation.

4.5 Study quality

4.5.1 The study adopted a multi-method approach which combined several types of data to examine the implementation of the ISM Code and identify challenges and recommendations. While it may be difficult to draw conclusions based on a single data point (e.g. a single interview, a single accident report, or statistical information from a single company or State), the multi-method approach makes it possible to draw conclusions on the basis of triangulation between multiple types of data. This strengthens the validity of the study. As discussed above, the data included statistical information on ISM verifications, port State control inspections and in-depth analyses of accident reports. Additional data came from interviews and surveys with different stakeholder groups, which provided insights into the implementation of the ISM Code based on first-hand experience and observations of different aspects of the ISM Code and its implementation. This was complemented by a literature review of previous studies of the ISM Code.

4.5.2 Data sources and participants were selected to ensure the broadest possible coverage. As described above, the accident reports analysed for this study are the complete set of reports that met the inclusion criteria. ISM verification data was obtained from six major ROs and one large flag State, which together cover the majority of the world fleet. The data on port State control inspections were obtained from the Tokyo MoU, a region that covers large parts of Asia, the Pacific and North America. The seafarer survey reached a wide range of respondents with different positions on board and drawn from different countries. Finally, the interview participants were carefully selected to maximize the range of stakeholders, nationalities, company sizes and ship fleet profiles.

4.5.3 Throughout the study, the expert group have taken great care to reduce bias and enhance reliability and validity. As described above, participants and data sources were carefully selected to ensure the quality of the information. Interviews were conducted by two members of the expert group wherever possible, and analyses were cross-checked and peer-reviewed by group members. In the report, selected case studies and numerous quotes are used to document the findings from the analysis of the qualitative data from the accident reports, interviews and surveys. Additional material is provided in the annexes.

5 FINDINGS

This section starts with an overview of the marine accident report findings and insights from the data on ISM verifications and port State control (Tokyo MoU) inspections. Next, the findings from the interviews, surveys and literature review are integrated and discussed in the general findings. Where possible, the findings from the marine accident reports, port State control data and verification data are also discussed in the general findings.

5.1 Findings from marine safety investigation reports

5.1.1 The SMS was identified as a contributing factor in 53 of the 65 analysed reports. Table 2 shows how the accident reports refer to the SMS as a contributing or causal factor, or else featured in other ways.

Table 2: Findings from the marine safety investigation reports

Findings identified	Contributing/causal factors	Other way	Total
Risk assessment[73]	10	5	15
Risk analysis[74]	5	2	7
Not fully implemented	21	10	31
Lack of written procedures	11	–	11
SMS lacking at organizational level	28*	2*	30
a. SMS not complete	18	2	
b. SMS not followed at organizational level**	11	1	
Not following procedures (on individual level)	21	5	26
Lack of common language	–	4	4

*The total is one less than the sum of a and b since two cases occur in both sub-sections a and b.
** "SMS not followed at organizational level" may refer to, for example, a case where the SMS states that there should be a lookout on the bridge 24/7 and everyone, including vessel and company management, accepts that there is no lookout.

5.1.2 In 50 of the 65 reports, the analysts assessed that it would have been possible to identify the ISM deficiency during an inspection (37 yes and 13 maybe/probably), which corresponds to 77% of all reports analysed.

5.1.3 To summarize, the findings from these 65 reports showed that:

- in 26 (40%), written procedures were not followed;
- in 22 (34%), risk assessment and risk analysis was lacking;
- in 11 (17%), there was a lack of written procedures; and
- in 4 (6%), there was a lack of common language.

The detailed findings from these analyses are integrated and discussed in section 5.4 (general findings).

[73] **Risk assessment** this refers to a lack of risk assessment at an individual level (i.e. no job safety analyses undertaken) before a shipboard task is undertaken.

[74] **Risk analyses** this refers to an organisation level shortfall and refers to a lack of risk analyses in the SMS for a specific task.

5.2 Findings from ISM verification data

5.2.1 Figure 5.1 shows the number of DOC and SMC verifications conducted between 2019 and 2023, based on data provided by five ROs (ROs A-D and F) and one flag State (see table D-1 in annex D). The figure shows both the total number of verifications, as well as the number and percentage of verifications for which ISM-related non-conformities were identified. In each of the organizations, the percentages of DOC and SMC verifications with ISM-related non-conformities were similar. For ROs C-D and F and flag State FS, the percentage of verifications with ISM-related deficiencies was roughly around 20-30%. The percentage was noticeably lower for RO A (around 9%), and noticeably higher for RO B (around 45-50%).

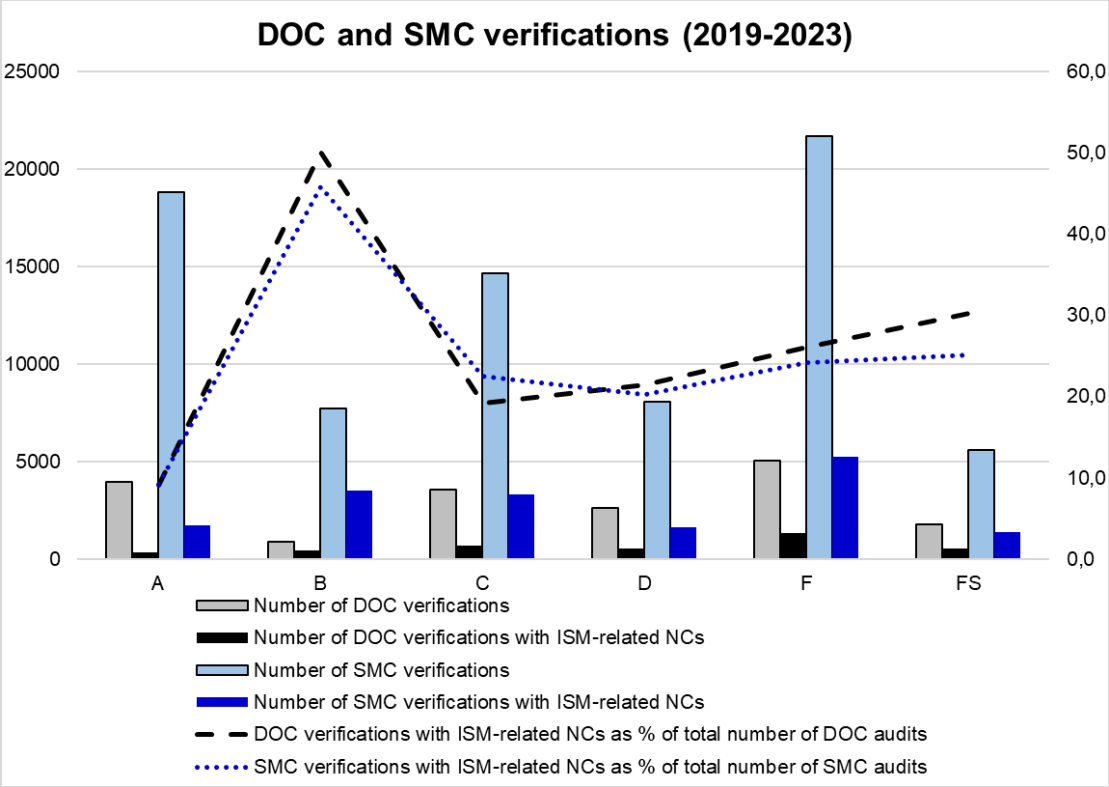

Figure 5.1: DOC and SMC verifications (2019-2023) in ROs A-D and F and flag State FS.

5.2.2 Figures 5.2a and 5.2b show the total number of minor and major non-conformities (NCs) related to the ISM Code during 2019–2023 reported by five ROs and one flag State, and the sections of the ISM Code to which the NCs relate. Detailed information is shown in annex D (tables D-2, D-3a and D-3-b).

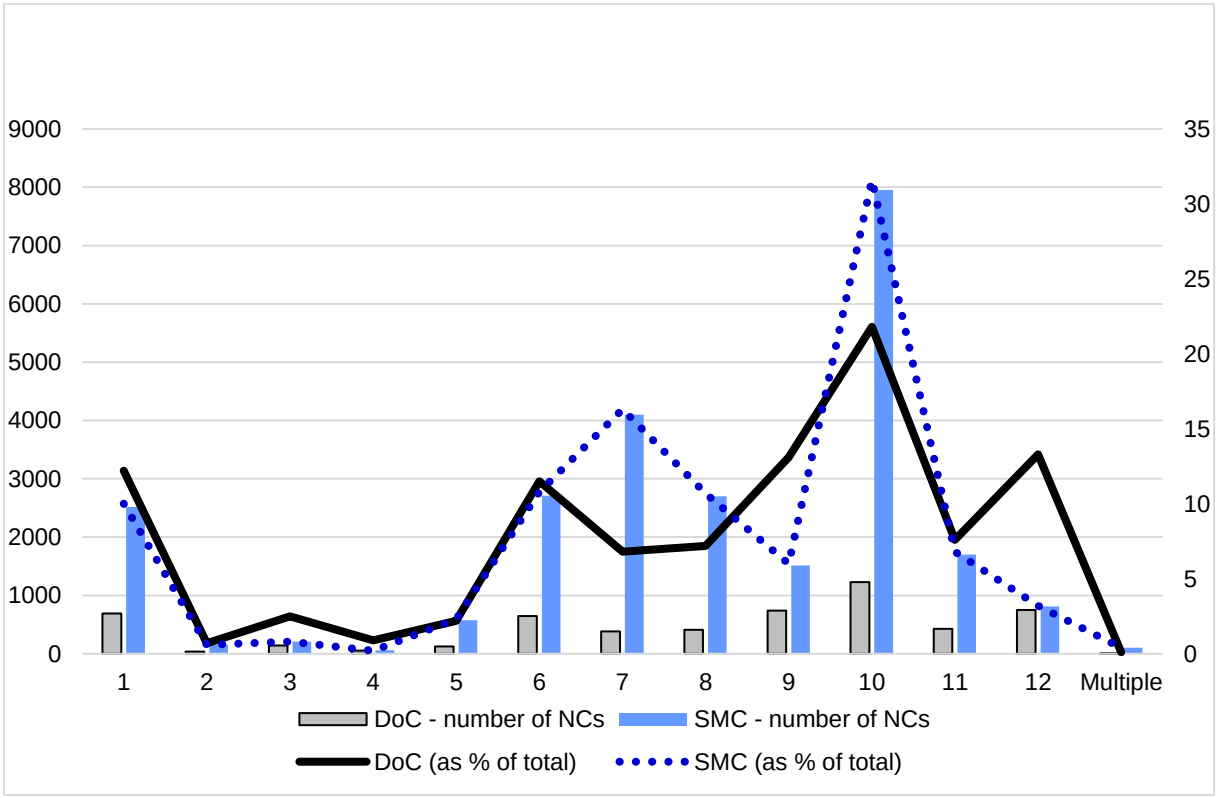

Figure 5.2a: Total number of major and minor non-conformities (NCs) identified in DOC and SMC verifications, based on data from ROs A-E.

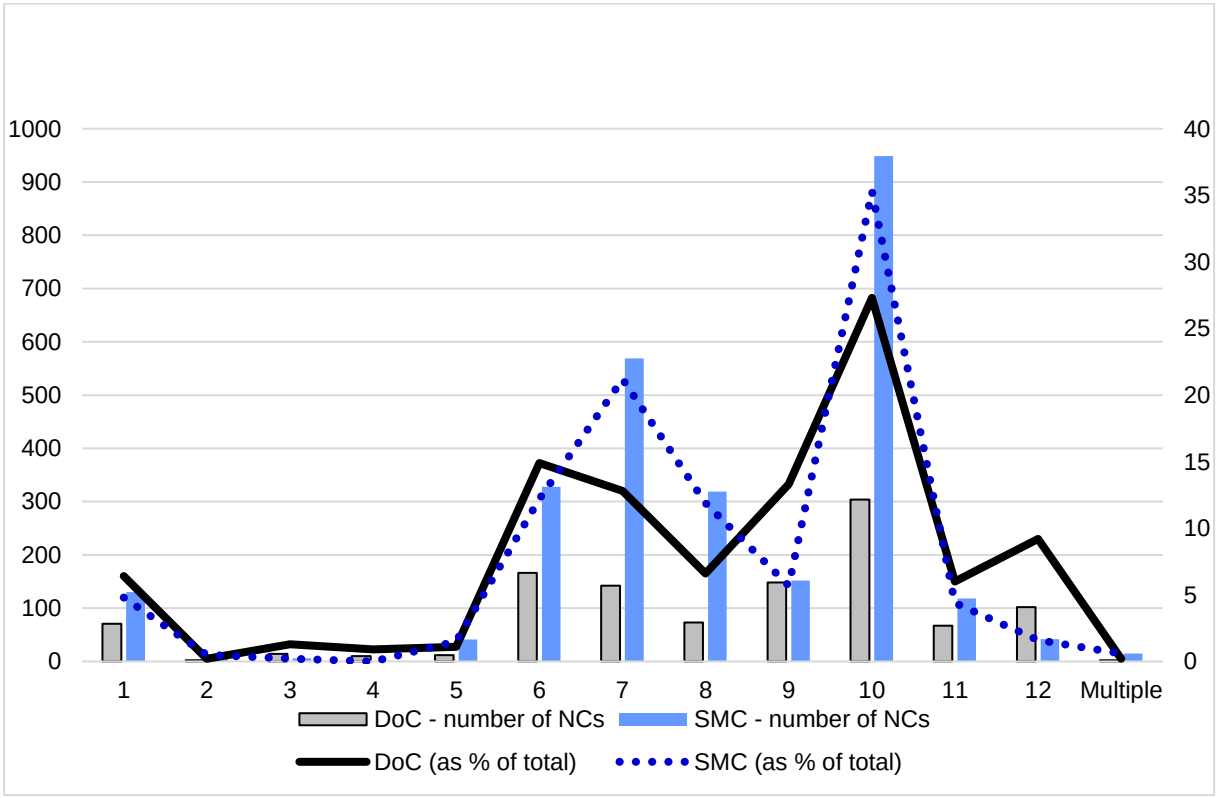

Figure 5.2b: Total number of major and minor non-conformities (NCs) identified in DOC and SMC verifications, based on data from flag State FS.

5.2.3 In the data provided by the ROs (figure 5.2a; table D-3a) for DOC verifications, the largest percentage of NCs related to "Maintenance of the ship and equipment" (section 10; 21.8%). This was followed by "Company verification, review, and evaluation" (section 12; 13.3%), "Reports and analysis of NCs, accidents, and hazardous occurrences" (section 9; 13.1%), "General" provisions (section 1; 12.2%) and "Resources and personnel" (section 6; 11.5%). The pattern was similar in the data provided by the flag State (Figure 5.2b; Table D-3b), with NCs related to section 10 being most frequent (27.3%), followed by the NCs related to sections 6 (14.9%) and section 9 (13.3%). In contrast to the RO data, the NCs related to "Shipboard operations" (section 7; 12.8%) were among the most frequent, while the NCs related to section 12 (9.2%) were less frequent.

5.2.4 For SMC verifications, the section that was referenced by the largest percentage of NCs was the same as for DOC verifications, namely "Maintenance of the ship and equipment" (section 10; ROs: 31.6%, FS: 35.3%). However, unlike with the DOC verifications, for SMC verifications, the references that followed concerned sections related to the procedures involved in key shipboard operations, notably "Shipboard operations" (section 7; ROs: 16.3%; FS: 21.2%), "Resources and personnel" (section 6; ROs: 10.8%; FS: 12.2%) and "Emergency preparedness" (section 8; ROs: 10.7%; FS: 11.9%).

5.2.5 Figures 5.3 and 5.4 (see also tables D-4 and D-5 in annex D) provide more detailed information on major and minor NCs, respectively. The relevant data were made available by Ros A-E.

5.2.6 As shown in Figure 5.3 (table D-4 in annex D), most of the major DOC non-conformities related to the "General" provisions (section 1: 44.7%), which include safe operating practices and risk assessment. This was followed by "Company verification, review and evaluation" (section 12: 14.0%), "Resources and personnel" (section 6: 10.0%) and "Reports and analysis of NCs, accidents, and hazardous occurrences" (section 9: 10.0%). For the SMC, the most prominent major NCs came under "Maintenance of the ship and equipment" (section 10: 32.0%). This was followed by "General" provisions (section 1: 19.1%), "Emergency preparedness" (section 8: 11.5%) and "Shipboard operations" (section 7: 11.1%).

5.2.7 Turning to minor non-conformities (figure 5.4 and table D-5), the ISM verification data showed a different pattern for DOC verifications as compared with those where major non-conformities were found, with "Maintenance of the ship and equipment" (section 10) issues dominating at 22.1%. This was followed by "Company verification, review, and evaluation" (section 12) and "Reports and analysis of non-conformities, accidents, and hazardous occurrences" (section 9), each accounting for 13.2% of the minor NCs in DOC verifications. The SMC minor NCs followed a similar pattern to the major NCs, with "Maintenance of the ship and equipment" (section 10) comprising the majority (31.6%). Some differences were identified in the second and third items, with "Shipboard operations" (section 7) comprising 16.6% of SMC minor NCs, followed by "Resources and Personnel" (section 6) at 10.9%.

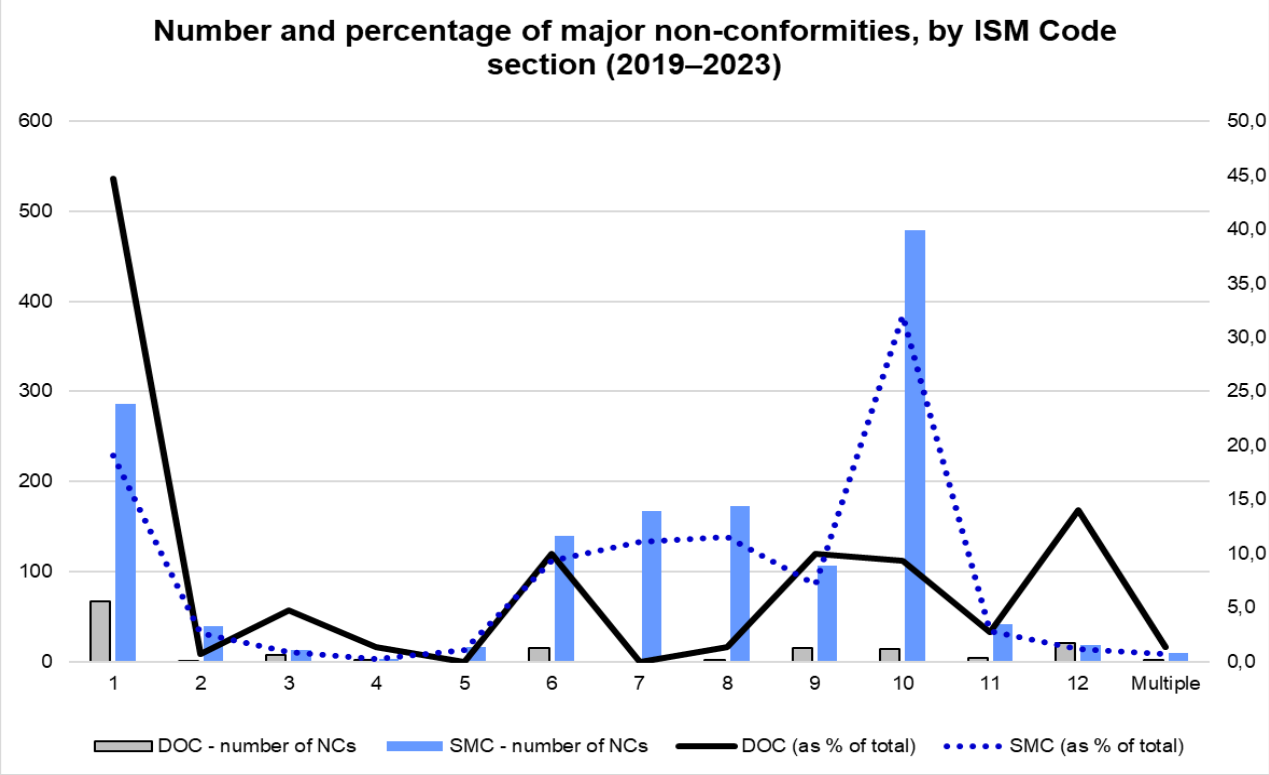

Figure 5.3: Number of major non-conformities identified in DOC and SMC verifications in ROs A-E.

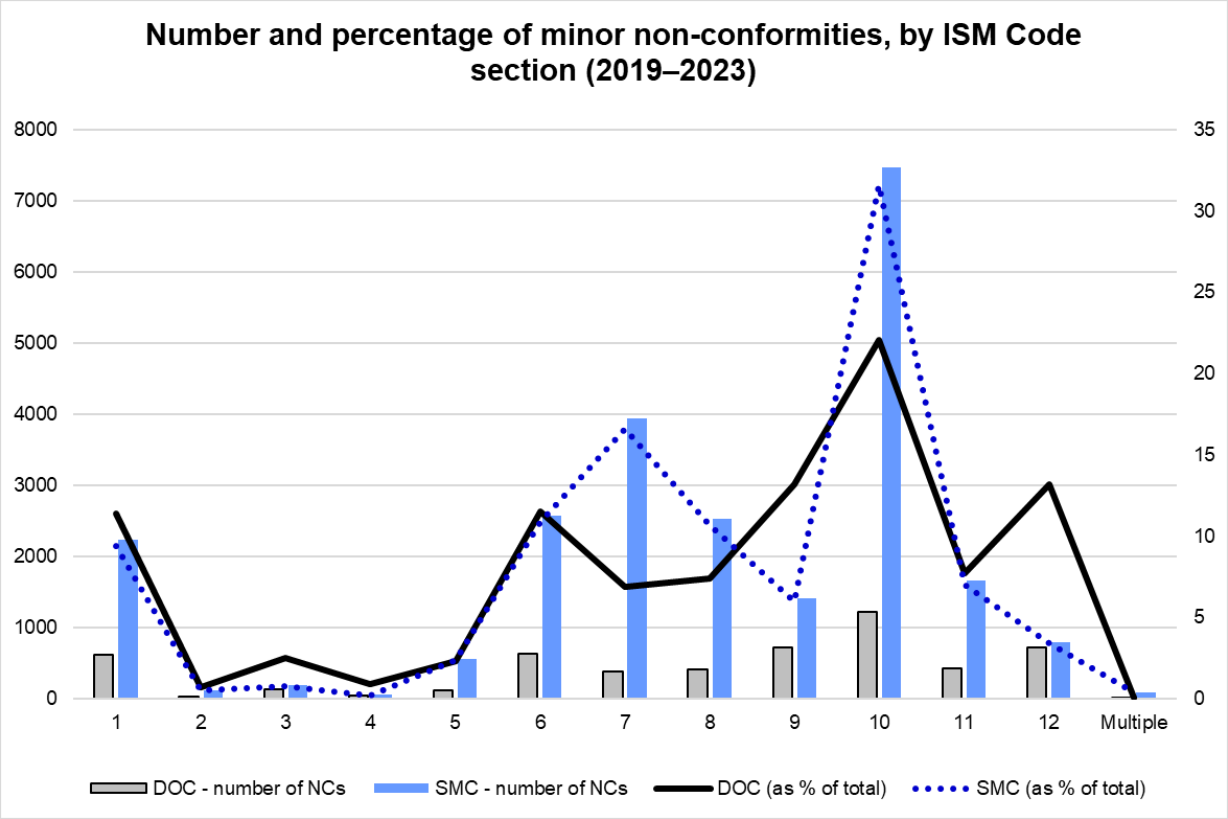

Figure 5.4: Number of minor non-conformities identified in DOC and SMC verifications in ROs A-E.

5.2.8 While some ROs provided data only about the highest ISM section level, those from three ROs and the flag State included references to specific paragraphs of the ISM Code, at least for some of the NCs. Tables D-6a and D-6b in annex D show the data from the three ROs and the flag State, respectively. Paragraph 10.2 was the most frequently mentioned (DOC: ROs: 14.5%, FS 13.5%; SMC: ROs 22.1%, FS 19.2%). It concerns the processes related to "conducting inspections, reporting non-conformities, corrective actions and records" related to maintenance. Other parts with a high share of NCs included section 7 "Shipboard operations" (DOC: ROs 7.6%, FS 12.8%; SMC: ROs 17.5%, FS 21.2%) and paragraph 1.2 (DOC: Ros 10.1, FS 4.5%; SMC: ROs 8.8%, FS 3.9%), which concerns the Code's objectives and companies' safety management objectives and SMS, and is linked to risk assessment, as well as paragraphs 8.2 concerning drills (DOC: ROs 6.1%, FS 4.3%; SMC: ROs 7.7%, FS 6.8%) and (for DOC verifications) paragraph 9.2 (corrective actions; ROs 7.6%, FS 6.6%).

5.3 Findings from Tokyo MoU port State control inspection data

5.3.1 The Tokyo MoU member authorities carried out over 30,000 inspections per year between 2013 and 2023, although with a dip during 2020–2022, the years of the COVID-19 pandemic (table E-1 in annex E). Deficiencies were reported in about 60% of these inspections, again with a lower number of deficiencies reported during the COVID-19 period, followed by an increase to pre-COVID levels in 2023.[75]

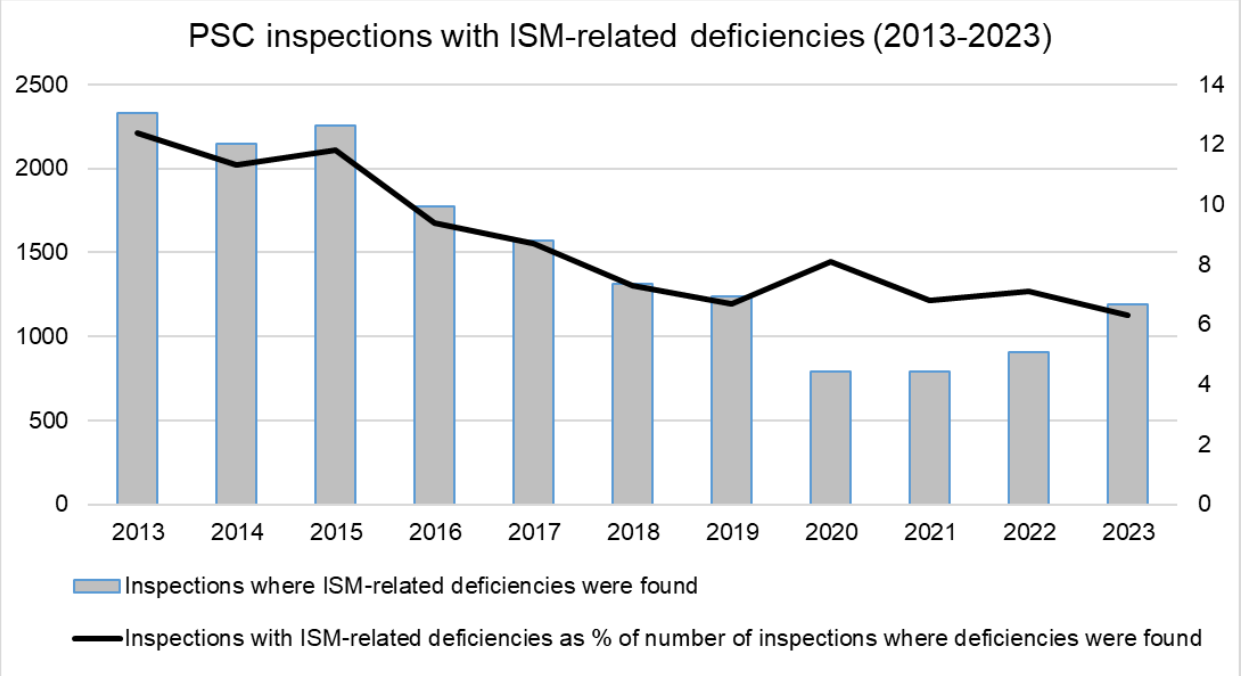

Figure 5.5: Port State control inspections with ISM-related deficiencies, 2013-2023. Based on Tokyo MoU data.

[75] Similar trends in the total numbers of inspections and deficiencies can be observed in the data reported by the Paris MoU for 2013–2022. See Paris MoU on Port State Control 2023, *Annual Report 2022*. Paris MOU Annual Report 2022.pdf.

5.3.2 Turning to ISM-related deficiencies during the same period (figure 5.5 and table E-1 in annex E) during the same period, there was an overall decrease in the number of **inspections** with ISM-related deficiencies, from 2,329 (in 2013) to 1,190 (in 2023). The number of inspections identifying ISM-related deficiencies was especially low in 2020 and 2021 (791 and 792 inspections, respectively) but increased again to 1,190 in 2023. Considering the number of ISM-related **deficiencies** (figure 5.6; table E-1), the pattern was similar, with an overall decrease from 3,100 (in 2013) to 1,190 (in 2023) and an especially low number of ISM-related deficiencies in 2020–2022. Concerning detentions (figure 5.7; table E-1), the data suggest that on average, 26.0% of the vessels where ISM-related deficiencies were found were detained – this percentage increased from 24.8% in 2013 to 37.6% in 2023. It is noteworthy that this increasing trend was not interrupted by the COVID-19 pandemic. As shown in the Tokyo MoU Report of 2023, ISM-related deficiencies emerged as the most frequent "detainable deficiencies" in 2022 and 2023[76].

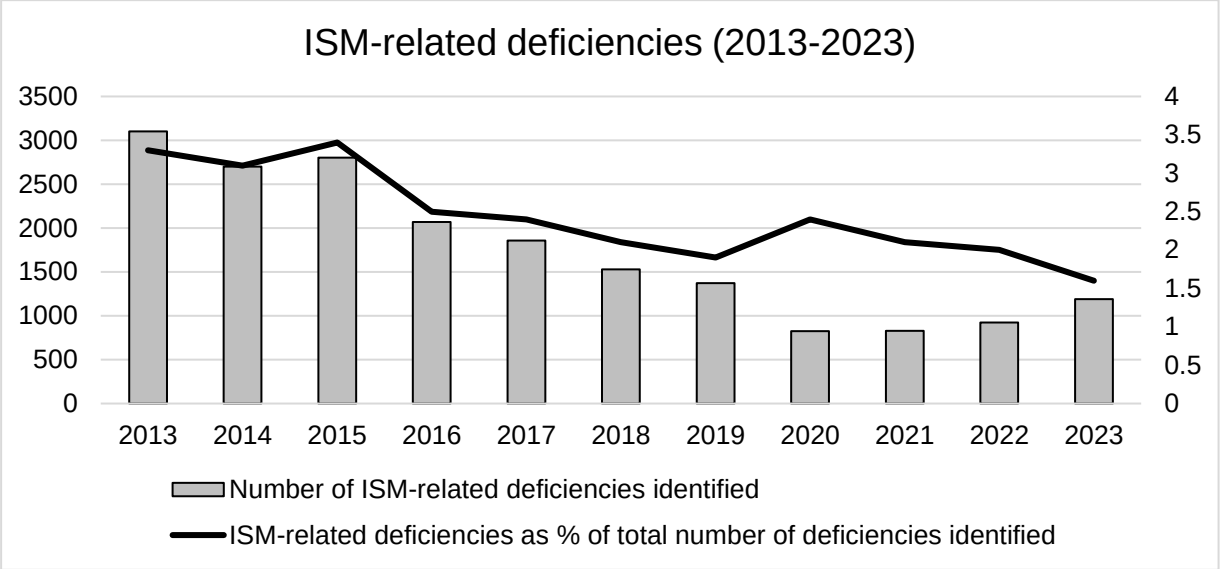

Figure 5.6: ISM-related deficiencies, 2013-2023. Based on Tokyo MoU data.

[76] Tokyo MoU Annual Report 2023, figure 8 and figure 19.

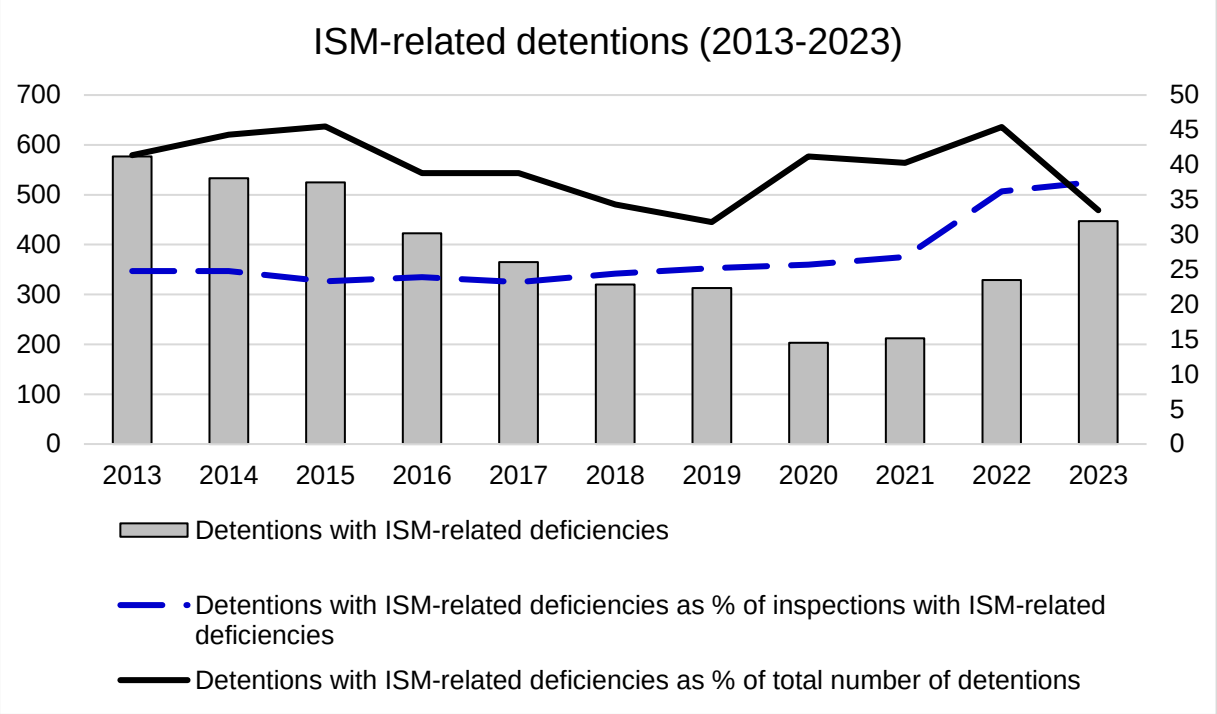

Figure 5.7: ISM-related detentions, 2013-2023. Based on Tokyo MoU data.

5.3.3 Figure 5.8 shows how often each of the Tokyo MoU's ISM-related deficiency codes was reported between 2013 and 2023 (see table E-2 in annex E; for information by year, see table E-3). The most frequently identified deficiencies were related to "Maintenance of the ship and equipment", which accounted for 22.9% of the deficiencies, closely followed by "Shipboard operations" with 20.7%. "Resources and personnel" was identified in 12.2% of the deficiencies.

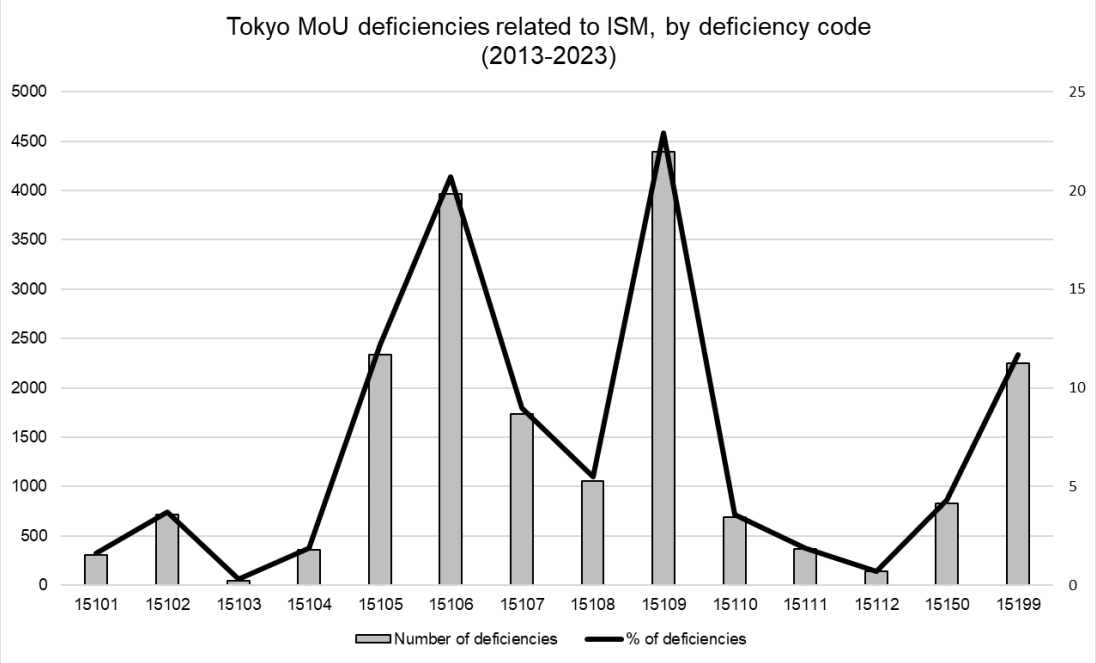

Figure 5.8: ISM-related deficiencies (2013-2023), by deficiency code (see table 1 for descriptors of the codes). Based on Tokyo MoU data.

5.3.4 Figure 5.9 (table E-4 in annex E) compares the ISM-related non-conformities (NCs) identified in SMC and DOC verifications with the deficiency codes identified in Tokyo MoU port State control inspections in 2019–2023. The data show some similarities. In particular, in DOC verifications, SMC verifications and port State control inspections, by far the highest number of NCs/deficiencies were related to "Maintenance of the ship and equipment" (ISM Code section 10). Furthermore, both SMC verifications and port State control inspections frequently identified NCs/deficiencies related to "Shipboard operations" (section 7) and "Emergency preparedness" (section 8).

5.3.5 Turning to detentions, the port State control inspection data from 2013-2023 revealed 4,247 vessel detentions with ISM-related deficiencies. This corresponded to 39.4% of all vessels detained. Figure 5.10 shows the ISM sections (Part A) referenced in relation to these detentions (table E-5 in annex E).

5.3.6 As shown in figure 5.10, in 21.9% of the detentions, port State control inspectors referenced more than one section of the ISM Code. For detentions where only one ISM section was referenced, the most frequently occurring was section 10 on "Maintenance of the ship and equipment" (16.1%). This was followed by section 7 "Shipboard operations" (10.4%) and section 6 "Resources and personnel" (6.3%).

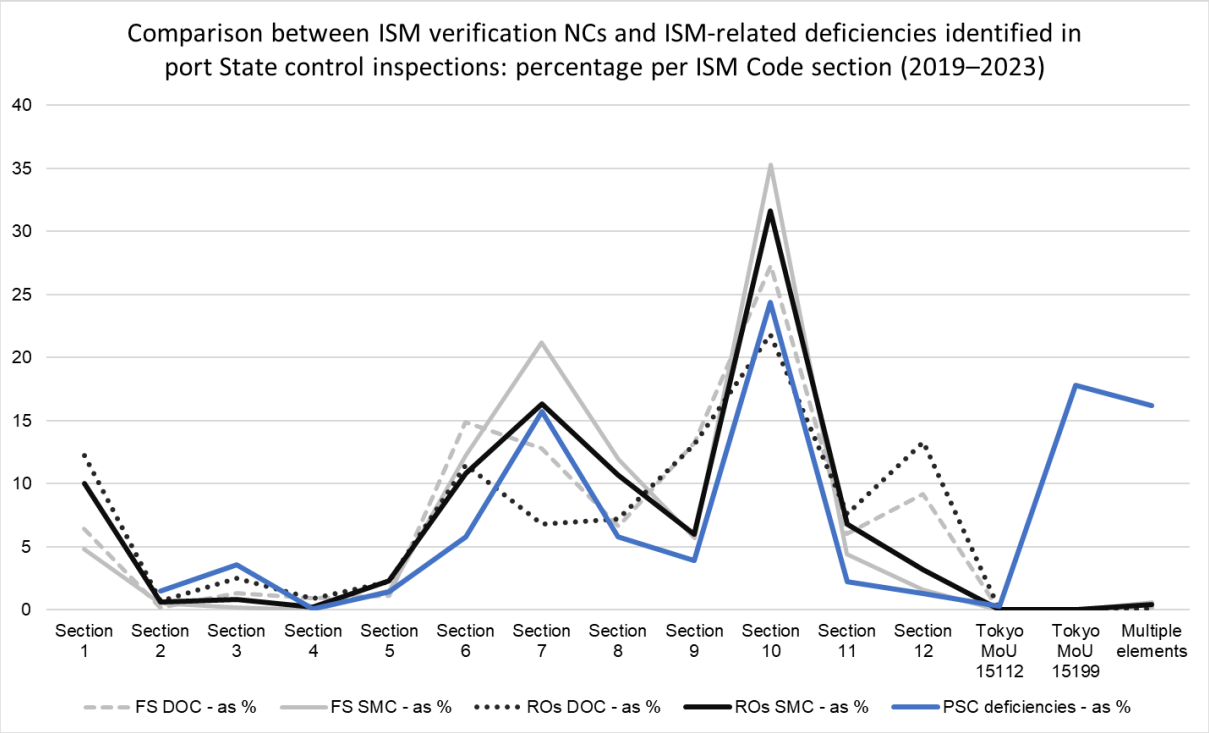

Figure 5.9: Comparison between ISM Code sections referenced in ISM verification non-conformities and in Tokyo MoU port State control inspections, 2019-2023.

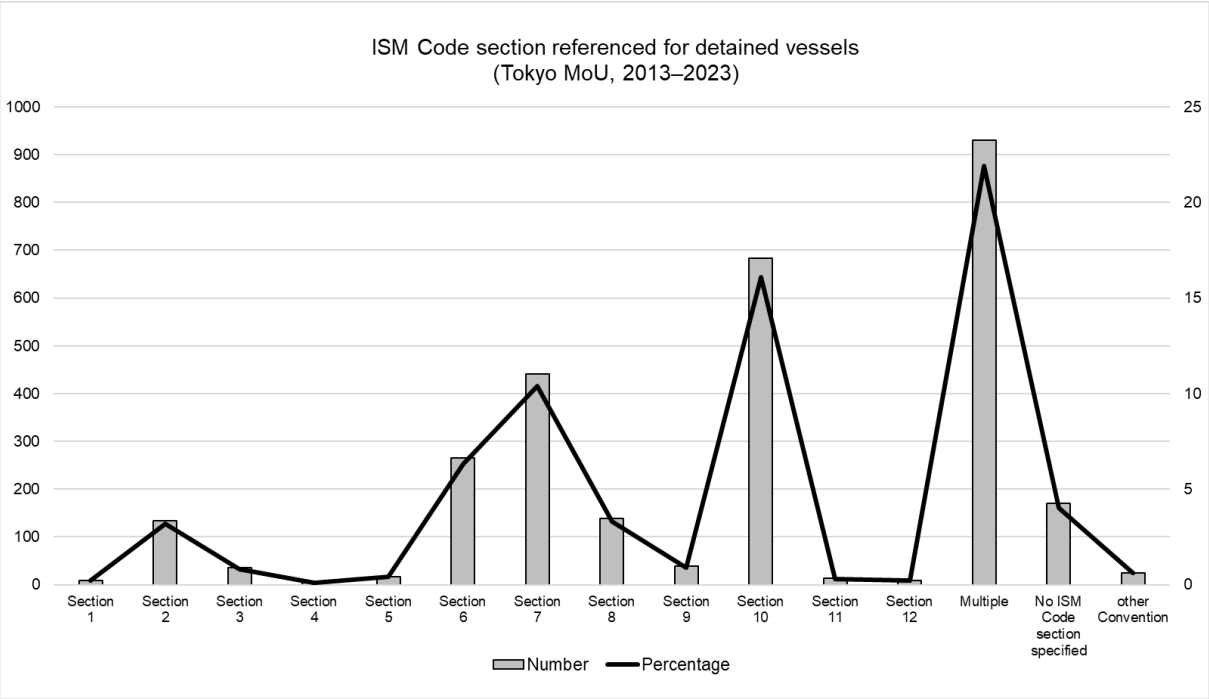

Figure 5.10: ISM Code section referenced for detained vessels, 2013-2023. Based on Tokyo MoU data.

5.4 General findings

This section presents the integrated results from the analyses of the interview data, seafarer and RO surveys, accident investigation reports, inspections and verification data, together with the literature review. The findings are divided into either specific areas of concern or gaps identified in relation to the effectiveness and effective implementation of the ISM Code.

5.4.1 Benefits of the ISM Code and its related instruments

5.4.1.1 The interviewees mentioned numerous benefits of the ISM Code. Many highlighted its goal-based and non-prescriptive format.

> *"I think operators see benefit in having a sort of a goal-based framework which we think the ISM Code provides rather than, you know, a list of prescriptive requirements" [Co5]*

> *"One of our concerns about opening the ISM Code up for revisions would be that the opportunity might be too tempting for some to undermine its goal-based nature and start to try to add prescriptive elements […]. The addition of prescriptive elements would be most problematic regarding risk identification and procedures, plans and instructions because those provisions have been what has successfully promoted ownership and maturity within each company with regard to risk assessments and cultivating the necessary strong and clear procedures, plans and instructions, including checklists, for ship operations." [Co9]*

5.4.1.2 The majority of the stakeholder groups interviewed noted that the ISM Code had contributed to enhanced safety standards in the industry and a better understanding of safety culture in companies. In addition, some stakeholder groups mentioned improved pollution prevention, ship-shore communication and safety awareness.

"The ISM Code itself is definitely instrumental in improving the safety culture on board the vessels and it was certainly a departure from pre-ISM days where the shore establishment was not really taking too much accountability of what was happening on board. So post-ISM, I think that changed significantly where the onus of providing a structure on board and ensuring its compliance was connected to the shoreside. In my opinion these two elements were primary for ISM Code and I think the third one was [that] this Code did a lot of improvement in communication between the different stakeholders, whether internal or external. So within the context of ISM, I think these three things were quite instrumental overall." [Co4]

"One of the main benefits from an overview I would say that […] we are on the road to a behaviour of safety." [Co10]

"There's no doubt that maritime safety pollution prevention is the main concern of whole companies now, OK? At all maritime stakeholders. So this, mainly, is an achievement, since the ISM implementation. The main contributor in this achievement is the ISM Code." [Co11]

"*The integration between the ships and the office is much more close and closer today than just a few years ago." [RO3]*

5.4.1.3 A few groups interviewed remarked that the ISM Code has led to better oversight by regulators (i.e. flag State Administrations) and most answered that the Code has provided an industry standard through a structured framework.

"Main benefit is that finally someone visits and audits the managers of the vessels, who are responsible for - and influence more than anyone else – the ship's operation and level of safety. For the first time someone is looking and auditing the people involved in the management of the ships ashore and aboard, and not just looking at the result." [Co2]

"Main benefit is that finally someone visits and audits the managers of the vessels, who are responsible for – and influence more than anyone else – the ship's operation and level of safety. For the first time someone is looking [at] and auditing the people involved in the management of the ships ashore and aboard, and not just looking at the result." [Survey RO1]

"The ISM Code has set a least level of playing field for the ship owner /ship managers, and all players must to establish a safety management system, which is to be certified /verified to confirm in compliance with the ISM Code requirement." [Survey RO1]

5.4.1.4 The majority of the interview respondents stated that the ISM Code provided responsibility and accountability for the company. Half of the respondent groups mentioned safety effects or performance, the provision of better tracking, and some indicated that the ISM Code had shifted the safety focus from technical to operational and added a focus on systemic failures.

"So that requirement [1.2.2.2.] within the Code is all-encompassing […] if we change the Code and we make it more prescriptive than it is now, you are negating that particular paragraph, which is so important. […] It is the best clause in the entire ISM code because it places the responsibility clearly on the ship owner to identify risks and put measures in place to mitigate them." [Co6]

"It has a clear system of audits (internal and external) and drives continuous improvement in ship management." [Co9]

"With the implementation of the ISM code we have an instrument that allows us to look at and regulate the operational aspects of ship management where previously rules and regulations were only concerned about standards for manufacturing installation and maintenance of equipment machinery and structures" [Survey RO1]

5.4.1.5 Although the question in the seafarer survey focused on problems or areas for improvements, nine respondents made a point of noting the positive impact of the ISM Code (e.g. "*ISM has greatly improved the standard of work and quality of life on board ships*").

5.4.1.6 The literature review showed that most previous studies in the maritime industry have been inconclusive concerning the impact of the ISM Code, and produced only limited empirical evidence about the specific benefits of adopting an SMS. However, some studies have indicated that if properly implemented, the SMS can improve safety outcomes (as perceived by the participants). Moreover, it does appear that incorporating an SMS into normal business operations leads to better safety outcomes. Several studies[77,78,79,80,81] support these findings.

5.4.2 Issues with the ISM Code and its related instruments

5.4.2.1 Most stakeholder groups interviewed stated that the ISM Code is written in a clear and straightforward way and provides a good framework. However, the majority of participants also expressed concerns that the Code was not specific enough in certain areas, and that this provided room for multiple interpretations, described by some as a "double-edged sword".

"Double-edged sword. Because the ISM is not very specific. That makes [it] easy for those who want to make it easy. If you want to be a good player, you make it a good tool for you and your company. So for the poor performers. Nothing very specific. That's a disadvantage, but for the good performance, that's the benefit." [RO3]

"With regard to the challenges that we're finding it's the items that are open to interpretation which varies. You know when we're having audits in different parts of the world […] we have to take into consideration also the different ethnic groups that sail with ships worldwide and how the mentality is different from case to case." [Co11]

"The language of the ISM and the SMSs. I believe there should be a way forward when making the revision of the ISM to use a universal common language in all the companies in all the manuals." [Co11]

77 Karakasnaki, M. (2018) "ISM Code Implementation: An Investigation of Safety Issues in the Shipping Industry." WMU Journal of Maritime Affairs, vol. 17, 2018, pp. 461–74.

78 Thomas, M. (2011) A Systematic Review of the Effectiveness of Safety Management Systems. Cross-modal Research Investigation, XR-2011-002, Australian Transport Safety Bureau.

79 Mejia, M. Q. (2005). Evaluating the ISM Code Using Port State Control Statistics. Lund University and World Maritime University, Licentiate Thesis.

80 Kongsvik, T. O., & Storkersen, K. V. (2014). "The Relationship between Regulation, Safety Management Systems and Safety Culture in the Maritime Industry." *Safety, Reliability and Risk Analysis: Beyond the Horizon*, Taylor & Francis Group.

81 International Maritime Organization (2005). Assessment of the Impact and Effectiveness of Implementation of the ISM Code. MSC 81/17/1.

Similar views were expressed in the seafarer survey. Fifteen respondents from the seafarer survey provided more comments on the Code itself. Some noted that the problem was "*not with the Code itself*", which they considered "*fairly comprehensive*", but with implementation (further discussed below). Others pointed to problems with interpretation – the Code was "*vague*", "*unclear*" and not sufficiently "*specific*". They felt that, without clearer guidance, this allowed multiple interpretations and might contribute to misinterpretations and misuse:

> *"The whole code ned to be made more specific but the main thing is that maritime authorities are not following it very strict. There is always room for discussion and authorities are afraid of being too hard to shipowners." [Seafarer survey]*

5.4.2.2 In the interviews, some stakeholder groups stated that the industry had moved on since the ISM Code was introduced, and that the Code therefore was outdated and needed to be reviewed to remain fit for purpose. This is in line with the findings from previous studies[82,83].

> *"It is something that is 30 years ago. It is something that was in force 25 years ago. And, in my opinion, the thought process itself of getting that ISM was by seniors in the industry who were already not connected to the maritime industry for five or ten years. If we need to prepare something for the next 30 years, we need to have people who are right there, as masters and chief engineers." [Co4]*

> *"It was written 30 years ago and that was step one and it was absolutely needed and it got us where we are now. This is a great foundation for us: management of change, risk assessment and on we go. We moved on, technology arrived, human beings changed behaviours, we had COVID and that changed our minds big style. We need to make provisions for that." [Co8]*

5.4.2.3 Several interviewees pointed out that risk assessment was not well understood and there were suggestions to strengthen competence in all areas, including risk identification.

> *"Risk assessment and risk management, if I would have to identify just one." [Survey RO1]*

> *"Risk assessment is implicit not explicit in the ISM Code. Risk assessment is the basis of the ISM and SMS, but the Code only mentions this once. It should actually be an element of the Code. And it's the area that most companies struggle with." [RO3]*

This is supported by previous studies[84,85]. In our study, it is evident from the analyses of accident reports that risk analyses are not undertaken to the extent needed. In 34% of the accident reports, risk assessment and risk analysis were missing. Furthermore, there are indications in the ISM verification data that risk assessment may be an issue. Section 1.2 of the ISM Code, which refers to the Code's objective and explicitly includes risk assessment in its paragraph 1.2.2.2, featured in 10.1.% of all DOC and 8.8% of all SMC NCs identified during verifications based on data provided by ROs (table D-6a in annex D) and comprised 4.5%

82 Batalden, B-M. & Sydnes, A. (2013) Maritime Safety and the ISM Code: A Study of Investigated Casualties and Incidents. WMU Journal of Maritime Affairs, vol. 13, no. 1, pp. 3–25.

83 Almklov, P. G., & Lamvik, G. M. (2018). Taming a globalized industry – Forces and counter forces influencing maritime safety. *Marine Policy*, *96*, 175–183.

84 Batalden, B-M. & Sydnes, A. (2013) Maritime Safety and the ISM Code: A Study of Investigated Casualties and Incidents. WMU Journal of Maritime Affairs, vol. 13, no. 1, pp. 3–25.

85 Panama. (2024). *Lessons Learned and Safety Issues Identified from the Analysis of Marine Safety Investigation Reports -Consolidated report on the statistics of marine casualties/incidents suffered by Panamanian-flagged vessels between 2020 and 2023* (No. III 10/4/5). International Maritime Organization.

and 3.9% in the data provided by the flag State (table D-6b in annex D). Of the major NCs in DOC verifications, section 1 was referred to in 44.7% (table D-4 in annex D).

5.4.3 Issues with company structure

5.4.3.1 At MSC 107, Norway identified changing company structure (e.g. virtual operation of an organization) and company definition in relation to ISM Code responsibility as potential risks that could impact safety outcomes[86]. Issues with company structure also emerged from the present study, with half of the stakeholder groups interviewed indicating that company structure affected the implementation of the ISM Code in a negative manner. Company structure as an issue was also evidenced in the seafarer survey. However, some stakeholder groups stated that company structure made no difference, and that the senior management of the company was ultimately responsible and accountable for proper implementation of the ISM Code.

5.4.3.2 Most of the groups interviewed indicated that the ISM Code was not designed for the way companies operate today, citing the move away from the traditional "one central head office" approach to a more dispersed model. Interviewees also observed that many companies today operate in different locations around the globe, some subcontract certain functions under the ISM Code to other entities (manning, maintenance, internal audits, etc.) and some even operate virtually. These types of arrangements were not contemplated when the ISM Code was developed. Interviewees also noted that this new way of working could be problematic as it moved away from the original intent of the ISM Code. This was especially the case, they felt, when oversight of sub-contracted entities supposedly conducting safety functions as part of the SMS was not properly implemented.

> *"The ISM code does not consider the way many companies work today where activities may be managed from many different locations around the globe and involve a variety of different safety cultures (or lack of same)." [Survey RO1]*
>
> *"When they [companies] delegate parts of ISM to other companies, what you call subcontracting, they sometimes give the responsibility as well. Subcontracting doesn't mean that you're not anymore responsible for that." [PSC6]*
>
> *"Another issue relates to the use of third-party subcontracting for managing manning and technical [tasks, which] often create problems during the DOC audit because the ISM manager has no access to technical files or to the manning documents and when this happens it's very hard to complete a DOC audit." [FS10]*
>
> *"The problem lies in the fundamental of ISM. Who is responsible? Who is it? A company? Is it a subcompany or a branch office?" [FS8]*

5.4.3.3 Several of the stakeholder groups interviewed mentioned that problems with limited oversight of subcontracted entities in relation to manning, suggesting that having direct control over manning would provide for better safety outcomes.

> *"Throughout the years of implementing the ISM Code, we have encountered numerous situations where companies were unable to effectively monitor their crew management." [FS2]*

[86] Norway. (2023). *Proposal for a new output on "Comprehensive review of the International Safety Management (ISM) Code and its related guidelines"* (No. MSC 107/17/5).

"Operators frequently subcontract/delegate many functions such as crew management, inspection, and maintenance activities, etc. Hiring of personnel is often left to the recruitment and placement service providers with little oversight. Moreover, the ship operators often lack resources or expertise to provide oversight of these delegated functions. IMO may consider developing guidance to owners for delegated functions." [Survey RO5]

"Seafarers from various countries, various nationalities work on board one ship and it is an obvious problem that the company has to deal with. Sometimes five different manning agencies in five different countries. We know that they should be standardized; the quality of different manning agencies is not really controlled and oversight not well done by the company and flag States." [SR1]

5.4.3.4 Some thought that company structure also impacted seafarers, as it created ambiguity in the reporting structure and affected ship-shore communication. Some stakeholder groups indicated that the subcontracting of manning arrangements could also lead to a perceived lack of ownership and engagement by seafarers, with consequences for motivation and familiarity with the vessel.

"Employees are hired through a manning agent who's been contracted by a management company who reports to an owner, so they may have the greatest safety management system I've ever seen. But a lot of these employees, they're only there for 4-6-8 months. They disappear. There's no way they're going to absorb the amount of information and know it like they should." [PSC1]

5.4.3.5 Additionally, some groups indicated that this was creating confusion in relation to the definition of a company in the ISM Code, especially when carrying out DOC verifications, as limited guidance is available to deal with this issue.

"The code does not provide guidance for the minimum core activities that must be conducted from the physical address of the DOC holder, to identify who (which entity) is actually responsible for the DOC. [...] The distinguishing between head and branch offices is no longer clear and flag States (and IACS) are usually leaving this up to the individual interpretation of the ROs to accept and manage." [Survey RO1]

5.4.3.6 Another issue of concern was the contractual arrangements between the ship owner and the ship manager, which half of the stakeholder groups interviewed saw as important for safety. However, one of the groups did indicate that the responsibility for ISM implementation lay squarely with the ship manager/operator, irrespective of any owner-management contractual arrangements. In their view, it was the ship managers' responsibility to ensure that any contractual arrangements they had with owners and charterers continued to ensure safe operations. Nevertheless, some groups interviewed expressed concern about these types of arrangements, indicating that some ship managers do not have the resources to manage safety responsibility effectively, which could lead to poor outcomes. This was also the opinion of three respondents in the seafarer survey, who mentioned issues related to the company structure and the fact that only the DOC holder has formal responsibility, whereas the other potentially relevant parties, such as owners or charterers, do not.

"The ISM Code says that the DOC holder is ultimately responsible for the safe operation of ships and for pollution prevention. But in the cases of third-party ship management companies, the DOC holder is the manager whereas the budget of the ships is still under control of the owners. This effects the timely supply of required stores and spares to the vessel which again affects the safe operation of ships and safety of crew/property/environment. There should be some provision whereby even the Owners/Operators are responsible and liable for ship's operations and management." [Seafarer survey]

"Section 3.1 of the ISM Code allows an owner to abdicate all responsibility for their ships by handing them over to a ship manager, who might then delegate crewing to one party and technical management to another. This leads to a situation where no one has a holistic view of the ship's operations." [CI1]

5.4.3.7 The literature provides further evidence suggesting that, in a globalized industry, company structure can lead to weaknesses in the implementation and regulation of maritime safety[87]. The suggestion is that globalization has led to a deterioration in safety standards by allowing for a higher level of outsourcing, flagging out and complex ownership structures that can, to some extent, bring operations beyond regulatory reach.

5.4.4 Issues affecting SMS implementation

5.4.4.1 Paperwork, checklist mentality, and procedures not aligned with shipboard tasks

5.4.4.1.1 In the seafarer survey, most comments concerned the SMS and the implementation of the ISM Code on board – 125 respondents (45.8%) noted problems in this area. Many respondents (27.5%) from the seafarer survey noted that there was too much paperwork, mentioning "*unnecessary*" and/or overly long checklists and duplicated documentation. In the eyes of respondents, this did not enhance safety, since forms were completed as a "*tick-box exercise*" or "*ignored*". Some respondents noted that this might even increase safety risks by increasing the crew's workload and thus contributing to fatigue.

5.4.4.1.2 Seventeen respondents in the seafarer survey commented specifically on the SMS. Some noted that procedures described in the SMS did not reflect actual shipboard operations or the requirements on a particular vessel. Others found that the SMS on their vessel gave only vague descriptions of procedures ("S*ometimes procedures are vague and can be interpreted in different ways*"), or was "*cumbersome*", "*bulky*" and had "*outdated information*". Some of the respondents from the seafarer survey considered that support from management was important if the Code was to be followed "*in spirit*", and not just as a "*tick-box exercise*".

"Most of the burden of keeping records in the form of paperwork is being passed on to seafarer and moreover there is an excellent duplication of efforts as well. All this things contribute to even more fatigue." [Seafarer survey]

"[The SMS] has grown out of all proportion to what it was originally supposed to do, leading to hours spent doing paperwork, increasing the work load on the crews." [Seafarer survey]

"Safety Management systems have become unwieldy. They should be simple instructions that can be followed. Forms and records should support a seafarer in safely operating ships, not a mechanism for blame, personal liability or corporate protection. How can a 29 page familiarisation form support a seafarer?!" [Seafarer survey]

[87] Almklov, P. G., & Lamvik, G. M. (2018). Taming a globalized industry – Forces and counter forces influencing maritime safety. *Marine Policy*, *96*, 175–183.

5.4.4.1.3 The implementation issues identified in the seafarer survey aligned with the most common views held by different stakeholder groups in the interviews. All stakeholder groups mentioned that the SMS increased paperwork, and most commented that it created a checklist/compliance-driven approach to safety management. In addition, interviewees indicated that procedures often did not correspond to the actual work being done. This has also been found in several previous studies[88,89,90,91]. A recent study[92] measured the size of the SMS used on ships and found that their sheer volume, in terms of the numerous forms and checklists required to be completed by seafarers on a daily basis, affected seafarers' workload and overall operational efficiency .

> *"ISM continually runs the risk of becoming a 'paper tiger' with a discrepancy between 'real life' and the 'paper world'. It can easily lead to bureaucracy. It has helped the industry to move forward, but the potential is much greater if we manage to bring it back to a help for real life, in stead of a way to satisfy the paper requirements." [Seafarer survey]*
>
> *"But essentially with the implementation […] people are getting this notion that it is a paperwork exercise. So the spirit of things is not being implemented and that is where you have checklist procedures and, sad to say[…], the industry is driving this belief system. The managers […] ashore are essentially being asked that if you've had a near miss or an incident as part of your preventive measure, what have you added to your SMS? What have you added to the checklist?" [Co4]*
>
> *"Some companies see procedures as barriers to identified risks, but not the fact that procedures must be clear and understandable to those responsible for the implementation, and procedures must be properly implemented to work as a barrier to the identified risks. Crew competences and experience have a significant impact on the development and implementation of the company procedures and hence the results of implementing same." [Survey RO1]*

5.4.4.1.4 Furthermore, the analysis of accident reports done for this study shows that, in some cases, the implementation of the ISM is handled as a tick-box exercise. Additionally, 17% of these accident reports identified a lack of written procedures, and 94% of them noted that the ISM and/or SMS was not complete or fully implemented. In the same context, respondents from the seafarer survey pointed out that the potential beneficial impact of the Code was being hampered and could be improved if implementation problems were resolved.

5.4.4.1.5 Shortcomings in implementation were also evident in the case studies based on accident reports. As set out in annex G, case study No. 2 (GISIS Incident reference C0012188) is an example where the SMS was theoretically in good order but not used in practice.

---

88 Batalden, B-M. & Sydnes, A. (2013) Maritime Safety and the ISM Code: A Study of Investigated Casualties and Incidents. WMU Journal of Maritime Affairs, vol. 13, no. 1, pp. 3–25.

89 Bhattacharya, S. (2011). Sociological Factors Influencing the Practice of Incident Reporting: The Case of the Shipping Industry. Employee Relations, vol. 34, no. 1, pp. 4–21.

90 Vandeskog, B. (2015). The Legitimacy of Safety Management Systems in the Minds of Norwegian Seafarers. *The International Journal on Marine Navigation and Safety of Sea Transportation*, vol. 9, no. March 2015.

91 Kongsvik, T. O., & Storkersen, K. V. (2014). "The Relationship between Regulation, Safety Management Systems and Safety Culture in the Maritime Industry." *Safety, Reliability and Risk Analysis: Beyond the Horizon,* Taylor & Francis Group.

92 Xian, L. A. (2024). *Assessing the burden of an excessive SMS size on the effective Implementation of the ISM Code* [Master Theses]. World Maritime University.

Case study No. 3 in annex G (GISIS Incident reference C1000183) provides another example of poor SMS implementation. In this case the findings identified that the SMS was not mature and contained incorrect or incomplete information in several documents related to emergency response and firefighting. Moreover, several elements of the SMS were not effectively implemented on board, resulting in inadequate management of fatigue, difficulty in complying with the ship's Planned Maintenance System (PMS) schedule and an inadequate stock of spare parts and securing equipment on board.

5.4.4.1.6 Taken together, some of the SMS implementation issues identified above suggest shortcomings related to "Shipboard operations", section 7 of the ISM Code, which covers company procedures, plans and instructions for key shipboard operations. This is also reflected in the data from ISM verifications and port State control inspections. The data from five ROs and one flag State showed that during 2019–2023, among the ISM-related NCs identified during their SMC verifications, 16.3% (ROs) and 21.2% (flag State) linked to section 7 (see figures 5.2a, 5.2b and tables D-3a and D-3b). In the port State control inspections carried out by Tokyo MoU member authorities between 2013 and2023, 20.7% of ISM deficiencies (see figure 5.8 and table E-2) and 10.4% of the detentions (see figure 5.10 and table E-5) related to shipboard operations.

5.4.4.2 Continuous improvement is poorly implemented

5.4.4.2. 1 A vital aspect of a successful SMS is continuous improvement, namely how companies continuously monitor and assess their SMS processes to maintain and continuously improve their overall effectiveness. This aspect incorporates numerous supporting activities. Some of the interview groups indicated that there is generally poor understanding and implementation of continuous improvement.

> *"Another key issue is that companies fail to consistently improve the actual management system and relevant procedures, and many still remain with systems for designed in the late 20th century and with requirements from then." [Survey RO1]*
>
> *"SMS developed by companies for compliance with ISM Code requirements is intended to be a "living system" which constantly runs in "Plan-Do-Check-Act" (PDCA) circle of continuous improvement. That is in some cases not performed in proper way by Companies." [Survey RO2]*

5.4.4.2.2 Regular internal audits provide one proactive indicator of how well the SMS is performing overall. Other important indicators are how companies respond to audit and inspection findings and reported incidents. The majority of the groups interviewed indicated that internal audit quality is low, with some auditors not even going on board to carry out their work.

> *"The other part from an ISM Code system that is not clear to a lot of companies is about the internal audits that they need to undertake and the like, we'll go on board and we'll ask for an internal audit report and sometimes it's not even on board. Sometimes it's on board and it's all perfect and it's like, how the hell did this become perfect when we're walking around and ready to detain the vessel." [PSC1]*
>
> *"the system of internal audits performed by the companies is in some cases not implemented and/or performed in correct way. [...] By proper implementation and performance of internal audits the companies should be able to identify issues which require corrective action and at the end improve the SMS." [Survey RO2]*

"This whole remote internal auditing is a complete garbage. It's ineffective. It shouldn't be [done] remotely. I think there should be wording in the ISM Code [for] where remote audits do not work." [V1]

Several respondents from the seafarer survey also indicated problems with internal audits. The problems they noted were similar for internal and external surveys and are discussed in sections 5.4.5 and 5.4.7.

5.4.4.2.3 Another concern highlighted by seafarer survey respondents and mentioned in section 5.4.4.3 (poor safety culture) is that the reporting of deficiencies, non-conformities, accidents and near misses in accordance with the ISM Code will only result in self-incrimination and punishment. Similar concerns were reported in previous studies[93,94,95]. A study[96] drawing on 303 vignette-based interviews identified a perceived lack of trust amongst seafarers' to carry out their roles, creating the potential for negative outcomes if they 'speak out'. Although the reporting of NCs is an integral part of the SMS improvement process, it is still viewed with suspicion by ship operators and seafarers alike, because of potential legal implications and possible adverse effects on employment.

5.4.4.2.4 In the ISM verification data, aspects related to continuous improvement include section 9 ("Reports and analysis of non-conformities, accidents and hazardous occurrences") and section 12 ("Company verification, review and evaluation"). Taken together, these two sections jointly account for 26.4% of all DOC NCs in the RO data (annex D, table D-3a), and 22.5% of all DOC NCs in the flag State data (table D-3b). Looking at the data on major NCs, the two sections jointly constitute 24.0% of all NCs in DOC verifications (annex D table D-4). As to section 9.2, which concerns how a company deals with NCs, this comprised 7.6% of all DOC NCs in the RO data (table D-6a), and 6.6% in the flag State data (table D-6b).

5.4.4.2.5 The issues identified concerning lack of continuous improvement are closely linked to safety culture, as relevant safety lessons are not learned and applied appropriately; this is strongly supported by research[97,98,99]. In effect, the guidance on near-miss reporting is an integral component of continuous improvement in the SMS[100]. This is why previous studies highlight the importance of a reporting culture and safety culture as preconditions for continuous learning. In addition to the findings reported by Mejia (2005)[101] and Lappalainen

---

93 Bhattacharya, S. (2011) Sociological factors influencing the practice of incident reporting: the case of the shipping industry. *Employee Relations*, 34(1): 4-21

94 Lappalainen, J., Vepsalainen, A., Salmi, K., & Tapaninen, U. (2011) Incident reporting in Finnish shipping companies. WMU Journal of Maritime Affairs, 10(2): 167-181

95 Xue, C. H., Tang, L. J., & Walters, D. (2021) Decoupled implementation? Incident reporting in Chinese shipping. *Economic and Industrial Democracy*, 42(1): 179-197

96 Sampson, H., Turgo, N., Acejo, I., Ellis, N., & Tang, L. (2019). 'Between a Rock and a Hard Place': The Implications of Lost Autonomy and Trust for Professionals at Sea. *Work, Employment and Society*, *33*(4), 648–665. https://doi.org/10.1177/0950017018821284

97 Oltedal, H. A., & McArthur, D. P. (2011). Reporting practices in merchant shipping, and the identification of influencing factors. *Safety Science*, *49*(2011), 331–338.

98 Xue, C., Tang, L., & Walters, D. (2021). Decoupled implementation? Incident reporting in Chinese shipping. *Economic and Industrial Democracy*, *42*(1), 179–197.

99 Georgoulis, G., & Nikitakos, N. (2019). The Importance of Reporting All the Occurred Near Misses on Board: The Seafarers' Perception. *The International Journal on Marine Navigation and Safety of Sea Transportation*, *13*(3), 657–662. https://doi.org/10.12716/1001.13.03.24

100 MSC-MEPS.7/Circ.7 - Guidance on near miss reporting. Approved 10 October 2008

101 Mejia, M. Q. J. (2005). *Evaluating the ISM Code Using Port State Control Statistics* [Licenciate Thesis]. Lund University and World Maritime University.

and colleagues (2012)[102] which suggested that the process of continuous improvement was not working as it should at the time of their studies, the findings from our study suggest that there is still considerable room for improvement today.

5.4.4.3 Poor safety culture

5.4.4.3.1 Respondents from several of the stakeholder groups commented on the lack of safety culture and the limited understanding of safety culture, with a specific mention by one interviewee that some root causes cannot be managed by the company. The creation of a safety culture is one of the original aims of the ISM Code, which makes it an important point to address. A safety culture encompasses two important dimensions, namely "management commitment" and "seafarer/staff involvement". This requires much more than simply the preparation of well-structured company safety procedures, since many safety problems emanate from poor management attitude towards safety. High-level management commitment and the involvement of all seafarers/staff is critical for creating a safety culture throughout the company. The issue of poor safety culture in the maritime industry is borne out by previous studies[103,104,105,106,107, 108] and by the review of accident reports carried out for this study, with the general findings indicating that many do not understand the concept of safety culture. Furthermore, there are frequent mentions of a "blame culture" affecting seafarers. The blaming of seafarers for issues identified on board is one indication of a deficient safety culture. One respondent from the interviews suggested that this has reduced the level of safety reporting.

> *"Company blame crew and push responsibility on crew for SMS implementation when discussing NCs [non-conformities] with auditors. Some companies have KPIs [key performance indicators] for zero NCs and put pressure on master and crew. This means that the master will fight against any NC." [RO3]*
> *"So I think that is another thing is about the culture. And the safety philosophy. Also, there's no reference in the ISM Code about that." [Co11]*
>
> *"When they interpret competence, it's not only the competence of understanding the list of the things, but the competent soft skill, interpersonal skill so that you can pick up what is really wrong […] And also from ship side as well. […] when seafarers communicate with the shoreside or flag, the interpersonal competences are really important. That, we think, is missing.'[SR1]*

---

102 Lappalainen, F. J., Kuronen, J., & Tapaninen, U. (2012). Evaluation of the ISM Code in the Finnish Shipping Companies. *Journal of Maritime Research*, *IX*(1), 23–32.

103 Lappalainen, F. J., et al. (2012). Evaluation of the ISM Code in the Finnish Shipping Companies." Journal of Maritime Research, vol. IX, no. 1, pp. 23–32.

104 Bhattacharya, S. **(**2011). Sociological Factors Influencing the Practice of Incident Reporting: The Case of the Shipping Industry. Employee Relations, vol. 34, no. 1, pp. 4–21.

105 Thai, V. V. & Grewal, D. (2006). The Maritime Safety Management System (MSMS): A Survey of the International Shipping Community. Maritime Economics & Logistics, vol. 8, pp. 287–310.

106 Vandeskog, B. (2015). The Legitimacy of Safety Management Systems in the Minds of Norwegian Seafarers. *The International Journal on Marine Navigation and Safety of Sea Transportation*, vol. 9, no. March 2015.

107 Bhattacharya, S. (2012). The Effectiveness of the ISM Code: A Qualitative Enquiry. *Marine Policy*, vol. 36, pp. 528–35.

108 Kirwin, B., Bettignies-Thiebaux, B., Cochioni, M., Baumler, R., & Carrera Arce, M. (2022). *SafeMode: Towards a Safety Learning Culture for the Shipping Industry* (European Union's Horizon 2020 Research and Innovation Programme) [White paper]. European Commission. https://www.safemodeproject.eu/uploadFile/7420221039476041055.pdf

5.4.4.3.2 A poor safety culture was also evident in the seafarer survey, where 16 respondents highlighted the *"extra burden to the onboard crew due to audits and inspections"* in relation to workload, the pressure to know the SMS by heart, but also the risk of being blamed by the company in case of NCs or deficiencies. Thirteen respondents from the seafarer survey pointed to a "blame culture", noting that seafarers might be blamed when things did not go smoothly.

> *"Then there is the constant barrage of Audits, Inspections, Surveys etc. that in themselves are not a bad idea, but the pressure that is put on the crew should a failure, deficiency or detention occur is enormous and still leads to people losing their jobs." [Seafarer survey]*

5.4.4.3.3 Further issues identified through the seafarer survey include some companies (and consequently crew members) being focused too narrowly on what was needed to pass inspections and verification audits. Given also the limited importance placed on the improvement value of audit findings, this points to a poor understanding of safety culture.

> *"Shore management audits, DOC, tick box exercise. Doesn't take a genius to see that shore management have a panic to address issues weeks before an audit. Months of safety meetings reviewed within minutes of each other before an audit." [Seafarer survey]*

> *"Spend money on the ships, not just the bare minimum to pass inspections." [Seafarer survey]*

> *"Still many cases or incidents happen because not good support from office, when we make report and have indication the root cause because office not aware or not support, they will tell us to modify that report, and all problem will come to vessel, if we not follow them out [our] carrier [career] with company will finished." [Seafarer survey]*

5.4.4.3.4 Respondents from the seafarer survey also noted that proper implementation was dependent on the attitude, knowledge and training of those involved, notably the crew on board (10 respondents) and the company (11 respondents). In effect, one of the objectives in the ISM Code (1.2.2.3) requires companies to "*improve safety management skills of personnel ashore and aboard ships*". This is a key requirement in SMS effectiveness and the findings indicate that it demands greater emphasis.

> *"I feel the ISM is fairly comprehensive, most issues arise from lack of experience or improper training." [Seafarer survey]*

> *"The problem is not with the code itself. As long as seafarers don't embrace the essence of the code, you can keep adding paperwork to our job and it will not have any effect on the work culture on ships." [Seafarer survey]*

> *"The ISM code is only followed and understood by senior officers. [...] More has to be done with junior officers and crewmembers to increase their awareness of ISM. Checklists are now so commonplace they are just ticked and due to time constraints and lack of interest job instructions are not read, filled or understood. There is a lack of basic seamanship." [Seafarer survey*]

5.4.4.3.5 Some of the stakeholder groups interviewed said that proper implementation was dependent on company attitude. Further, some interviewees indicated that seafarers' involvement in the development and continuous improvement of the SMS varied between companies. This is also supported by previous studies[109,110, 111,112].

> *"So there you have some companies which understand the importance of this methodology and they are good in utilizing their colleagues to get their experience and their input on what is the weaknesses in the system." [RO3]*
>
> *"So let's look at what is the incentive for a seafarer to report right. Why should he report? Because there are sufficient incentives for him not to report. So why should he report? He should have it from inside him, a culture that it is important to report to avoid any future incidents, right? But how do you get this culture is you have to be ... You have to have grown up in a culture like that, right?" [Co10]*
>
> *"Most of the Clients are very well accepting our certification audits. Some company representatives are reluctant to accept findings and observations that might contribute to the continual improvement or avoid raising future NCN. Some others expect the auditor raising findings they already know exist, but not raised internally, therefore they are willing to use the auditor to rise them during an external audit." [Survey RO1]*

5.4.4.4 Master's authority and responsibility

5.4.4.4.1 Some stakeholder groups from the interviews described the master's authority and responsibility as a grey area that should be better explained or defined, whereas a few opined that it was clear. Some mentioned that the ISM Code did not provide sufficient protection to the master.
Similar issues were identified by respondents to the seafarer survey. Seven respondents commented on issues related to the master's authority. Some noted that the master's authority was a grey area and would need to be defined more precisely. In practice, it might be overridden by commercial pressures. Others noted the need to provide better protection for masters who used their overriding authority, in order to prevent them suffering "negative repercussions".

> *"Masters Authority is only on paper. Its invariably the Base Manager steering the ship. Master, for all practical purposes, has no authority." [Seafarer survey]*
>
> *"And as long as they can demonstrate that's for the good of the vessel and for the safety of the vessel, I think that that's well understood, but there can be a bit of a grey area and a bit of a sliding scale where I think some masters can end up interpreting it." [Co3]*

---

109 Kongsvik, T. O., & Storkersen, K. V. (2014). "The Relationship between Regulation, Safety Management Systems and Safety Culture in the Maritime Industry." *Safety, Reliability and Risk Analysis: Beyond the Horizon*, Taylor & Francis Group.

110 Bhattacharya, S. (2012). The Effectiveness of the ISM Code: A Qualitative Enquiry. *Marine Policy*, vol. 36, pp. 528–35.

111 Sampson, H., Acejo, I., Ellis, N., Tang, L., & Turgo, N. (2016). *The relationships between seafarers and shore-side personnel: An outline report based on research undertaken in the period 2012-2016* (No. ISBN: 1-900174-48-0). Seafarers International Research Centre (SIRC), Cardiff University.

112 Vandeskog, B. **(**2015). The Legitimacy of Safety Management Systems in the Minds of Norwegian Seafarers. *The International Journal on Marine Navigation and Safety of Sea Transportation*, vol. 9, no. March 2015.

"And if I have to stand and discuss this in a court of law, it is pretty black and white. I think ISM has too much grey material." [Co4]

"Completely diluted, I started with that … it's the administrator in the office who sends the message not realizing the weight of the message and we see people dying because of that." [Co8]

"What you have to do, the regulations, is set the minimum requirements, and the minimum requirement is to clearly state the master's overriding authority." [Co6]

5.4.4.4.2 While the interviewees and respondents to the seafarer survey highlighted issues with the master's authority in practice, it is noteworthy that relatively few NCs referencing this section were identified during the ISM verifications. The ISM verification findings in relation to "Master's responsibility and authority" (section 5) accounted for 2.2% of all DOC and 2.3% of all SMC NCs in the RO data (table D-3a in annex D) and 1.1% and 1.5%, respectively, in the flag State data (table D-3b in annex D). Similar results were evident in the port State control inspection data, where the number of deficiencies related to "Master's responsibility and authority" accounted for 1.9% of all ISM deficiencies (table E-2 in annex E). However, it seems likely that issues affecting the practical implementation of master's authority might be hard to identify in verification audits and inspections.

5.4.4.5 Designated person ashore

5.4.4.5.1 In the interviews, the role of the Designated Person Ashore (DPA) was generally described as mainly clear but not properly implemented. In the interviews, some stakeholder groups expressed concerns about workload, training and authority. The ISM verification data findings revealed similar results to those for the master's responsibility and authority, with few NCs related to "Designated person(s)" (section 4 of the ISM Code): 0.9% (ROs and flag State) of all NCs identified in DOC verifications and 0.2% (ROs) and 0.0% (flag State) of NCs in SMC verifications, respectively (annex D, tables D-3a and D-3b). As above, issues with practical implementation were clearly identified in the interview data.

"The effectiveness of the ISM Code depends on the DPA, on the one individual. I think all the industries now are directed to risk management teams, so I think the DPA must keep only the link as a focal person and all the accountability to be attributed to a risk management team. [...] Nowadays it's necessary. You cannot rely on one individual to make, this is a huge task. Also the accountability of this must be split in risk management on shore and the risk management team on board." [Co11]

5.4.4.5.2 Respondents from the seafarer survey identified additional issues with the DPA. Seven mentioned issues related to the role and competence requirements of the DPA and the lack of independence and authority of the DPA ("*Most DPA s are ineffective and held as a relatively toothless position with limited authority to change things*"). Some respondents noted that the DPA was "*not impartial*" but was closely integrated into senior management. Two respondents reported a lack of communication between the DPA and the vessels they were responsible for.

"DPA communication need to improve randomly he should visit the vessel and he need to interact with crew find out basic needs & short out issues but ship crew thought DPA only communicate with higher level management." [Seafarer survey]

This was supported by the interview respondents, with some indicating that ship-to-shore communication was as an issue. Whereas few interviewees noted that ship-to-shore communication had improved, some mentioned that interaction with shore management was still problematic. This is also supported by previous studies[113,114, 115].

5.4.4.5.3 Further, two respondents mentioned DPAs' lack of competence as an issue:

> *"Seafarers need certificates to obtain their jobs. All positions on board, no exceptions! Office and management positions on shore (DPA designated person ashore for example) can be anybody, which is not aware what is he designated for. Management positions should have a clue what is happening on ships that they are responsible for." [Seafarer survey]*

5.4.5 Issues affecting ISM verification and certification

5.4.5.1 ISM verification and certification effectiveness

5.4.5.1.1 The ISM verification and certification function provides the first line of defence for ensuring that companies are properly implementing the requirements under the ISM Code and that this is working in practice. Auditing can play a proactive role in addressing NCs in SMSs and facilitating corrective and preventive actions. Half of the stakeholder groups interviewed indicated that the ISM certification was effective and that audits were generally useful and added value. One group indicated that the ISM Code provide good guidance in this regard. However, some groups indicated that ISM certification was not effective and not working as it should. Most of the groups suggested that effective ISM certification depends on several factors, namely the way in which verifications are undertaken, auditor competence, flag State Administration oversight over delegated certification functions, and ROs' resources and capabilities.

One group questioned why the verification frequency for the DOC (annual) and that for SMCs (every 2.5 years k) were not aligned.

5.4.5.1.2 Case study 1 (GISIS incident reference C0013072, in annex G) provides an example where the ISM/SMS was not properly or fully implemented. Further, the overall analysis indicates that it is likely that a proper SMS verification would have identified this issue.

5.4.5.2 Delegation of certification function by flag State Administrations

5.4.5.2.1 The audit regime includes a range of actors with differentiated roles, including the flag State Administration, ROs (if appointed by the flag State) and shipping companies. Most of the stakeholder groups interviewed indicated that differences exist in how flag State Administrations manage their regulatory function. This mainly related to flags that delegated their functions to ROs. As to those that did not delegate their certification function to ROs, there were some suggestions that they exercised better and more direct control over their regulated entities (i.e. companies).

---

113 Kongsvik, T. O., & Storkersen, K. V. (2014). "The Relationship between Regulation, Safety Management Systems and Safety Culture in the Maritime Industry." *Safety, Reliability and Risk Analysis: Beyond the Horizon,* Taylor & Francis Group.

114 Bhattacharya, S. (2012). The Effectiveness of the ISM Code: A Qualitative Enquiry. *Marine Policy*, vol. 36, pp. 528–35.

115 Sampson, H., Acejo, I., Ellis, N., Tang, L., & Turgo, N. (2016). *The relationships between seafarers and shore-side personnel: An outline report based on research undertaken in the period 2012-2016* (No. ISBN: 1-900174-48-0). Seafarers International Research Centre (SIRC), Cardiff University.

"Flag oversight of RO activity varies greatly – from annual visits to nothing at all." [Survey RO1]

"We get very different instructions from the flags. Some are super detailed and with very good preferences. From some, we get almost nothing." [RO3]

"For us there are no issues with ROs as we do all the auditing ourselves." [FS11]

5.4.5.2.2 One stakeholder group interviewed indicated that they experienced no issues with the delegation of functions to ROs, whereas another group indicated that they have limited interactions with flag State Administrations as most certification functions were delegated to ROs. In effect, the current situation globally is that most flag State Administrations delegate ISM certification functions to ROs, which are given authority to conduct ISM verifications and certification on their behalf.

"The advantage in having a large number of vessels is the international coverage by ROs which they provide to us. We will not be able to cover our whole fleet if we don't have such a structure. Imagine that we have about [number] vessels, more than [number] gross tonnage today. Imagine the amount of audits and inspections that are happening on a daily basis on board our fleet. So as a flag State, as a government office, we will never be able to provide such a follow-up." [FS9]

5.4.5.2.3 Most groups interviewed indicated that in some cases flag State Administration oversight was poorly implemented with limited ability to oversee the work of the ROs, and that such a situation could be especially challenging for the larger flag States. In this regard, the many issues identified are discussed in the next section.

"Flag and class are not what they used to be and certainly are not regarded in the terms of what they used to be. […] They're just not the authorities that they used to be. My personal professional opinion is that the flags and the ROs have become too commercial. They have become commercial entities; they're interested in numbers and revenue. They're not interested in maintaining the standards and upholding the safeguards that perhaps they did 25-30 years ago. And that is visible in terms of the quality and the calibre of the inspection that we have on our vessels. Honestly, I have, you know, some flags are OK, some flags are terrible. The same with the ROs and it seems if I were to go to the next step, I would say that they almost don't want to tell us that we are not complying. They don't want to raise findings against us. Because it reflects on them. Or, they perceive that we will see it as 'if you're not going to give us the answer we want, we'll go to another flag that will'". [Co1]

"The level of competency, knowledge and experience of flag state officials has been decreasing over the years, and the competent and experienced officials usually do not stay long with the flag state administration before moving on. Also some of the official guidance provided by flag states dates back to the late 90s and have not been reviewed and revised since the introduction of the ISM code." [Survey RO1]

5.4.5.3 Recognized Organizations' conduct of their delegated functions

5.4.5.3.1 Some stakeholder groups interviewed insisted that the responsibility for monitoring ROs' performance of their ISM-related functions lies with the flag State Administrations ("*the flag State retains overall responsibility. Therefore, it is absolutely necessary to have a monitoring programme*." [FS2]). In the interviews, the representatives of the flag States provided an overview of how they oversee and monitor ROs. Most indicated that they carried out numerous activities to manage this function. These included, among others:

- authorizing only ROs that are members of IACS;
- putting in place agreements with instructions to ROs;
- physically auditing delegated ROs on a periodical basis;
- overseeing ship and company verifications;
- analysing statistical data on inspections and verifications in order to monitor trends; and
- using flag State inspection findings to monitor ROs.

They also indicated that they have processes in place to suspend poorly performing ROs.

5.4.5.3.2 Most interviewed groups identified several issues with how ROs undertake their delegated functions, indicating that these led to poor-quality verifications and subsequent safety issues. Furthermore, one group (the flag State Administrations) indicated that they had experienced deterioration in ship performance within their fleets after certification was delegated to ROs. The issues identified by most of the stakeholder groups interviewed included the following:

- verifications are rushed, with some groups indicating that the time ROs spend on board undertaking SMC verifications was not enough to be effective. In some cases, ROs combined numerous other regulatory audits, surveys or inspections (e.g. SPC, MLC, 2006) during the same visit, which detracted from the focus on the shipboard SMS;
- most groups expressed concern at the practice of replacing onboard verifications with remote audits. They noted that the ISM Code never intended SMC verifications to be undertaken remotely. There was an understanding that the COVID-19 pandemic necessitated remote audits, but that was regarded as an exceptional circumstance and it was felt that all verifications should now be conducted on site;
- drills not being requested or undertaken as part of an external SMC verification was another point of concern. Some groups emphasized that such drills were essential, as they provided a good indication of whether the crew understood the procedures in the ships' SMS and could apply them in practice;
- some groups indicated that verification NCs were not being closed out properly, with ROs being content to accept poor or limited evidence before doing so;
- most groups indicated inconsistencies between individual auditors as well as between different ROs. Some pointed to auditors' lack of training and insufficient competence;
- one group expressed concern that issues identified by ROs were not being reported to flag States, creating a communication void that made follow-up interventions difficult; and
- a few groups indicated that certain ROs had requested verification or certification extensions outside the certification window.

The following quotes illustrate some of these points:

> *"For instance, we had an ISM, ISPS & MLC where the owners asked to have a remote audit performed because they were in an impractical place and also the class couldn't provide any surveyors there, so we said OK, but you know, maybe we would like to have a follow-up audit, but this puts us in a very tricky situation because the class says well, we're doing it for everyone." [FS10]*

> *"There is no mandatory requirement to witness an emergency drill (ISM 8.2) as part of the audit process. Some flags do require it, but many don't and neither does IACS. And even if one is witnessed it may not be that effective – because (again) of time constraints on the audit." [RO1]*

> *"There is inconsistency in how audits are done, sometimes even though ROs follow the same regulations, from auditor to auditor, it can differ." [FS8]*

5.4.5.3.3 The seafarer survey respondents also expressed concerns about the certification and auditing function undertaken by ROs. Fourteen respondents from the seafarer survey commented on verifications carried out by flag States or ROs. The most frequently made point in this context (eight respondents) was the workload and pressure that verifications (and port State control inspections) imposed on the crew on board (see section 5.4.6 on Manning and fatigue). Other comments related to issues with the effectiveness of verifications, with one respondent observing that "*Classification Societies only look to get vessels passed with a cursory look during external audits."*

Similarly, in the interview, some of the stakeholder groups noted the low quality of some verifications, attributing this to the vagueness of the ISM Code and to auditors' lack of expertise.

> *"The ambiguity allows people to read into it what they want or what they don't want. And I think it also creates room for error, particularly from the flag States and from the ROs, you know. The standards we see in terms of their audit and assessment are wildly different. And we know we have examples where we have had vessels and offices go through flag State audits without a single finding, and then within weeks later we have a port State control inspection, or an oil major visit and they come and give us 20 findings". [Co1]*

> *"The international organizations like IMO or different, they could put focus on it. They should maybe standardize the education of these people. What is required? Yeah, because. Some vessels are very sophisticated and some of these auditors, they don't know what kind of vessel is this? They don't know what kind of equipment they have aboard." [Co12]*

5.4.5.3.4 Interview participants linked some of the above-mentioned issues to commercial pressure. Some perceived this as leading to a conflict of interest for ROs in relation to the companies they verified. Although a few of the stakeholder groups indicated that they did not experience such a conflict of interest, nearly all of the groups agreed that ROs were at risk of such a conflict, and felt that the commercial pressure on ROs was negatively impacting the quality of verifications. Additionally, some commented that commercial pressure had contributed to the push towards remote verification.

"We understand from the auditor that there is not enough time to collect all documents during the ISM audits. We also think that the time spent on board by ROs to complete a comprehensive audit is very often too short, and that this is linked to the commercial pressure (trading) and cost of the service, but [we consider that] that section should not affect a good check." [FS10]

"They get completely conflicted between the goals of performing a large number of audits and the dollars that they need to generate." [CI1]

"Owner pays to the RO to audit their company. That is a contract of each trust, but in reality there are some difficulties to avoid the conflict of interest. We recognise that ROs are under commercial pressure, and they tend to minimize the time to do the audits." [FS7]

"I think that the auditor also being the class is an issue, especially on this kind of topic, because quite often the class is involved in the development of the ISM itself and that same class is in a contractual agreement with the ship up to a certain extent. It may be difficult sometimes to see a class saying that the ISM system is not good when they were involved in the evaluation and initial implementation. So I think that there is this weakness." [PSC8]

"ROs are the same for the classification society for the ship, so there's a conflict of interest there as well. In a lot of cases, , they're actually also acting on behalf of the owners. So, they don't want to give too many NCs or anything like that." [V1]

"I have yet to see an RO raising a major." [FS8]

5.4.5.3.5 The findings from the accident investigation reports provide further evidence to suggest that gaps exist in the verification process, with non-compliance with ISM requirements being missed at the certification stage. In 50 of the reports, the analysts assessed that it certainly or probably would have been possible to identify the ISM deficiency during a verification (37 yes and 13 maybe/probably), which corresponds to 77% of the reports analysed.

5.4.5.3.6 Although there is a limited number of studies focused on auditing practices in the maritime industry, a few have identified issues in relation to flag State performance[116]. Based on port State control data, one study found that nearly half of the flag States had sub-standard overall performance levels[117]. Generally, the consensus in the literature is that the ISM Code is a positive legal instrument, but that poor implementation by flag State Administrations and individual shipping companies has undermined its benefits.

5.4.5.3.7 Concerning certification and auditing, Batalden and Sydnes' study cited several reasons why audit mechanisms may fail, indicating weaknesses in ISM auditing and certification[118]. They drew their findings on 18 semi-structured interviews with industry members together with a comprehensive literature review. They found that verification of compliance was mainly assessed through the inspection of documents. This resulted in some companies adjusting their SMS to suit the auditing standard, rather than putting effort into

116 Mansell, J. N. K. (2009). Measures of Flag State technical performance. In *Flag state responsibility* (pp. 179-217). Heidelberg: Springer Berlin Heidelberg.

117 Kara, E. G. M. (2022). Determination of Maritime Safety Performance of Flag States Based on the Port State Control Inspections Using TOPSIS. *Marine Policy*, vol. 143: 105156.

118 Batalden, B-M., & Sydnes, A. K. (2015). Auditing in the Maritime Industry: A Case Study of the Offshore Support Vessel Segment. *Safety Science Monitor*, vol. 19, no. 1.

developing an effective system. To some extent this may explain some of the SMS implementation issues described in section 5.4.4 above, with studies identifying companies employing "quick fixes" to close out non-conformities. Another issue identified by Batalden and Sydnes is that audits being conducted while vessels were at berth, thus limiting the possibility of assessing how operations were being undertaken in relation to their SMS. The same study also found that some auditors lacked the operational knowledge required for assessing the SMS and its role in contributing to safe operations.

5.4.6 Manning and fatigue

5.4.6.1 The findings in this study generally suggest that manning shortfalls are impacting the implementation of the ISM Code. The majority of the stakeholder groups interviewed identified numerous issues related to manning. All groups indicated that in many cases, minimum safe manning determinations issued by flag State Administrations were inadequate and vastly underestimated the number and type of crew needed for continued safe operations. The responses indicated that manning determinations often did not reflect onboard task requirements, including aspects such as maintenance, and most failed to adequately consider the risk of fatigue.

> *"The Minimum Manning Certification issued by the flag state is a mistake of the industry. This certification only consider how to manoeuvre a vessel from one place to another, without any consideration of cargo operation, ship's security requirement, this is a malpractice of the flag states. Although ISM Code, through its amendment by adding 6.2.2 has addressed the issue [...], this effort has been largely offset /undermined by the malpractice of flag state's continuing issuing minimum safe manning certificate." [Survey RO]*

> *"Vessels are of a size that we've never seen before. And the manning is at a level that we've never seen before either, and that's a huge concern. It's also, to be honest, fatigue. And that comes back to manning. The crewing levels are so low, there's no time to do everything." [PSC1]*

5.4.6.2 Likewise, 44 respondents from the seafarer survey noted issues related to manning determinations (37 respondents) and seafarers' competence and experience (seven respondents). Respondents noted that minimum safe manning determinations did not reflect actual task requirements on board. They observed that the crew number was often too low in relation to the actual workload, which was influenced, for instance, by the frequency of port calls, audits and inspections, or the age of the vessel.

> *"Minimum safe manning requirement from administration should be depends upon the age of the vessel. Most of the time in management companies, to reduce the employee cost, following only the requirement by administration. Seafarers onboard are getting overloaded as the age of the vessel goes more than 10, 15 years. Work rest hours are mostly manipulated to meet the requirement in those vessels." [Seafarer survey]*

5.4.6.3 The comments from interviews and surveys were corroborated both by the ISM verification data and the port State control inspection data, which suggested that section 10, "Maintenance of the ship and equipment" was one of the most frequent issues identified during verifications and inspections. It accounted for over 30% of the NCs in SMC verifications (annex D, tables D-3a and 3b) and 22.9% of the ISM-related deficiencies in port State control inspections (annex E, table E-2). The seriousness of this issue is underlined by the fact that 32.0% of the major SMC NCs related to "Maintenance of the ship and equipment" (annex D, table D-4). Furthermore, in port State control inspections, section 10 was the most frequently referenced single section of the ISM Code, in connection with the detention of

vessels, cited in 16.1% of detentions (annex E, table E-5). This is in line with comments suggesting that the onboard crew was not sufficient to conduct proper maintenance. This was also supported by participants at an IMO regional workshop held in July 2024, who represented stakeholder groups representative of the ISM system. When tasked with identifying issues and recommendations concerning the ISM Code, the 30 workshop participants unanimously agreed that general cargo ships face difficulty in maintaining equipment owing to insufficient manning. This suggests that paragraph 6.2.2 of the ISM Code is not being effectively implemented.

5.4.6.4 There was agreement among most stakeholder groups interviewed that minimum safe manning determinations are a flag State responsibility. Interviewees representing flag States described how manning determinations are approved, with most indicating that they referred to IMO resolution A.1047(27). Some also indicated that they used a manning table that specified crew numbers in relation to vessel tonnage and propulsion power as a guide to the application and approval process by the company. Several participants representing companies indicated that they had decided to go beyond the minimum requirements and always operated above the minimum safe manning determination, thus acknowledging that the flag State determinations are not sufficient for safe operations.

> *"The minimum safe manning is just a number. It's just to take the vessel from A to B, nothing else. We have more." [Co12]*
>
> *"It's the minimum manning. It should not be called "safe". It's minimum and [with] that you can barely operate the ship. It's the minimum. But I would say 99% of our fleet go beyond the safe manning certificate. So it's definitely not an issue – I mean we want to operate our ship safely. Our clients want to operate the ship safely. Nobody wants to have an accident." [Co5]*
>
> *"We have never gone down to safe manning. We have always looked at safe operations." [Co10]*

5.4.6.5 Generally, however, there seemed to be confusion around how minimum safe manning determinations are put together and approved by the flag State Administration. Some groups perceived this to be too subjective, noting that most flag State Administrations seemed to consider safe manning as a *"*number*"*. The majority of the groups agreed that these safe manning determinations were too low, with little consideration of operational requirements, and thus ultimately impacted safe vessel operations.

> *"With regard to the determination – some flags or companies do not take into account all the operational requirements. The Minimum Safe Manning Document [MSMD] does not reflect what is happening on the ship. Most of the time we have to deal with the company to change the MSMD or remove the AB [able seaman]. Although the Resolution 1047 is clear to my mind – for some flags [it] is not clear. The MSMD should provide for different activity of the vessel. This should consider fatigue and hours of work and rest." [FS11]*
>
> *"Companies and flags do not always seem to take into account the administrative burdens, including the extensive communication and reporting requirements placed on vessels today, which takes away resources from the core operational and safety-related activities on board. Some masters never seem to move away from the computer to actually lead and supervise crew and activities on board." [RO1]*
>
> *"We see safe manning documents. Essentially, it's bare minimum, bare bones that can run a ship. But I think any mariner who spends a little bit of time out at sea would understand that safe manning has got nothing to do with effective manning." [Co4]*

"Minimum safe manning has been developed not to establish as the norm, it was developed to establish what is required to safely operate a vessel with the minimum level. Now every company is taking that minimum safe manning and this is the crew that you will find on board, which is at the end nonsense. […] I think it should be exceptional that you have only the minimum safe manning. It should not be the standard." [PSC8]

5.4.6.6 An issue identified by some of the groups was that some companies tended to operate at this minimum manning determination approved by the flag State. Interviewees linked this push for minimum crew numbers on board to commercial pressure, and noted that it resulted in high workload, fatigue and unsafe outcomes. In the interviews, there were some strong views expressed on this aspect, with most stakeholder groups indicating a high level of inconsistency and variation in how flag State Administrations guided and approved minimum safe manning determinations. Additionally, it was suggested that flag State Administrations rarely challenged companies' safe manning determinations during the assessment and approval process. Ultimately, the expectation is that if the company adheres to the ISM Code (paragraph 6.2.2) requirements in relation to manning (which refers to resolution A.1047(27)), the minimum safe manning determination approved by the flag State (which refers to the same resolution) should reflect the appropriate manning required to operate the ship safely.

"[The] flag rarely challenges the company evaluations and proposals. The minimum safe manning is usually proposed by the company and accepted by the flag state, without further questions. The requirements of the ISM Code clause 6.2.2 often seem to be overlooked or not appropriately considered and evaluated." [RO1]

"For many other parts of the world, the flag States consider safe manning as a number. For this ship 10 people are fine. It's not, but they - that is the interpretation. Some flag States 'interpretations of safe manning." [SR1]

5.4.6.7 The majority of the groups indicated that resolution A.1047(27) is open to interpretation, leading to discrepancies across the industry.

"IMO guidelines are giving you principle, when you're talking about principles this is something that is open to interpretation." [FS9]

"All the information we got from [the flag State of the country] and elsewhere was no, this [minimum safe manning determination] is operational crewing in case of emergency, you know to get the vessel away off the berth, take it somewhere. And all of a sudden minimum safe manning has become the norm, and I know [name of company] do this a lot." [SR2]

"Obviously there are good companies that do good things, but on average it's much more seen as a tick-box compliance exercise than a culture building exercise. Yeah. And it's sometimes mind boggling how you can see different ships operated by different flags doing the same thing, having different determinations." [SR6]

5.4.6.8 Another issue identified was the manner in which the various legislative requirements related to manning were being interpreted. The lack of adequate linkages and guidance between these various pieces of legislation that ultimately govern manning determinations (i.e. the 1974 SOLAS Convention, the 1978 STCW Convention, the ISM Code, the MLC, 2006) means that these tend to be considered separately, rather than holistically. In the interviews, one of the stakeholder groups suggested that during verifications, some ROs avoid going into depth regarding manning and fatigue, even though this is a requirement under the ISM Code, because of the difficulty and complexity in verifying compliance.

"I don't like the minimum manning, it is a term which I feel belongs to the past. The STCW also tried not to have focus on the operational manning. So if [you] read all the resolutions today, and also some of the flags, they focus on the ISM Code [section] 6. But if you look into the resolution, you will see that it's no longer a focus on the minimum of manning as moving the vessel from A to B. It's focused on actually operating the vessel. The regulation focuses on the operational manning. But the flag is still living in the past […] if you read the MLC code, if you read STCW you will see that all of them are supporting the idea of having an operational manning of the vessel. But the flag is not following up." [RO3]

"The Safe Manning requirements are often established based on input provided by the ship operators. Once these requirements are established, they are seldom changed to consider changes in vessel operations, vessel condition, or its age. The issues with manning levels often manifest themselves when the vessel is operating in a complex environment such as frequent port calls or fast port turnarounds in port, increased maintenance due to age of the vessel, or other safety and security consideration due to area of operation which increases resource demands and results in crew fatigue. This is evidenced by frequent violations of MLC/STCW rest hours regulations even when the vessel complies with the minimum safe manning determinations by the flag state." [Survey RO5]

5.4.6.9 Some of the groups indicated that this has led to "flag shopping" whereby some companies used this as a bargaining chip to register their ships with flag State Administrations offering the lowest minimum manning determinations.

"What you will find is [that] a lot of shipowners / management companies will go 'flag shopping 'is what we call it, to find a flag that will accept what they consider as appropriate safe manning, and that is the lowest of the low." [PSC1]

"I actually think that the minimum safe manning has become a document of negotiation [for] cheap owners [to decide] which flag they are going [to use] or not, because this flag is offering less crew members than the other flag, because at the end IMO is using [applying] principles." [FS9]

"That's a well-known fact that flags are competing against each other on the minimum safe manning. It disturbs me a lot. When you actually issue minimum safe documents [for a number of] seafarers that is not even theoretically possible to run [safe] operations with […]. But still they do." [RO3]

5.4.6.11 The issue of commercial pressure was also raised in the seafarer survey. For instance, one respondent wrote, concerning the impact of commercial pressure on crewing:

"Minimum manning certificate is just an eye wash. On certain vessel this certificate mentions half the numbers that are actually required to run efficient operations. [...] ISM has severely failed to improve the manpower issues and commercial pressure and budgets are the real term dictators in this arena." [Seafarer survey]

5.4.6.12 The impact of imbalances between crew numbers and workloads was also evident in the responses from the seafarer survey. In addition to their comments on the number of crew members on board, many of the respondents (39 respondents) were concerned with working and rest hours, workload, fatigue and stress experienced by them and their colleagues on board. Twenty respondents mentioned this issue in general terms, five discussed problems with the current watch system and 14 noted issues related to work and rest-hour regulations being ignored in practice.

> *"It should be implemented practical not only paper work. Seafarer well being is area of concern which should be taken seriously by imo. Rest hour should be implemented more aggressive. You can identify in ports like [names of ports] where vessel r going for short stay and onboard crew is continuously working for 36-48 hrs for bunkering, audits, provision, visits, technicians and this list is long." [Seafarer survey]*

> *"Working hours, we spent all tricks how to not be in 'red'... from my previous company (worked there 15 yrs but now changed company) Passing panama canal, after bunkering and some inspections, overhauls [...] as soon we are done with job - departure. If we are in 'red' than company tells us that we did not organize job well" [Seafarer survey]*

5.4.6.13 As a strategy for coping with high workload and to cover up overly long work hours, 14 respondents from the seafarer survey mentioned practices involving falsification of records.

> *"The amount of paperwork is piling up and the trend is on the increasing side which causes falsification rather than actual work." [Seafarer survey]*

5.4.6.14 Numerous studies conducted in recent years have focused on manning, fatigue and workload in shipping[119,120,121]. The literature highlights issues with the current procedures used to determine minimum safe manning by flag State Administrations, which, once identified, mostly focused on ship size (gross tonnage) and propulsion power. In addition, it appears that the principles laid out in resolution A.1047(27) on *Principles of minimum safe manning* are not always adhered to[122,123,124].

---

119 Bourke, A. (2020). *Principles of minimum safe manning: A thematic analysis of the submissions to the International Maritime Organization for the development and adoption of Resolution A.1047(27)* [Industry Research Project]. University of Tasmania.

120 MacDonald, R. (2006). Safe Manning of Ships – Yesterday, Today and Tomorrow. *WMU Journal of Maritime Affairs*, *5*(2), 143–151.

121 Baumler, R. (2020). Working time limits at sea, a hundred-year construction. *Marine Policy*, *121*, 104101.

122 Bourke, A. (2020). *Principles of minimum safe manning: A thematic analysis of the submissions to the International Maritime Organization for the development and adoption of Resolution A.1047(27)* [Industry Research Project]. University of Tasmania.

123 Pathak, K. S., & Bhardwaj, S. (2024). Safe Manning: Workload assessment of deck officers. *Journal of Maritime Research*, *XXI*(1 (2024)), 106–113.

124 MacDonald, R. (2006). Safe Manning of Ships – Yesterday, Today and Tomorrow. *WMU Journal of Maritime Affairs*, *5*(2), 143–151.

5.4.6.15 Andrei et al.,[125] in a survey of 1,026 seafarers from ships representing 23 different flag State Administrations operating globally, found that around 30% of seafarers reported working more than 69 hours per week, and 20% indicated that their working hours were unpredictable. Approximately 12% of the participating seafarers reported experiencing sleep problems and 20% experienced some level of chronic and acute fatigue. Approximately 40% of these participants reported working under time pressure.

5.4.6.16 Baumler[126] investigated the continuing pressure in the maritime industry over the years that has caused fundamental rights such as working time limits to depart from the elsewhere widely accepted norm of the eight-hour working day. That pressure has taken the form of a continuous drive by the industry to push seafarers to operate at the limits of the hours of work and/or rest requirements and to make continuous demands on seafarers to work below the minimum standards. However, the problem goes deeper than seafarers working at the limit of the regulatory standards: studies have identified systemic non-compliance with minimum regulatory requirements such as those governing hours of work and/or rest. A recent study on work and rest hours compliance compared the findings of a port State control concentrated inspection campaign (CIC) with those from a global seafarer survey. It identified a large discrepancy between the port State control inspections and the survey outcomes (which included responses from 4,860 seafarers). While the former showed a 90% or above compliance rate, the seafarer survey reported rates ranging from 11.7% to 16.1%[127].

5.4.6.17 The findings from previous studies correspond to concerns raised by the majority of the stakeholder groups in this study, who indicated that minimum safe manning determinations are ignoring operational requirements. These findings indicate shortcomings in how the regulations are being interpreted, with some flag State Administrations potentially approving manning levels well below what was intended at an international level.

Ultimately, the present study and the previous literature provide evidence suggesting that a misalignment exists between manning, actual workload and seafarers' fatigue realities on board ships, further indicating that manning considerations in section 6.2 of the ISM Code are not being appropriately considered.

5.4.7 Port State control

5.4.7.1 There is no doubt that port State control plays a critical role in safety and environmental protection in the industry. Overall, despite port State control not being responsible for the ISM Code directly, its role in capturing non-compliance with the ISM Code and other safety regulations is seen as critical to ensuring that safety standards continue to be met. This belief was supported by most of the stakeholder groups interviewed as well as by the respondents from the seafarer survey, who expressed the view that the port State control regime is important for improving safety at sea.

One group interviewed stated that port State control is only dealing with the problem superficially, owing to the limited time spent on board during an inspection and its role being limited to identifying non-compliant vessels. All of the groups identified issues related to the challenges that port State control faces and how port State control is perceived in conducting its functions.

125 Andrei, D., Grech, M., Crous, R., Ho, J., McIlroy, T., & Neal, A. (2015). *Assessing the Determinants and Consequences of Safety Culture in the Maritime Industry* (Research No. LP130100215).

126 Baumler, R. (2020). Working time limits at sea, a hundred-year construction. *Marine Policy*, *121*, 104101.

127 Bhatia, B. S., Carrera-Arce, M., Baumler, R., & Grech, M. R. (2024). Seafarers vs. Port State Control: Decoding Work/rest Compliance Data Disparity. *Marine Policy*, *163*, 106105.

"Having port State control checking ISM absolutely, the number of ISM-related deficiencies and detentions that we find tells me that our role is important. […] As PSC we're limited by time because we know (1) the crew are fatigued already and (2) that the vessel is sailing in six hours and we can't unduly delay it without reason. So, from a port State control perspective, we're scratching the surface and a lot of times [that means] looking at the records that they have rather than verifying it's actually been done." [PSC1]

"What I found is when you have a good crew, your inspection goes a lot quicker because they can demonstrate what you're asking for very quickly. Because they're a good crew, they generally know their system and the ship's well looked after, so everything goes smoothly and you walk off the ship thinking, wow, that was brilliant.[…] And that's sort of like that's the wrong way to think. […] Because we see so much constantly below that [level], we're impressed when people are just doing their job, you know, which is really unfortunate." [PSC7]

5.4.7.2 Interviewees from the port State control group were concerned at the challenges involved in identifying issues with manning determinations, indicating that there was limited guidance available to support port State control inspectors in this area. The group mentioned that the only compliance indicator normally used for verifying safe manning is how the minimum safe manning determination issued by the flag State Administration compares with the number of crew members on board.

"As PSC our hands are really tied. Generally, we'll look at the safe manning certificate and that's the extent we go to say, all right, now give me the list of certificates or crew certificates of competency or proficiency that you have on board, and we tick off against the safety, the SMC or minimum safe manning certificate. And we say, all right, you met the requirements. There's not much else we can do. The only time we can do something is under ISM or MLC on work hours of rest." [PSC1]

"The issue we tend to find from a port State control perspective is that if we disagree that the vessel is safely manned, we will consult the flag State and we will say we have concerns on the manning of this vessel. They may come back and say that they believe it is fine, and again that is when we start having that disconnect between what is acceptable in our waters and what is acceptable to others. […] I would say [what] we would find is that we would contact the flag State [to say] that we have serious concerns [referring to six hours on, six hours off watch schedules], but ultimately, it's the flag State's prerogative and there's nothing to stop them having those watches." [PSC6]

5.4.7.3 Another issue identified by the same port State control group was difficulty in verifying ISM-related corrective actions following a detention.

"If you're going on board and you put a detention because the ship, the lifeboat is not starting or the emergency generator is not starting on board, then you go back on board and are able to test to see it working with your own eyes. Can you do that with ISM? You cannot. You have no demonstration that has been made when you took a decision to detain the vessel on the ISM, for example. You received the documentation saying that the external audit has been made and can you validate that ISM is working now […]. It's kind of an act of trust, act of fate." [PSC8]

"There's pretty good criteria for port State control officers in terms of what their backgrounds and skills that they bring to that position are. But it's pretty silent on the ISM Code. We assume because they've been a master, because they've been a seafarer, that they have that in-depth knowledge of the ISM Code." [PSC1]

5.4.7.4 There were concerns expressed by half of the stakeholder groups about port State control inconsistency in respect of ISM-related deficiencies. They indicated that variations existed between port State control regimes. One group pointed to inconsistency between individual port State control inspectors. An area of concern was that the ISM Code was often referenced as a blanket reason for deficiencies and/or detentions.

"We find port State control inspectors go on board with their own agenda. And that's not, you know, people would say this is in [country name] maybe or so, that's not the case. We have people in [port] and [port] or in [country] behaving like little kings and detaining ships for things that they think are not correct, like 'my opinion is that this drill wasn't done correctly, I therefore detained the ship'and we go like, 'Well, based on what you know'." [Co2]

"It depends on the background of everybody, of the inspector. If he's an engineer, he will focus more on engineering items. If he's a captain, he will focus on the bridge. We can see, for example, that there are some red flags for specific inspectors, so other inspectors will look at vent heads and other inspectors will look at navigation lights and this is something that needs to be improved." [Co11]

"The other thing that we see is also, like I said about the auditors'interpretation of what we're saying, is the same happens with port State control worldwide. We've seen […] a very big increase during the last couple of years where port State control officers, when they find some items on the vessel such as defects, they will put the [deficiency] code of the defect declaring it an ISM Code failure." [Co11]

5.4.7.5 Another issue mentioned by one group was bribery and corruption by individual inspectors in certain countries.

"Please remember there are parts of the world where port State control inspections are used as leverage for bribery and corruption. So, you know, it isn't standardized across the world, the competence levels are not standardized. The implementation levels are not standardized. If you look at the III guidance for port State control officers, [it] already has in there about bribery and corruption. But that doesn't mean to say it's actually implemented properly by those coastal States. Definitely not." [Co6]

5.4.7.6 These findings support the view that the aspect of port State control is not covered by resolution A.1047(27) on *Principles of minimum safe manning*, and with no guidance available for inspectors. As indicated by the interviews, port State control currently reviews the minimum safe manning document against the ship's crew. If they match, that is deemed satisfactory from a port State control perspective. With no consistent guidance available, port State control is limited in the follow-up it can undertake, even if it has identified concerns in this area.

5.4.7.7 Discrepancies between port State control regimes were identified in previous studies[128,129]. Xiao and colleagues conducted an analysis of 125,259 inspections from the Tokyo MoU database across a three-year period (2015–2017) while Graziano and colleagues[130] focused on cross-national differences in EU countries. Both studies identified discrepancies in port State control inspections among different Member States, which the authors attribute to variations in inspection team composition and the inspectors' backgrounds. Irrespective of the differences, both studies contend that overall port State control continues to be effective in improving safety outcomes, with Graziano and colleagues[131] advocating for a holistic training policy for port State control officers and a more structured inspection procedure.

5.4.8 Summary of improvements suggested by participants

This section presents a summary of the suggestions for improvements made by participants in the interviews and respondents to the seafarer survey. The suggestions are grouped under themes developed from a thematic analysis of the responses.

5.4.8.1 Supporting guidance

5.4.8.1.1 Almost all respondent groups suggested the need for guidance or guidelines to enable flag States to ensure consistent interpretation, including further guidance on delegating ISM Code functions to ROs. All respondent groups and several seafarers mentioned the need for more guidance on SMS in general, targeted support for seafarers, companies and shore management, and for risk assessment and internal audits[132] specifically, as well as support for port State control. In addition, there were multiple recommendations about ensuring that the SMS does not become too complex, does not involve unnecessary paperwork, is simplified, ship-specific, applies standardized language and is searchable and accessible. In this connection, it was also suggested that digital technology could be deployed. The need for such guidance is also supported by the literature[133,134,135].

128 Xiao, Y., Wang, G., Lin, K.-C., Qi, G., & Li, K. X. (2020). The effectiveness of the New Inspection Regime for Port State Control: Application of the Tokyo MoU. *Marine Policy*, *115*.

129 Graziano, A., Cariou, P., Wolff, F.-C., Mejia Jr, M. Q., & Schröder-Hinrichs, J.-U. (2018). Port state control inspections in the European Union: Do inspector's number and background matter? *Marine Policy*, *88*, 230-241.

130 Graziano, A., Schröder-Hinrichs, J.-U., & Ölcer, A. I. (2017). After 40 years of regional and coordinated ship safety inspections: Destination reached or new point of departure? *Ocean Engineering*, *143*, 217–226.

131 Graziano, A., Schröder-Hinrichs, J.-U., & Ölcer, A. I. (2017). After 40 years of regional and coordinated ship safety inspections: Destination reached or new point of departure? *Ocean Engineering*, *143*, 217–226.

132 Vinodkumar, M. N. & Bhasi, M (2011). A Study on the Impact of Management System Certification on Safety Management. *Safety Science*, vol. 49, pp. 498–507.

133 Uflaz, E., et al. (2022). A Quantitative Effectiveness Analysis to Improve the Safety Management System (SMS) Implementation on Board Ship." *Safety Science*, vol. 156, p. 105913.

134 Batalden, B-M., & Sydnes, A. K. (2015). Auditing in the Maritime Industry: A Case Study of the Offshore Support Vessel Segment. *Safety Science Monitor*, vol. 19, no. 1.

135 International Maritime Organization (2005). Assessment of the Impact and Effectiveness of Implementation of the ISM Code. MSC 81/17/1.

"We can have guidance […] to help […] all the flag States and ROs [understand] that this is how we interpret it, this is how we see it. That's one thing, I think that that will improve the implementation, because once we all get together and put a benchmark or like a standard line there, then the companies will be able to understand that this is what is expected right now." [FS8]

"Provide clear guidelines to support SMS implementation which should include information on internal audits, root cause analyses, corrective actions." [RO1]

5.4.8.2 Strengthening some areas of the ISM Code

5.4.8.2.1 Participants from several stakeholder groups also recommended making changes to specific sections of the ISM Code itself to strengthen these areas.

"Updating of the ISM code itself - taking into account new technologies, new ways of working, new ways of thinking of younger generations of seafarers, and how other management systems standards have evolved." [Survey RO1]

5.4.8.2.2 Changes related to risk assessment and occupational health and safety were strongly recommended by all respondent groups and some seafarers.

"Without doubt, risk management. Risk management is, I think, - all is about the risk management. And more and more comprehensive, more and more guidance on risk management, how to do [it]." [Co11]

"Risk assessment should be strengthened in the ISM Code and included as another element. This should be linked to ISO:31000 which is the international standard that provides principles and guidelines for risk management. As per the IACS recommendation." [RO3]

"It would also be useful for the ISM Code to refer to the ISO:450001 standard - I think that would be useful for companies. I think we maybe might need also some more accessible guidance for seafarers as well." [SR6]

5.4.8.2.3 Management of change and management review was mentioned by a few stakeholder groups. Additionally, all groups and many respondents to the seafarer survey suggested the inclusion or strengthening of top management responsibility and accountability in the ISM Code.

"I believe the biggest issue we have is – and it's a golden opportunity for us now when we are revising it – to actually go with the management of change, and every management of change will tell you that you need to identify stakeholders and then go for the opinion." [Co8]

"We need to have a constructive dialogue with [the] CEO as responsible person. This will also ensure more focus on support and ISM implementation. But also ensure proper oversight whatever the company structure is." [RO3]

*"First, for accident investigation, if we would actually get the Chief Executive Officer into the stand talking, [it] would make a difference. The **Costa Concordia**, [for example] if it was actually the chief executive of the company being asked and made responsible for his actions. A lot of that would send a very strong message." [Co8]*

5.4.8.2.4 Suggestions also pointed to placing more responsibility on the owner, because this was considered to impact safety outcomes.

> *"There is hardly any obligations or consequences directly to owners. A ship owner penalization (NCN to owners), might help, but probably PSC would be the better authority for that." [Survey RO1]*

5.4.8.2.5 Several groups and some seafarers advocated strengthening the master's role and supporting the DPA. In addition, many comments related to strengthening ship-to-shore communication[136] as well as seafarer input[137] to the SMS.

> *"There are specific requirements that need strengthening. For instance, the overriding authority of the master. We understand that in some cases, shipping companies may wait for a reply from the captain on how to proceed. From both my experience and that of my colleagues, it would be beneficial to reinforce these provisions regarding the overriding authority of the master." [FS2]*

> *"Having a [designated person] [given a] small amount of vessel to manage. Then they will be able yes to manage ISM, they would also be able to evaluate if it's working properly, they will be able to interact with the crew members on board the vessel that fall under their responsibility and then therefore maybe they would be more agile to make sure that the ISM system is working properly and updated." [PSC8]*

5.4.8.3 Resourcing and personnel (manning)

5.4.8.3.1 All respondent groups suggested that the ISM Code should be reviewed with regard to manning determination, and that minimum safe manning determinations should be more specific, stricter, and ensure that operational aspects are adequately considered[138]. It was also suggested that the manning determinations could be supported by a risk assessment. In addition, seafarers suggested strengthening the regulations concerning work/rest hours and fatigue, including requiring the company to provide more crew when needed, and to prevent the falsification of records.

> *"Minimum safe manning should be significantly revised, current numbers of crew are way too low, which leads to overworking and immense fatigue and stress." [Seafarer survey]*

> *"We propose that the IMO make guidelines for the issuance of minimum safe manning more specific, not so open to interpretation. Give us a tool in order to avoid this kind of situation, because having these guidelines so open, flags are going to use it for their own way. Develop stronger guidelines for the issuance of minimum safe manning certificate, these need to be more specific and not open for interpretation." [FS9]*

> *"I think it would be good to link manning to ISM. […] To have more guidelines and to link the minimum safe manning to a risk assessment. You know, it could be very useful because it compels the owner/operator to provide you with a rationale behind the requests that they're putting forward and not just based on maybe the scale that company or Administration has. So, in my opinion to link the determination to a risk assessment would be very good. [FS10]*

136 Thomas, M. (2011) A Systematic Review of the Effectiveness of Safety Management Systems. Cross-modal Research Investigation, XR-2011-002, Australian Transport Safety Bureau.

137 International Maritime Organization (2005). Assessment of the Impact and Effectiveness of Implementation of the ISM Code. MSC 81/17/1.

138 Baumler, R. (2020). Working Time Limits at Sea, a Hundred-Year Construction. *Marine Policy*, no. 121, 104101.

5.4.8.4 Port State control guidance on manning

5.4.8.4.1 There was strong support for more port State control guidance in relation to manning.

> *"If port State control are provided with guidance in relation to understanding better or knowing better how to review the crew on board, that would be good. But I guess the gap that needs to be closed is the fact that when we do port State control, we are verifying compliance with what the flag State has approved, and the flag State ultimately has the responsibility to ensure that they're only approving things to the standard that the IMO set." [PSC1]*
>
> *"Another way would be for port State control officers that inspect vessels coming into our waters [to be] more strict, more meticulous in our revision of the rest hours because I think that this is one of the biggest frauds that we can find on board vessel. This is very clearly not reflecting reality. I never find a ship where it was reported on the ship that it was exceeded. There is a lot of pressure on the crew and they don't feel supported because even if there is the ISM system in the company, if they complain that they don't sleep they will be fired, but the company will put pressure on them." [PSC8]*
>
> *"When it comes to safety, I think they [PSC] should be able to step in and dictate a little bit more than what they can, because in the day if their determined number in [country] is different to a determined number in what's in any other country, then the greater one should be the one that is actually picked rather than the minimum one." [SR2]*

5.4.8.5 ISM verifications and certification

5.4.8.5.1 Most participants in the interviews as well as respondents in the seafarer survey indicated that more needs to be done with regard to ISM verifications and certifications, to ensure that flag States' responsibilities are being properly upheld. Participants suggested that flag States should be more involved and should be held accountable for shortfalls under their responsibility. Further, participants suggested the need to improve the monitoring of flag States and auditors, including strong sanctions for non-compliance (i.e. if auditors, ROs or flag States fail to properly implement the Code)[139,140].

[139] Sharma, D. R. (2023). Development Of Model for Measuring Audit Quality in Maritime Safety Management. *The International Journal on Marine Navigation and Safety of Sea Transportation*, vol. 17, no. 4.

[140] Batalden, B-M., & Sydnes, A. K. (2015). Auditing in the Maritime Industry: A Case Study of the Offshore Support Vessel Segment. *Safety Science Monitor*, vol. 19, no. 1.

5.4.8.5.2 Most of the respondent groups commented on the need to improve audits. Suggestions included:

- specifying the minimum time required to complete an audit;
- adopting a risk-based approach for verification audit frequency, with less frequent audits for well-performing ships;
- aligning the audit frequency for DOC and SMC;
- changing the way in which some audits are conducted (e.g. ISM audits should not be done remotely);
- the aspects to be covered during audits (e.g. making drills a mandatory part of ISM audits; addressing seafarers' competency);
- those who should perform the audits (e.g. considering using different ROs for ISM and statutory functions);
- follow-up of non-conformities (e.g. ISM should specify better follow-up when major NCs are identified; requiring ROs to report issues to flag States);
- Administration and record keeping (e.g. allowing authorization of an interim DOC Certificate issued by another flag state; DOC and SMC ship types should be the same as SOLAS/MARPOL); and
- permitting DOC verification and certification to be conducted without a vessel for a limited period (i.e. conducting delivery voyages).

The following quotes illustrate some of these points:

> *"Place responsibility for the adequacy of SMS for controlling risk onto flag states. Otherwise ISM relies on casualties and effective investigation (which rarely identifies root causes at present) to demonstrate harm. The existing approach is therefore totally reactive." [Seafarer survey]*
>
> *"Can possibly separate the ROs issuing statutory certificates from those issuing ISM certification. But ultimately the flag is responsible. If you delegate, you need to control your delegation. If you delegate, you still have responsibility and need to control this delegation." [FS11]*
>
> *"IMO should consider providing guidelines or criteria for minimum duration of DOC and SMC audits. This will encourage adequate time allocation for verification activities, and a level playing field for operators, ROs and the flag State inspectors." [RO5]*

5.4.8.6 Human element

5.4.8.6.1 On the topic of human element, some suggested promoting safety and/ or just culture.

> *"The ISM Code doesn't specifically mention the aspect of safety culture. It's only mentioned in the guidelines so I think it should be mentioned. I could see some significant issues with getting that across the line. It might be difficult, but yeah, in principle" [SR6]*

> *"The 'Plan Do Check Act' concept is not directly defined and explained in ISM Code and more information on this concept would be necessary." [RO2]*

> *"We need to improve the culture of continuous improvement from IMO." [FS8]*

5.4.8.6.2 Several groups advocated including non-technical skills training and that risk assessment should be part of seafarer training.

> *"Training with regard to the soft skills of how to properly present, of having the right to address wrongdoings, it's a must. For me, it's something that should be included in the basic training of a seafarer." [Co11]*

5.4.8.6.3 There were also a few comments about setting up a complaints process for seafarer reporting as well as strengthening the follow up of such issues[141].

> *"Anonymous reporting system to be encouraged within seafarers to identify non compliant flags and companies." [Seafarer survey]*

5.4.8.7 Support safety learning

5.4.8.7.1 Several groups suggest supporting safety learning, including more input from seafarers in ISM training and sharing of ISM information, sharing of best practice, as well as improving GISIS to find data on ISM shortfalls and trends.

> *"If commercially, we are required to do root cause analysis, why for goodness' sake are we not requiring proper root cause analysis from accident investigators is beyond me. Member States don't want to do it. And why don't they want to do it? Because it means more work for them and it's just wrong." [Co6]*

[141] Bhattacharya, S. (2012). The Effectiveness of the ISM Code: A Qualitative Enquiry. *Marine Policy*, vol. 36, pp. 528-35.

6 RECOMMENDATIONS

The following recommendations are based on information gathered from this study through interviews, surveys, verifications and port State control inspection data, marine incident reports and the research literature. The proposed recommendations are intended to address gaps identified through the findings in order to improve the effectiveness and effective implementation of the ISM Code.

The recommendations are presented under the following headings:

6.1 reviewing the guidelines on the implementation of the ISM Code;

6.2 reviewing the guidelines on port State control in relation to the ISM Code;

6.3 reviewing some specific elements of the ISM Code;

6.4 initiating a holistic review of IMO instruments dealing with resources and personnel;

6.5 promoting the development of training guidance for non-technical skills; and

6.6 enhancing capacity building on the effective implementation of the ISM Code and its related instruments

When presenting the recommendations, we include a brief summary of relevant key findings, referring readers to the relevant paragraphs in sections 5 for more detailed information.

6.1 Reviewing the guidelines on the implementation of the ISM Code

6.1.1 Guidance for flag State Administration

The findings indicate the need for more guidance specifically for flag State Administrations, to ensure clarity and consistency across the global fleet in the implementation, certification and enforcement of the ISM Code (see findings in sections 5.4.2.1; 5.4.8.1; and 5.4.8.5). The findings indicated inconsistencies in how flag State Administrations applied the ISM Code, contributing to a lack of proper implementation, oversight and enforcement (see findings in section 5.4.5.2 and 5.4.5.3).

Companies (DOC holders) are the first line of defence in ensuring proper implementation and continuous improvement of the SMS in accordance with the ISM Code. As the national regulators, flag State administrations play a key role in ensuring that ships flying their flag operate in accordance with IMO standards. They are primarily responsible for the proper enforcement of these standards, including ensuring compliance through verifications and certification of companies and their ships. Regardless of any delegated arrangements (e.g. delegation of tasks to ROs), the flag State Administration retains the responsibility to ensure that any delegated tasks are performed in accordance with ISM Code requirements. Consequently, flag State Administrations must have the ability and capacity to implement the requirements under the ISM Code, oversee their regulated entities through a consistent and adequate set of processes and, if delegating this function, are able to appropriately manage, control and oversee the delegated organizations.

IMO has produced guidelines for flag State Administrations on the implementation of the ISM Code[142]. These provide detailed assistance in some areas, but remain somewhat vague and ambiguous in others, contributing to poor implementation, suggesting a need for more IMO support in the form of guidance (see findings in sections 5.4.5.3; 5.4.6.5; 5.4.6.8; and 5.4.8.1). This would help to ensure that consistent practices are developed and applied in the auditing, certification and enforcement of the ISM Code and related requirements.

6.1.1.1 ISM verification and certification

6.1.1.1.1 The findings identified several issues related to ISM verification and certification which pointed to inadequate flag State Administration oversight of delegated functions. This in turn seems to affect how ROs undertake their delegated functions and, given also the commercial pressure identified on delegated entities, the findings suggest that these factors may contribute to poor audit quality (see findings in sections 5.4.5.1; 5.4.5.2; and 5.4.5.3).

6.1.1.1.2 Numerous suggested improvements were made concerning the conduct of ISM verifications. Participants in the seafarer survey and interviews indicated that verifications should be stricter and more focused on actual operational safety, rather than simply on just checking paperwork (see findings in sections 5.4.5.1 and 5.4.8.5).

6.1.1.1.3 Relatedly, some considerations were put forward in support of employing a separate RO (or duly qualified delegate) to conduct ISM verification and certification to the RO conducting other statutory functions for the same vessel (see section 5.4.8.5). However, there were also arguments in favour of allowing the same ROs to conduct both ISM and statutory delegated functions, as this provided for better insight into the vessel's condition and allowed for a more consolidated approach. On the other hand, the positives in having separate delegated entities for ISM and statutory functions far outweigh the challenges, bearing in mind the potential for conflicts of interest, as noted in the findings.

6.1.1.2 Auditor training

6.1.1.2.1 The findings also identified inconsistencies in ISM verification, pointing to poorly trained auditors as a contributing factor (see findings in paragraphs 5.4.5.3.2; 5.4.5.3.3; and 5.4.5.3.7). The need for better auditor competence was noted in interviews with stakeholders as well as by respondents in the seafarer survey.

6.1.1.3 Risk assessment

6.1.1.3.1 Risk assessment is a key component of the SMS. The findings indicated a lack of understanding of how risk assessment is undertaken, implemented and enforced across the industry (see findings in sections 5.1.3; 5.2.6; 5.2.8; and 5.4.2.3). The analysis of accident investigation reports showed that in 34% of the cases, risk assessment and risk analysis had been lacking. In the interviews, most groups agreed that the ISM Code requirements for risk assessment were not sufficiently robust. This is supported by a recent analysis submitted by Panama[143] to the IMO which identified inadequate risk assessment as the second highest causal factor in marine accidents over the past two years (the highest risk factor being inadequate maintenance).

---

142 Resolution A.1118(33), Guidelines on Implementation of the International Safety Management (ISM) Code by Administrations (adopted 2024).

143 Panama. (2024). *Lessons Learned and Safety Issues Identified from the Analysis of Marine Safety Investigation Reports -Consolidated report on the statistics of marine casualties/incidents suffered by Panamanian-flagged vessels between 2020 and 2023* (No. III 10/4/5). International Maritime Organization.

In the study interviews, it was noted that risk assessment is only explicitly mentioned once in the ISM Code objectives. Moreover, the Code does not specify any particular approach to the management of risk. All stakeholder groups indicated that risk assessment should be a requirement that is clearly linked to most of the elements in the ISM Code. Some interviewees stated that the process must be systematic and that the entire risk assessment must be appropriately documented in order to provide evidence of the decision-making process (supporting finding in paragraph 5.4.8.2.2).

6.1.1.4 Occupational health and safety

6.1.1.4.1 The fundamental purpose of a risk assessment within an SMS is to ensure the health and safety of seafarers. However, data point to continuously high seafarer injury and fatality rates across the industry (see section 3.1). For example, InterManager's analyses of work health and safety data show that fatalities and injuries continue to be an issue, with no noticeable decrease in the past 10 years[144]. The incident data presented by Panama (2024)[145] show a similar trend, with the number of seafarer fatalities increasing by 37.5% and 18.1% respectively in 2023 compared to 2022.

6.1.1.4.2 The ISM Code does not mention the subject of occupational health and safety on ships, despite the requirement "to assess all identified risks to its ships, personnel […] and establish appropriate safeguards" specified in the Objectives (1.2.2.2). In view of the continuing high seafarer injury and fatality rates across the industry, it is important that occupational health and safety guidance be strengthened in order to ensure consistently safe and healthy workplaces for all seafarers across the industry.

6.1.1.5 Continuous improvement

6.1.1.5.1 Continuous improvement is the backbone of the ISM Code. Internal audits and companies' responses to non-conformities and deficiencies (identified in audits and port/flag State control inspections), incident reporting and root cause analyses following an investigation all feed into continuous improvement. Continuous improvement allows the SMS to mature – this is how the ISM was intended to operate. In the ISM Code, continuous improvement is referred to only indirectly, in section 12.

6.1.1.5.2 The findings in this study have identified weaknesses in the way that these activities are being undertaken, undermining the implementation of continuous improvement (see findings in paragraphs 3.2.9; 3.2.10; 3.2.13; and in sections 5.4.4.2 and 5.4.4.3). Most of the interviewees indicated that continuous improvement needs to be strengthened in the ISM Code to ensure proper implementation.

6.1.1.5.3 An important aspect to consider are the ISO standards, which establish best practice and have resulted in benefits to those the companies adopting such standards[146]. Based on a survey of 163 companies, Pantouvakis and Karakasnaki showed that shipping companies who voluntary implemented the ISO 9000 or 14001 quality management system standards also efficiently incorporated the mandatory specifications of the ISM Code into their daily

144 May 2024 Stats review - InterManager accessed 20 June 2024

145 Panama. (2024). *Lessons Learned and Safety Issues Identified from the Analysis of Marine Safety Investigation Reports - Consolidated report on the statistics of marine casualties/incidents suffered by Panamanian-flagged vessels between 2020 and 2023* (No. III 10/4/5). International Maritime Organization.

146 Pantouvakis, A., & Karakasnaki, M. (2016). An empirical assessment of ISM Code effectiveness on performance: the role of ISO certification. *Maritime Policy & Management*, *43*(7), 874–886.

operations[147]. Companies with ISO certification performed better in the areas of operational innovation and process improvements and employee motivation, with most changing their philosophy to adopting these processes, and moving towards a more effective SMS that supported continuous improvement. This points to potential benefits for the industry as a whole to develop a continuous improvement philosophy based on the ISO: 9001 standard.

6.1.1.6 Master's responsibility and authority

6.1.1.6.1 The findings from the interviews and seafarer surveys identified some gaps concerning the master's authority (see findings in section 5.4.4.4). This was generally described as a grey area in which masters were afforded little or no protection in practice. Similar issues were identified in previous studies[148].

6.1.1.6.2 Participants identified a need to review and clarify the role of the master to ensure their authority is upheld, suggesting that this aspect could be better explained, defined, and strengthened in the ISM Code (see findings in paragraph 5.4.8.2.5).

6.1.1.2 Designated person ashore

6.1.1.2.1 The findings (see section 5.4.4.5) indicated gaps with regard to the role and competency requirements for the DPA. The findings from the seafarer survey and the interviews identified gaps in the ISM Code regarding the designated person's competency requirements. There was also concern around the DPA's high workload, with suggestions made that the ISM Code should ensure the independence of the DPA from senior management and provide reasonable protection to the DPA, similar to the master. The DPA plays a critical role with direct access to both the vessel and senior management, and is thus essential to effective ship-shore communication. The ISM Code places further responsibilities on the designated person function, namely "*monitoring the safety and pollution prevention aspects of the operation of each ship and ensuring adequate resources and shore-based support are applied as required"* (ISM Code Section 4), accordingly, this should be properly resourced and supported.

6.1.1.2.2 Consequently, interview participants and respondents in the seafarer survey indicated the need to strengthen the ISM Code requirements regarding the designated person's competence, workload, authority and independence (see findings in paragraph 5.4.8.2.5).

6.1.2 Flag State Administration oversight

6.1.2.1 The findings indicated the need for greater accountability among flag States and ROs (see findings in sections 5.4.5.2; 5.4.5.3; and 5.4.8.1). Seafarer survey respondents suggested that the flag State should become more involved and take greater responsibility. There were also recommendations to establish a complaints procedure within IMO to allow reporting of non-compliance by companies or flag States, suggesting that flag State Administration oversight by the IMO may be necessary to ensure proper implementation of the ISM Code. The MLC, 2006, under Regulation 5.2.2 has already in place a complaint process for seafarers to report breaches of the MLC, 2006, to the competent authorities. A complaint procedure to report ISM non-compliance occurrences to relevant authorities could be introduced in the ISM Code, including by anonymous means of reporting.

147 Pantouvakis, A., & Karakasnaki, M. (2016). An empirical assessment of ISM Code effectiveness on performance: the role of ISO certification. *Maritime Policy & Management*, *43*(7), 874–886.

148 Batalden, B. M., & Sydnes, A. K. (2014). Maritime safety and the ISM code: A study of investigated casualties and incidents. *WMU Journal of Maritime Affairs*, 13(1), 3–25.

6.1.3 SMS implementation and guidance for companies

6.1.3.1 The findings identified several issues related to SMS implementation by companies (see findings in sections 3.2; 5.4.4.1; 5.4.4.2; 5.4.4.3; and paragraph 5.4.5.3.7). In particular, aspects of the SMS relating to risk management and continuous improvement were identified by interview participants and seafarer survey respondents as poorly implemented or not well understood, indicating the need for further supporting guidance. Several mentioned the need to review the relevant company guidance[149] in order to strengthen SMS in these areas.
One group of respondents suggested that such guidance should also cover ship (shore) management competency (see findings in paragraphs 5.4.4.5.2 and 5.4.8.2.5).

6.1.3.2 The findings highlighted persistent issues related to an overly narrow focus on paperwork and a checklist-driven approach, the complexity and size of the SMS, and lack of seafarer involvement in the SMS (see findings in sections 3.2 and 5.4.4.1). This is a well-known issue that was mentioned in an IMO review of the ISM Code undertaken in 2005[150], as well as in several more recent studies. The accident report analyses in this present study found that 94% of reports identified issues with SMS implementation (see findings in paragraph 5.4.4.1.3). 45.8% of the respondents from the seafarer survey also identified SMS implementation issues (see paragraph 5.4.4.1.3). Additionally, this study also identified that 16.3% and 21.2%, respectively, of SMC NCs found during verifications carried out by ROs and flag States, and 20.7% of deficiencies identified by port State control inspectors, were related to "shipboard operations" (see findings in paragraphs 5.2.4 and 5.3.3).

6.1.3.3 In line with this, 22 respondents from the seafarer survey called for the strengthening of relevant regulations or guidance with provisions in place on the SMS (see findings in section 5.4.8.1). Respondents thought it important to ensure that the SMS does not become too complex and require unnecessary paperwork, that it is specific to the vessel, and that both language and (where possible) procedures are standardized.

6.1.3.4 Moreover, participants recommended that the SMS should be easily accessible in one place, rather than spread across an array of documents, books and online files, allowing it to be easily searchable.

6.1.3.5 Additional suggestions from the seafarer survey and the interview groups are for the SMS to take into account new technologies and new ways of working, one example being digital checklists and forms.

6.1.3.6 It is the company's responsibility to ensure that SMS procedures reflect shipboard practices and are well understood by the seafarers who apply them on board. It is important that SMS manuals are relevant to the ship, user friendly and written in a way that is understood by the crew. Some of the companies interviewed indicated that they were addressing these concerns by adopting the approach developed by Lovoy[151], which addresses SMS usability.

149 MSC-MEPC.7/Circ.8 Revised Guidelines for the operational implementation of the International Safety Management Code (ISM) by Companies (Adopted 28 June 2013).

150 International Maritime Organization (2005). Assessment of the Impact and Effectiveness of Implementation of the ISM Code. MSC 81/17/1.

151 Terje Lovoy, Senior Partner, Lovoy Training INC https://lovoy.info/.

Recommendation 1: IMO should consider improving the implementation of the ISM Code, in order to ensure consistency in the uniform application and interpretation of mandatory provisions, as well as compliance and enforcement by Administrations and/or companies. It is recommended that consideration be given for a comprehensive review and revision of the guidelines on the implementation of the ISM Code by Administrations and companies, in particular resolution A.1188(33) on *Guidelines on the implementation of the ISM Code by Administrations* and MSC-MEPC.7/Circ.8 on *Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies*, with focus on:

.1 ensuring that seafarers are involved as part of the Safety Management System (SMS) development, review and implementation process, in order to gain end-user perspective and enhance crew members' sense of ownership of these systems;

.2 developing specific risk management guidelines suited for the industry, taking into account ISO 31000:2018 *Standard on Risk management*[152] as a reference, in order to provide a structured framework to support best practice for a systemic approach to risk management and enhance understanding among seafarers on board and personnel ashore;

.3 including provisions on occupational health and safety, in particular a framework for managing occupational health and safety risks, in order to ensure consistent application of organizational health and safety practices across the industry, taking into account ISO 45001:2018 *Standard on occupational health and safety management systems*[153] and other relevant maritime standards, noting existing requirements under the 1974 SOLAS Convention, the 1978 STCW Convention, the MLC, 2006, and the mandate of the Organization;

.4 including provisions on continuous improvement, in particular to specify the importance of responses to non-conformities and deficiencies; corrective actions; analyses and evaluation of data and what constitutes a proper conduct of incident investigation and analyses, taking into account ISO 9001:2015 *Standard on Quality management systems*[154] and other relevant standards;

.5 developing further guidance on the importance and conduct of internal audits, taking into account ISO 9001:2015 *Standard on Quality management systems*[155] and other relevant guidance;

.6 including clarifications and details of the role and responsibility of the master to ensure consistency in the interpretation of the corresponding provision in the ISM Code concerning Master's responsibility and authority;

---

152 ISO 31000:2018 Risk Management – Guidelines, Edition 2, 2018 and ISO 31000:2018 Risk Management – A Practical Guide, Edition 1, 2021.

153 ISO 45001:2018 Occupational health and safety management systems - Requirements with guidance for use, Edition 1, 2018.

154 ISO 9001:2015 Quality management systems – Requirements, Edition 5, 2015.

155 *Ibid.*

.7 reviewing the *Guidance on the qualifications, training and experience necessary for undertaking the role of the designated person under the provisions of the International Safety Management (ISM) Code* (MSC-MEPC.7/Circ.6)[156], regarding the function and responsibility of the DPA Additionally, consideration should be given to whether the DPA is a role or a function;

.8 including provisions that ISM-related documentation should be transferred and made available on board for the life of the ship, in particular when the company changes, taking an approach similar approach to the CSR;

.9 improving the provisions related to ISM verifications in order to ensure their effectiveness and quality, in particular consider including time frames for the conduct of ISM verifications; and establish minimum criteria for the number of personnel needed to carry out verification(s), noting that the verification process can vary based on organization size and complexity;

.10 including clear instructions that SMC verifications must be carried out on board. Only under exceptional circumstances should remote verifications be permitted;

.11 including provisions for personnel conducting verifications to observe drills during SMC verifications;

.12 including provisions relating to the close-out of non-conformities to ensure that these are undertaken as per the intent and objectives of the ISM Code;

.13 for those flag States that delegate obligations emanating from SOLAS chapter IX and the ISM Code:

.1 strengthening flag States' oversight of delegated entities (i.e. ROs), in particular consider including provisions on feedback and reporting, taking into account other relevant IMO instruments; and

.2 including provisions for the delegation to different ROs by Administrations of ISM and other statutory functions;

.14 reviewing the competence to carry out verifications in the context of the ISM Code, as set out in the appendix to resolution A.1188(33) on the *Guidelines on the implementation of the ISM Code by Administrations* – regardless of whether the personnel are from the flag State Administration or a delegated entity (i.e. ROs);

.15 strengthening aspects associated with risk management, hazard mitigation, considerations for appropriate manning, and continuous improvement (including the establishment of key performance indicators) by means of internal audits, root cause analyses and corrective actions; and

[156] MSC-MEPC.7/Circ.6. on Guidance on the qualifications, training and experience necessary for undertaking the role of the designated person under the provisions of the International Safety Management (ISM) Code (approved 19 October 2007).

.16 implementing a usability[157] approach in the development and continued review of the SMS to ensure applicability, as well as safety and environment protection, including provisions aimed at ensuring that ship and operational procedures in SMSs are specific and reflect shipboard operations.

6.2 Reviewing the guidelines on port State control in relation to the ISM Code

6.2.1 The important role that port State control plays in maritime safety is undisputed. However, some areas for improvement were identified, mainly related to the interpretation of ISM Code deficiencies. Most of the findings suggest inconsistencies in the identification and coding of SMS-related deficiencies by port State control (see findings in paragraphs 5.4.7.3; 5.4.7.4; and section 5.4.8.1).

6.2.3 Specifically, the findings also show that port State control faces challenges in identifying manning problems during inspections (see findings in paragraphs 5.4.7.2; 5.4.7.3; 5.4.7.6). Most interviewees from this stakeholder group (port State control) indicated that there was limited guidance to support them in identifying such issues and that, in most cases, they rely on the flag State determination (see findings in paragraphs 5.4.7.2; 5.4.7.6; and 5.4.8.4.1). There was a general understanding that more guidance was required for port State control in this regard.

Recommendation 2: IMO should consider reviewing the port State control guidelines in relation to the ISM Code, in order to ensure that the provisions of the ISM Code are implemented consistently on all ships, with focus on:

.1 *Procedures for port State Control, 2023* (resolution A.1185(33)) to support consistency in the identification and coding of ISM Code-related deficiencies during inspections and across port State control regimes; and

.2 developing objective provisions to support the identification of levels of manning entailing that the ship may not be fit to proceed to sea without danger to the ship, the persons on board or the environment (as per paragraph 6.2.2 of the ISM Code). This should provide a second check with regard to ensuring that the flag State Administrations have applied due diligence to IMO standards in approving manning determinations as per resolution A.1047(27).

This recommendation should be pursued within the context of updating appendix 11 (Guidelines for port State control officers on certification of seafarers, manning and hours of rest) to resolution A.1185(33) on *Procedures for port State control, 2023* to include an evaluation of overdue maintenance, overall material condition of the ship, and follow-up actions when a ship is suspected of being inappropriately manned.

6.3 Reviewing some specific elements of the ISM Code

The findings indicated that most stakeholders are supportive of the ISM Code in its current format, which is perceived as clear and well understood (see findings in paragraphs 5.4.1.1; 5.4.1.5; and 5.4.1.2). However, the findings indicate that the ISM Code is open to interpretation, and that some strengthening would be required in certain areas to address

[157] Extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use (ISO 9241-11:2018 *Standard on Ergonomics of human-system interaction*).

changes that have taken place since its initial adoption to ensure that it continues to be fit for purpose (see findings in sections 3.2.4; 5.4.2; 5.4.3; and 5.4.8).

6.3.1 Strengthening the master's authority and responsibility

As discussed in section 6.1.1 (guidance for flag State Administration), some gaps concerning the master's authority and lack of protection in practice were identified. It is important to empower and protect masters to allow them to prioritize safety in decision-making without undue commercial pressure.

6.3.2 Strengthening and clarifying company structure and responsibility in the ISM Code

6.3.2.1 Most stakeholders supported strengthening the ISM Code to ensure that it accounts for company structures today. The literature review, as well as participants in the interviews and seafarer survey, indicated that the ISM Code should be improved by strengthening the requirements for companies to monitor and oversee subcontracted parties, holding companies accountable for non-compliance in this area (see findings in section 5.4.3 and paragraph 5.4.8.2.3). There were concerns expressed that hazards and safety risks potentially introduced by subcontracted entities are not being properly addressed.

6.3.2.2 In light of these concerns, the findings indicated a need for the ISM Code to provide a clear definition of companies' responsibilities, including the identification of hazards and the management of associated safety risks for the entire chain of services within the ISM system, without any gaps or overlaps. The findings also identified issues pertaining to the relationship between the shipowner and management company (DOC holder), which, according to interview participants, could have consequences for safety outcomes. Participants in both the interviews and the seafarer survey also raised concerns about the ISM Code's focus on the DOC holder (ship management), absolving the shipowner from any responsibility (see findings in paragraphs 5.4.3.5 and 5.4.8.2.4).

6.3.3 Strengthening top management responsibility in the ISM Code

6.3.3.1 The findings indicate the need to strengthen the ISM Code with respect to top management responsibility and accountability (see findings in paragraph 5.4.8.2.3). At present, these aspects are mentioned only in the preamble (para 6) of the ISM Code. It was suggested that this paragraph should be moved into the ISM Code, Part A and supported by further clarifications.

6.3.3.2 This recommendation conforms to modern management system approaches such as ISO 9001 on *Standard on Quality management systems*, which places a strong emphasis on top management's leadership and commitment meeting the requirements, including taking a "hands on" approach. The findings support this approach, implying that strong commitment from senior management is essential for the successful implementation of the SMS (see findings in paragraphs 3.4.3; and 5.4.4.3.1).

6.3.3.3 Companies must actively demonstrate both to their seafaring and shore-based staff that safety is taken seriously, and that top management will first and foremost support the effective implementation of the SMS.

6.3.3.4 There were further suggestions that the responsibilities of senior roles (e.g. CEO, senior management) should be specified in the ISM Code, as demonstrable assurance of clarity as to who bears ultimate responsibility and accountability. Responses from the seafarer survey and the interviews strongly supported this view (see findings in paragraph 5.4.8.2.3).

6.3.4 Strengthening management of change in the ISM Code

6.3.4.1 The objective of management of change is to ensure that safety risks resulting from organizational change are managed to an acceptable level. Change of any description within a company or on board a ship introduces the possibility of additional risk. Potential hazards associated with changes need to be identified and the risks associated with the potential consequences managed. Altering or introducing new technologies, equipment, processes, procedures or approaches to work may result in changes to the tasks and functions that seafarers and shore personnel undertake. It is hence important that companies have systems in place to identify any changes which may impact the level of safety risk associated with its service delivery. Management of change is a formal process conducted by a company in a systematic manner, so that consideration of impacted hazards and risk mitigation strategies are accounted for before the changes are implemented.

6.3.4.2 The requirement for management of change is currently absent from the ISM Code and has been identified as an important criteria for ensuring that the Code continues to reflect best practice (see findings in paragraphs 5.4.2.2; and 5.4.8.2.3). With the advent of new technology this is considered to be a critical element.

6.3.5 Strengthening safety culture in the ISM Code

6.3.5.1 The purpose of the ISM Code is to promote the implementation of a safety culture across the industry. Most of the findings in this study, also evidenced in the literature review, point to safety culture as being poorly implemented[158,159] (see findings in paragraphs 3.2.8; 3.2.9; and in sections 5.4.4.1; 5.4.4.2; and 5.4.4.3). The responses in the seafarer survey noted the prevalence of a "blame culture", whereby seafarers are reluctant to report hazards, non-conformities, near misses and incidents from fear of being blamed and punished. This 'fear of reporting' undermines continuous improvement. One of the elements that are critical for a safety culture is a just culture, in which seafarers are freely and unbiasedly able to report observed hazards, non-conformities and incidents without fear of punishment, blame and prosecution. In a safety culture, the identification of safety issues (prior to the occurrence of consequential outcomes) is viewed as a positive contributor to institutional learning and effectiveness in the management system. The ability to identify shortcomings, learn from them and make improvements is the foundation for targeting safety issues and achieving overall safety improvement.

6.3.5.2 The study findings suggest that many seafarers perceive that any issues identified on their ships (e.g. non-conformities, deficiencies) are blamed on them, and are therefore reluctant to report incidents to management (see findings in paragraphs 5.4.4.2.3; 5.4.4.3.1; and 5.4.4.3.2). Perceiving themselves as undervalued and unsupported by shore-based management in their SMS duties, they do not feel compelled to report hazardous occurrences, as evidenced by previous studies[160]. This is a significant area of concern, as a key requirement for the success of the ISM Code is good communication and reporting between ship-based crew and shore-based management. These factors clearly impact the ISM Code's ability to instil a safety culture.

158 Lee, M.-J. (2016). *A study on the effectiveness of the ISM Code through a comparative analysis of ISM and PSC Data* [Master Thesis]. World Maritime University Dissertations. 543.

159 Laverick, C. (2018). *Enforcing the ISM Code, and Improving Maritime Safety, with an Improved Corporate Manslaughter Act: A Safety Culture Theory Perspective* [Doctor of Philosophy]. University of Central Lancashire.

160 Kongsvik, T., Fenstad, J., & Wendelborg, C. (2012). Between a rock and a hard place: Accident and near-miss reporting on offshore service vessels. *Safety Science*, *50*(9), 1839–1846.

6.3.5.3 Accordingly, some of the stakeholder groups suggested that the ISM Code should place more emphasis on safety culture, including the aspect of a just culture (see findings in section 5.4.8.6.1). Currently this notion is only mentioned in the Code's implementation guidelines[161], and with no explicit reference to safety culture within the Code itself. In addition, it was suggested that a self-assessment toolkit for assessing the safety culture on vessels should be developed, similar to the Tanker Management Safety Assessment (TMSA) developed by the Oil Companies International Marine Forum.

Recommendation 3: IMO should consider reviewing elements of the ISM Code, in particular:

.1 updating the definition of "Company" to reflect modern company and management structures, including delegated or contracted responsibilities and centralized support, to ensure that responsibility and commitment to safety and marine environment protection are upheld across all parties involved. In addition to the definition, the following elements linked to the Company concept should be appropriately addressed and emphasized in the ISM Code:

.1 delegated and/or sub-contracted entities must provide access to all their relevant systems and documents to ensure full compliance;

.2 proper verification processes for crewing agencies must be established, integrated and maintained in the management systems;

.3 when a company delegates its obligations to other entities, the ISM Code should explicitly provide that the company retains the ultimate responsibility for all ISM-related duties.

.4 strengthening the commitment from all levels of management, highlighting responsibility and accountability in the ISM Code to bring it up to date with other international standards. This should align with relevant ISO standards such as ISO 9001:2015 *Standard on Quality management systems*[162], which sets out clear responsibilities for senior management;

.5 when the company is an entity other than the shipowner, the following should be considered for inclusion in the ISM Code:

.1 an obligation for the shipowner to provide enough resources for the safe and environmentally sound operation of the ship;

.2 requirements for the shipowner to designate a point of contact to liaise with the Company's DPA, as appropriate; and

[161] Resolution A.1118 (30) – Revised guidelines on the implementation of the ISM Code. Adopted on 6 December 2017.

[162] ISO 9001:2015 Quality Management Systems – Requirements, Edition 5, 2015.

.2 adding management of change in the ISM Code, taking into account the ISO 9001:2015 *Standard on Quality management systems,*[163] which provides for best practice on planning of changes, with consideration of other relevant standards. Associated guidelines should be developed in support of the implementation of this provision;

.3 strengthening section 5 on master's responsibility and authority, in order to ensure that the master is afforded the right protection and to allow the master to escalate ISM related relevant breaches directly to the flag or port States;

.4 introducing a new complaint procedure to report ISM non-compliance occurrences to relevant competent authorities, similar to what already exists as per the MLC, 2006, on complaint procedures (regulation 5.2.2);

.5 including safety culture in the ISM Code as an objective. This should be supported by a clear definition and guidelines to achieve it, as well as how it links with the concepts of continuous improvement and just culture, and the Company's commitment both on board and ashore;

.6 considering the following amendments to the ISM Code to improve clarity and usability:

.1 restructuring the ISM Code and its related guidelines to align it with other IMO instruments (integrating all provisions in different parts as in the STCW, Polar and ISPS Codes);

.2 using the term "shall" consistently as intended in SOLAS regulation IX/3; and

.3 harmonizing the definition of Company in SOLAS regulation IX/1 (definitions) and the ISM Code (at the moment there is one variation related to the word shipowner or owner of the ship);

.7 including the use of gender-neutral language (i.e. crewing instead of manning), in order to foster an environment that is inclusive, respectful, and promotes equal opportunities for all maritime professionals.

6.4 Initiating a holistic review of IMO instruments dealing with resources and personnel

6.4.1 Safe manning is an important aspect of Section 6.2 of the ISM Code, which requires appropriate manning "to encompass all aspects of maintaining safe operations on board", and makes an explicit reference to the *Principles of minimum safe manning* (resolution A.1047 (27)).
The manning issues identified in the findings of this study clearly indicate that more needs to be done in this area, given the well-documented impact of manning and fatigue on the safe operation of ships (see findings in paragraphs 3.3.1; and section 5.4.6).

6.4.2 The findings indicate that minimum safe manning determinations generally do not reflect actual operational requirements and tend to underestimate the number of crew required to operate safely (see findings in paragraph 3.3.1; section 5.4.6; and paragraph 5.4.8.3.1).

163 *Ibid.*

The seafarer survey respondents indicated that the minimum safe manning determination should be more realistic in reflecting the actual workload on board, for example by taking account of the age of the vessel, the shipping line and the types of skills required. Currently, the way in which manning practices are implemented on board is impacting workload and consequently fatigue. Many respondents from the seafarer survey, also supported by research findings,[164] identified problems with work and rest hours, indicating that certain watch systems contribute to the risk of fatigue (e.g. six hours on/six hours off) and that work and rest hour regulations are not being followed in practice. As long as the industry continues to allow such low manning numbers, seafarers are unable to meet minimum rest requirements. As in previous studies, this study found indications of falsification of working hours and/or rest records[165].

6.4.3 Of particular concern is the inconsistency and variation among flag State Administrations in the assessment and approval process for minimum safe manning determinations (see findings in paragraphs 5.4.6.7 and 5.4.6.9), suggesting that resolution A.1047(27) on *Principles of minimum safe manning* leaves room for interpretation. The resolution refers to three main objectives:

- adoption of a goal-based approach;
- standard procedures for effective implementation; and
- effective enforcement.

However, no definitions or guidance are provided to support these objectives. Furthermore, a high-level, goal-based framework is included in the resolution to guide the identification of functions and tasks and for calculating respective the workloads. However, it is ultimately left to the flag State Administrations and management companies to interpret[166].

6.4.4 The general findings indicate that the issue of inconsistency may contribute to poor interpretation and implementation of the original intent of resolution A.1047(27) (see findings in paragraphs 5.4.6.5; 5.4.6.6; 5.4.6.7 and 5.4.6.8). It is possible that the term "minimum safe manning" is creating this lack of clarity. Indeed, the term is not reflective of the resolution's intent, which is to ensure "appropriate or safe" manning. Annex 3 of this resolution requires companies, when submitting their proposal to the Administration, to consider all operational situations and all tasks required for completing duties and responsibilities safely, and to include fitness for duty considerations (i.e. fatigue), consideration of peak workloads and the need to deal with emergencies. Administrations need to take these operational aspects into account when reviewing and approving the manning determination, but it is clear that, under the current non-mandatory guidance, some flag State Administrations may not be following the requirements. This is possibly leading to a race-to-the-bottom situation[167],in which some companies use the ″minimum safe manning determination″ issued by the flag State as the norm rather than the minimum. In turn, this creates an unfair situation for companies who do the right thing by increasing their manning numbers to match their actual operational requirements.

164 Research, T. B. I. T. and T., & Laboratory. (2023). *Understanding seafarer roster patterns and fatigue on vessels*. Department for Transport, UK.

165 Bhatia, B. S., Carrera-Arce, M., Baumler, R., & Grech, M. R. (2024). Seafarers vs. Port State Control: Decoding Work/rest Compliance Data Disparity. *Marine Policy*, *163*, 106105.

166 Bourke, A. (2020). *Principles of minimum safe manning: A thematic analysis of the submissions to the International Maritime Organization for the development and adoption of Resolution A.1047(27)* [Industry Research Project]. University of Tasmania.

167 Bourke, A. (2020). *Principles of minimum safe manning: A thematic analysis of the submissions to the International Maritime Organization for the development and adoption of Resolution A.1047(27)* [Industry Research Project]. University of Tasmania.

6.4.5 Most of the participant groups from the interviews and the seafarer survey strongly supported the need for a holistic review of the minimum safe manning resolution (resolution A.1047(27)) (see findings in section 5.4.8.3). Such a review should provide clear instructions to flag State Administrations on what needs to be considered in assessing, approving and enforcing minimum safe manning determinations that realistically reflect actual requirements during vessel operations. As noted above, resolution A.1047(27) is explicitly referenced in the ISM Code and is meant to guide companies in determining appropriate manning.

6.4.8 In addition to a comprehensive review of the regulatory standards related to manning, participants called for strengthening of the aspects dealing with appropriate manning in the ISM Code (see findings in sections 5.4.6 and 5.4.8.3). Twenty-one respondents from the seafarer survey indicated that the ISM Code should be stricter regarding manning. Similarly, some interview respondents suggested that the determination of manning should be based on a proper risk assessment, and that this should be a requirement in the ISM Code. The risk assessment should cover many important considerations including the risk of fatigue.

Recommendation 4: IMO should consider initiating a holistic review of its instruments dealing with resources and personnel, in particular:

.1 resolution A.1047(27) on *Principles of minimum safe manning* as referred to in the ISM Code (paragraph 6.2.2); SOLAS regulation V/14 (ship's manning), ISM Code (section 6 on Resources and personnel), hours of rest within the watchkeeping requirements set out in the 1978 STCW Convention, in order to ensure consistency by flag State Administrations in the assessment, approval and enforcement of safe manning determinations. ILO's MLC, 2006, should also be taken into account in order to ensure the systematic consideration of all manning related provisions;

.2 complementing the term "appropriately manned" in paragraph 6.2.2 by a requirement for the company to undertake a risk assessment in order to support the establishment of appropriate manning and the assurance that the ship is appropriately manned.

6.5 Promoting the development of training guidance for non-technical skills

6.5.1 Consideration of the human element is an integral part of an SMS, necessary for understanding, identifying and mitigating risks and for optimizing the human contributions to organizational safety. As discussed above, one area where more guidance is needed is risk identification, assessment and management. Preferably this should be taught at cadet level, updated in officer training and included in life-long learning initiatives. To support this work, it is also necessary to keep working to introduce an open, just, and fair culture across the industry – including on board, ashore and in ship-shore communication. In addition, the current concept of crew resource management should be evaluated, redesigned and implemented at all levels. If safety is our priority, then robust, effective, and mandatory training standards are a necessity.

6.5.2 The inclusion of non-technical skills[168] training to raise competency in human factors specific to for shipping should be considered. The ISM Code is built around people as the cornerstone of safety., The Preamble (paragraph 6) states that "*In matters of safety and*

[168] The cognitive and social abilities that complement the technical skills of workers and contribute to safe and efficient performance in high-risk industries. They include competencies within domains of situation awareness, decision making, task management, and communication and teamwork (Source: Thomas, M. J. W. (2018). *Training and assessing non-technical skills - A practical guide*. CRC Press: Taylor and Francis Group).

pollution prevention it is the commitment, competence, attitudes and motivation of individuals at all levels that determines the end result." Training should aim to support this by facilitating effective support for and input from the people involved in SMS processes. The initial focus of such training could include risk assessment, decision making, incident analysis (including root causes), open reporting, handling of non-conformities, communication, fatigue and workload.

6.5.3 Ultimately, the human element is most evident in the extent to which crew feel comfortable in raising issues on their vessel. It is well known, for example, that the airline industry's use of such non-technical skills training enables crew members to challenge persons in authority if they think that a situation is unsafe.

Recommendation 5: IMO should consider effective measures to promote the development of training guidance for non-technical skills to optimize the human contributions to organizational safety. This should specifically address human factors competency designed for shipping, and training should initially focus on risk assessment, decision making, incident analysis (including root cause analyses), open reporting, communication, handling non-conformities, task management and fatigue.

6.6 Enhancing capacity building on the effective implementation of the ISM Code and its related instruments

6.6.1 Legislation for making safety investigations into very serious casualties mandatory in IMO Member States has been in force since January 2010 through amendments introduced to SOLAS Chapter XI-1. The investigation reports are shared in the IMO's GISIS database, and analysed to identify safety issues. The accident reports also undergo a process in which lessons learned are written and made public in a concise format.

However, there is no systematic integration or exchange of relevant experience and findings between different databases. There is clear potential for developing the sharing of findings from accident investigations, ISM and port State control verifications and other databases within the industry. Further, the findings from the interviews (see section 5.4.8.7) suggest that accident safety investigations can be improved.

6.6.2 The findings from this study show that the industry is calling out for a system that brings together different groups of stakeholders (e.g. companies, flag State Administrations, ROs, port State control) from different geographical regions and facilitates the sharing of safety learnings among stakeholders across the industry (see findings in section 5.4.8.7). It would be natural if the initiative in such a process were taken by IMO but, as the process is still evolving, it may be beneficial for the industry to continue working within specific areas in this regard.

Recommendation 6: IMO should consider enhancing capacity building on the effective implementation of the ISM Code and its related instruments, in particular to:

.1 enhance the sharing of safety information to improve uptake by industry, in a simple and user-friendly manner. This should include lessons learnt developed by the III Sub-Committee and the reports in the Global Integrated Shipping Information System (GISIS) (Marine Casualties and Incidents), which should be readily available in a format that the industry can use as learning tools; and

.2 examine possibilities of organizing annual/biannual workshops/forums focusing on safety learning, such as capacity building activities, inviting relevant stakeholders to share best practice and continuous improvement in SMSs.

7 CONCLUSION

"We want to see the industry improve itself but want to be held to a higher standard. You know, the thing that happened in Baltimore, and I'm not even sure what that was, I mean, there's the investigation, so shouldn't say too much. But you know that was on the front page of every newspaper all around the world. Broken ships crashing into bridges? That's not what we want to see. We as an industry don't want to see that because we don't think we necessarily have the best reputation. I don't think trying to run on the smell of an oily rag helps." [Co5]

7.1 This study took a holistic approach to investigate the implementation and effectiveness of the ISM Code in practice and has identified recommendations for improvement. The results are based on qualitative and quantitative data from multiple sources covering large parts of the global fleet to provide confidence in its findings and recommendations. Participants from different stakeholder groups noted the benefits of the ISM Code and the role in enhancing safety in the maritime industry. There is no doubt that certain sectors of the industry have come a long way, with some even going beyond the requirements of the ISM Code. Nevertheless, this study has also identified elements that could be improved further in order to progress the whole industry to reach a standard that the ISM Code was intended to achieve.

7.2 It is evident that the practical implementation and enforcement of the ISM Code and related instruments, including those dealing with resources and personnel, are a primary concern. The recommendations based on the findings of this study are intended to address these concerns and bring the industry to a single, harmonious level of acceptable standards for the safe operation of ships and the protection of the marine environment.

7.3 It is to be hoped that as an industry, we accept responsibility for our failures and use them as an opportunity to learn and progress. In line with the intent of the ISM Code, in particular with regard to encouragement and promotion of continuous improvement at all levels of the industry, the insights, experiences and lessons learned from across the maritime industry provide the foundations for the recommendations presented here. In this regard, these recommendations embody a first positive step towards improvement, in recognition that the identification of problems is also an opportunity to address them effectively. This in turn determines the degree of success in how we move forward as an industry.

ANNEX A

LIST OF 30 INTERVIEWED PARTICIPANTS, WITH LOCATIONS AND INTERVIEW DATES

Table A-1: list of interview participant with stakeholder group, location and interview dates

Interview participants were selected from stakeholder groups including flag State Administrations, recognized organizations, port State control, companies and company representatives, seafarer representatives and vetting services and consultants

Group	Location	Interview date
PSC	Asia Pacific (Tokyo MoU)	11 April 2024
PSC	Europe (Paris MoU)	24 April 2024
PSC	Asia Pacific (Tokyo MoU)	2 May 2024
PSC	North America (Tokyo MoU)	30 May 2024
FS	Europe	28 May 2024
FS	Europe	22 April 2024
FS	Asia	7 May 2024
FS	Europe	2 May 2024
FS	South America	22 April 2024
FS	Asia Pacific	8 May 2024
FS	Europe	21 May 2024
RO	Europe	16 May 2024
Co	Europe	29 April 2024
Co	Europe	30 April 2024
Co	Asia Pacific	17 April 2024
Co	Africa	29 April 2024
Co	Asia Pacific	23 April 2024
Co	Europe	17 April 2024
Co	Europe	18 April 2024
Co	Europe	22 May 2024
Co	Africa	13 & 15 May 2024
Co	Europe	25 April 2024
Co	Europe	30 April 2024
Co	Europe	30 April 2024
Co	Europe	6 May 2024
SR	Europe	14 May 2024
SR	Asia Pacific	24 April 2024
SR	Europe	22 May 2024
V	Asia Pacific	30 April 2024
CI	Asia Pacific	7 May 2024

ANNEX B

CHARACTERISTICS OF RESPONDENTS TO THE SEAFARER SURVEY: DESCRIPTIVE STATISTICS

Table B-1: Characteristics of respondents to the seafarer survey

	Number	**Percentage[169] (as % of n = 1501)[1]**
Number of respondents	1,501	100.0
Gender		
Man	1,424	94.9
Woman	71	4.7
Other	3	0.2
Missing	3	0.2
Age		
18-25 years	106	7.1
26-35 years	430	28.6
36-45 years	491	32.7
46-55 years	255	17.0
56 years and above	213	14.2
Missing	6	0.4
Experience at sea		
Less than 2 years	131	8.7
2-10 years	446	29.7
11-15 years	304	20.3
16-20 years	226	15.1
Over 20 years	364	24.3
Missing	30	2.0
Department		
Deck	827	55.1
Engine	395	26.3
Other	78	5.2
Missing	201	13.4
Experience at sea		
Officer	1120	74.6
Rating	102	6.8
Other or unclear	78	5.2
Missing	201	13.4
Working language on board on current or most recent voyage		
English	1179	78.5
English and one or more other languages	23	1.5
One or more other languages (except English)	108	7.2
Missing	191	12.7

169 Percentages are rounded to the nearest decimal. Due to rounding, percentages may not add up to 100%.

ANNEX C

ADDITIONAL SUPPORTING QUOTES FOR SECTIONS 5 AND 6

5.4.1 Benefits of the ISM Code and its related instruments

5.4.1.3

"… obviously a very fundamental piece of legislation and it changed the outlook and the expectations of the industry. Add guidance that ship owner, ship operators or ship managers can refer to in terms of building safety policy and standards." [Co1]

"It enables you to monitor ship's procedure to check safety items systematically." [RO8]

5.4.1.4

"… gave us a good indication whether we are on the right track." [Co13]

"I'm looking at positive indicators or leading indicators which were not there earlier, or I would rather say it has enabled collection of data for the future." [Co10]

5.4.2 Issues with the ISM Code and its related instruments

5.4.2.1

"The purposely vague working of the code leaves the SMS to be written specifically to pass audits. It's open too, and often is abused in order to generate a favourable paper trail of small safety improvements and often covering up more serious failures." [Seafarer survey]

"However, it's the implementation piece which is potentially problematic. The implementation and also consistency because it's quite subjective … And that's the nature of not having prescription because you have that level of subjectivity." [Co5]

"Yes, instructions and guidance provided by the Flag states could vary significantly from one flag state to another." [Survey RO5]

5.4.2.2

"It hasn't been really revised to meet the growing demand in shipping, right? We have had so much new equipment put on board. It's probably on a document that was written in 1992 where the ISM Code came out a little bit of revision here and there, but […], it's not addressing today's shipping culture and shipping industry […] and we haven't taken into account so many things." [Co10]

"The code has not developed much with time and this perhaps still to open for individual interpretation (despite IMO revised guidelines for implementation) it has not been subject to proper review and possible revision improvement at the same pace as our industry and technologies have developed this is sometimes a challenge." [Survey RO1]

5.4.2.3

"What's equally important is that you have to look at those risks that are not identified by a company. So, all SMS in my personal view and certainly my experience need to have a process in place for activities that occur on board that have not been identified as a risk." [Co6]

"Yes, due to different perception of the level of risk, identification of measures to mitigate or prevent identified risks." [Survey RO5]

5.4.3 Issues with company structure

5.4.3.2

"Operators frequently subcontract/delegate many functions such as crew management, inspection, and maintenance activities, etc. Hiring of personnel is often left to the recruitment and placement service providers with little oversight. Moreover, the ship operators often lack resources or expertise to provide oversight of these delegated functions. IMO may consider developing guidance to owners for delegated functions." [Survey RO5]

5.4.3.5

"As inferred by shore management, Extreme stress is being laid upon ism code 10: Maintenance, primarily the load of which has to be borne by the seafarer and vessel manager. The other shore management members are bystanders, including the owner of the vessel. ISM Code doesn't unfortunately hold the owner responsible, only the DOC holder. The owner has the liberty to provide even the junkiest of the vessels, expecting seafarers and DOC holder to sway their magic wands." [Seafarer survey]

"*Owners are not held responsible directly, we are always only addressing the ship manager, who is under commercial pressure." [Survey RO1]*

"The ISM Code is probably gone a little bit wrong in the fact that it almost absolves the owner of any responsibility. Today the owner hires a management company and that management company obviously agrees to contractual terms to an amount that they will receive each year and based on that amount determines what really gets done, not what's actually the safest." [PSC1]

5.4.4 Issues affecting SMS implementation

5.4.4.1 Paperwork, check-list mentality, and procedures not aligned with shipboard tasks

5.4.4.1.2

"The requirement of having a ship specific SMS was taken up by most of the companies seriously. However over the years, the SMS manuals of the company are rather company specific and not ship specific. There need to be requirement of development of ship specific SMS manual, ship specific in literal terms." [Seafarer survey]

5.4.4.1.3

"Not all companies are following the ISM Code as it was intended. On most companies this is viewed as a paper exercise to comply with the rules." [Seafarer survey]

"If I just followed it then I would not operate safely because that is not how it is designed to be implemented. It's not. It's not designed to be I tick this box and I am safe and I am compliant." [Co5]

5.4.4.2 Continuous improvement is poorly implemented

5.4.4.2.2

"There's certainly a trend in some companies where the superintendent hasn't seen the vessel in a long time, or they haven't done their own internal audit for how they're going to check the ISM themselves." [PSC6]

5.4.4.3 Poor safety culture

5.4.4.3.2

"Companies are putting lot of pressure for getting zero PSC deficiencies. Seafarers are always in fear that PSC can come at any time. [...] Master either has to bribe them or get deficiencies. No place on this earth is perfect so is the ship. But if we get even 1 deficiency, company is after us. [...] Even after maintaining things well, something remains or something may go wrong at the last minute. The whole ISM has improved many things but whenever anything goes wrong, it goes back to the weakest link in the chain and that is seafarer. Especially Chief Engineer, as most of the troubles involve technical aspects on daily basis." [Seafarer survey]

"So I think that is another thing is about the culture. And the safety philosophy. Also, there's no reference in ISM Code about that, OK. Yes, this is a part of safety culture or comes along with the right of employees to stop to exercise of work authority. So it's part of safe culture. Some top principles should be included in the ISM Code." [Co11]

"For any company that conducts a full and effective root cause analysis (ISM 9), it may turn out that addressing the root of the problem is not within the Company's control (e.g. failure to comply with rest hour requirements because of charter party clauses). This often means that simpler solutions are sought, which are not effective in preventing recurrence." [Survey RO1]

"A few operators (typically, smaller, or newly established) have difficulty in implementing the SMS requirements primarily due to weakness in the safety culture or lack of resources which can be further attributed to lack of understanding of the requirements and intent of the ISM Code." [Survey RO5]

"The ISM Code does not allow actually no blame culture to start with. It doesn't. It's not promoting no blame but it actually promotes blame." [Co8]

"The staggering number of ships sort of give us a staggering number of close-outs that the person in charge on the ship didn't do this, and we say – mate, it's not the ship's fault, it's your fault because you didn't manage the [...] ship properly. Manage your ship, and you take ownership of the close-outs, so you know there is that sort of fear factor, to be honest with you." (V1)

5.4.4.3.3

"Unfortunately, the focus on the outcome of the inspections is outsized, and ensures the opportunity for blackmail is increasing. From a working environment point of view, there are so many different scales to be weighed on, that safety work is reflective of which audit is coming next. A stressor, and therefore not cotributing to safety in and of itself." [Seafarer survey]

5.4.4.4 Master's authority and responsibility

5.4.4.4.1

"And if I have to stand and discuss this in a court of law, it is pretty black and white. I think ISM has too much of grey material." [Co4]

"Completely diluted, I started with that … it's the administrator in the office who sends the message not realizing the weight of the message and we see people dying because of that." [Co8]

5.4.5 Issues affecting ISM verification and certification

5.4.5.3 Recognized Organizations conducting delegated functions

5.4.5.3.3

"We could avoid a lot of accidents or incidents or achieve detentions if they shared information with us at the appropriate time, you know. Sometimes when we find the problems on board, it's already too late. ... The thing is that it's not reaching our desk as a flag State, where the decision has to be made." [FS9]

"don't understand how the ROs are constantly accepting the requirements. They request to have extension at the last second from the last day of the window plus [it's] not only few things or few cases. Very recently even last week same they asked us to extend certificate, already expired" [FS10]

5.4.5.3.4

"Yes conflicts exist. There is a commercial pressure between some ROs and the company – there is conflict. From time to time conflict of interest happens. Sometimes Class performs some jobs with regard to consultancy activities done by the RO to a company. We ask them what is being done about impartiality and dependencies." [FS11]

"ROs, are commercially driven and may not apply sanctions in the appropriate way." [Survey RO1]

"ROs are the same for the classification society for the ship, so there's a conflict of interest there as well. In a lot of cases, so you've got, they're actually also acting on behalf of the owners. So, they don't want to give too many NCs or anything like that." [V1]

5.4.6 Resources and personnel

5.4.6.1

"So if you don't have sufficient number of people on board the ship, they're busy with their own work and essentially new people come in on board, sign on board the ship. They will not have sufficient people to mentor them and also show them around the familiar with the ship and the working living conditions. So that's the essential problem for us. The manning requirement under ISM does not consider the importance of familiarization."[SR1]

"The minimum safe manning certificates are a complete joke. And I know there's a caveat in them to say that this does not take into account the actual operation of the ship. It is a complete joke, they vastly underestimate the requirement, the manning required for the ships." [V1]

5.4.6.2

"Manning levels should increase as the workload has increased significant." [Seafarer survey]

5.4.6.4

"So we do that assessment. We ensure that the ships are, you know, the people are not only competent and skilled, but they are also sufficient for the purpose." [Co4]

"Yes, always above we have I think from 19 to 20 crew members in our vessels, maybe some vessels even more. We have additional officer in case of a trade pattern which requires more people on board because of the crew resting hours. So we are always supportive to our crew to have them do their job easier." [Co14]

"I think when I was working at [company name] for example there was a difference between the minimum crewing determination and optimal operational crewing that were different levels. Because as a company, we decide we can get the optimum performance out of what we need to do with this vessel with these people on board. And it was a different number. And you know, that could be extra caterers, or it could be an extra tier. It could be extra, you know, someone who's a Nav watch rating." [Co6]

"All ship owners [carry their own assessment] and I don't think anybody in this world, correct me if I'm wrong, I don't think there is a single vessel in the whole wide world which is running only on minimum safe manning complement." [Co4]

"The safe manning is dictated by the flag State requirements. The actual manning that we're doing on the vessel is again decided like you said by us and then sent to the flag for approval. We are receiving a minimum manning certificate from the flag stating how the ship crew would be, but always we are having more officers and more ratings than the minimum requirement of flag." [Co11]

5.4.6.5

"They all vastly underestimate because I look and they're all different. And I look at it and I think how the hell are they supposed to run this ship with these number of people! This one of our questions in our inspections is to have a look at the minimum safe manning and have a look at the actual operation of the ship and also the crew on board at the time and compare it. And you know it basically – this the question, is this ship able to run effectively and safely with the numbers of people on board regardless of what the minimum is?" [V1]

5.4.6.6

"The principle is really that we are relying on the company to carry out the assessment on the support operation. And under the commercial pressures, most of the shipping company will assess the operation with less manpower. Even some of the assessment is less than the real situation." [FS7]

"Commercial pressure may represent issues related to performance of operations as defined in the SMS. Such situations may be present in faster loading and unloading operations which may endanger the vessel structure, keeping number of crew members on MSMD [minimum safe manning determination] requirements in spite of the need for extra crew members for safe performance of shipboard operations." [RO2]

"In this context it's always been about diminishing crew numbers to become more profitable, I guess, or more competitive with foreign flag vessels, who generally have less crew than [country] on vessels, which you know because the conditions of employment are less [lower]." [SR2]

5.4.6.8

"The minimum safe manning certificate most of the time has nothing to do with the actual manning needs of the ship. Unfortunately, in most cases to prove this though an audit and require additional manning is very difficult. The formula used to calculate safe manning is in need of urgent update." [RO1]

"My impression is that on this issue, because it's not objective, the ROs avoid delving deep and prefer to stay on more general issues." [FS2]

"As far as I'm aware the ISM Code says, you know, "resourced in accordance with all international regulations" and we know, I think you were in the working group on the guidelines on fatigue as well, so we know how, everybody knows that the minimum standards are inadequate. Everybody knows that. We know that you can't physically do everything that you're supposed to do all those tasks and be within your hours of rest, which are inadequate anyway. So, how does the ISM Code deal with that? I think it would be some way of strengthening the fact that crewing also requires a risk assessment process. It'll be how many people do I need to safely carry out this operation, not what's the lowest number I can get on my safe manning document?" [SR6]

5.4.6.9

"The original crewing determination said that we had to have all the […] extra officers on board at the time and we had to have one of them manning forward and for years they've been pushing to try and remove that determination and just have them come out at the last minute. And they decided to try and go flag shopping for a bit." [SR2]

5.4.7 Port State control

5.4.7.4

"In some of the cases the port State control is exaggerating, you know we get vessels detained for a piece of equipment which is broken, and you just need to drive one mile away and get the equipment and bring it back to the vessel. But you got the vessel detained. Is that worthy enough to hold a vessel? You know, instead of using the Code 30, you could use the Code 17 and not detain the vessel for that reason. You know, of course, if there is a breakdown, you are not going to solve that in one or two hours, but you know at that point the port State control somehow is overreacting in some of the cases I would say." [FS9].

"Inconsistent identification of which defects are 'ISM-related' and which are not. Paris MoU for example, has declined to explain how it decides on this matter." [RO1]

"We know that some regimes are very good. Some regimes are not. And we just have to [..] roll with the punches and be the best prepared we can be to go to those vessels to, into those areas." [Co1]

"I think ISM is the number one for deficiencies. But that's because you can blame anything on ISM." [Co6]

"if you look at a detention, every detention will ultimately say that the vessel has been detained through a failure to implement the ISM Code. Every detention will say that because that's what the rules say. Now it could be the fact that a valve is broken, or a piece of equipment wasn't working, or someone didn't know what to do in an emergency or whatever. So, I think it's a bit of a misleading statistic. And I think if we look at some of the unfortunate experiences we've had, it is the seafarer's awareness of and preparation for the port State control inspection. I think it would be best to take out that catch all ISM failure that's going to be on every detention, just discount that and look at the actual code 30." [Co1]

"I'm also sure if you've been interviewing port State control officers, they see the reverse of it, don't they? So, you're back to some subjective views here. So ship owners will have some complaints about port State control, and PSC have some complaints about ship owners. And on we go. Yeah, in principle, it works quite well. But there are areas in the world where it is not implemented on a consistent basis." [Co6]

5.4.8 Summary of suggested improvements provided by respondents

5.4.8.1 Supporting Guidance

5.4.8.1.1

"I think definitely guidance on how to do risk assessment properly would be helpful…Guidance to companies and onboard staff on how to implement that effectively." [SR6]

"Have guidance around […] how their port State control officers should be looking at any particular issues within the ISM, I think that would be helpful to the industry, so that they could know that actually this is what this port State control officer is saying and there is no inconsistency." [Co5]

"The biggest bugbear of all is the fact that whilst on a detention, the port State control inspector is required to put down which IMO regulation it's applicable against. So it should be a mandatory requirement that any deficiency is also stated, which regulation they're talking about, because this is where it becomes subjective sometimes." [Co6]

5.4.8.2.2

"If you look at the TMSA anything risk management, you have KPI [key performance indicators] and then you have a very clear best practice telling you what are we looking for. How do we want this to be implemented. And that could be, and I think that this is probably the biggest part missing in the ISM Code." [Co13]

"As a good improvement, we would suggest to add as mandatory, the objective evidence of a risk assessment, to be produced as preliminary material aimed to create the SMS of each company and its shipboard procedures." [FS10]

5.4.8.2.3

"We should be looking at how other management systems such as the ISO standards have evolved. There is too much focus on procedures and not enough on the effectiveness of their implementation." [RO1]

5.4.8.2.5

"The master's authority works well, but it's not quite defined, and some people think that they have a bit more authority than that. I think it could be explained a little bit better and a little bit more, [in the sense that] this is it, if the master must use that authority [to which you are] subject you can't question it, that's it, it is what happens." [SR2]

"There is a guideline that [sets outs] what requirements a DPA should fulfil in order to be considered as capable, which is just a guideline. There are some cases [where] the person appointed as DPA is not the most qualified. Our expectation is that maybe that guideline should be made mandatory by IMO." [FS9]

"Ship-to- shore communication is a huge difficulty for us. Under the ISM, it is a requirement that a company has to establish a safe management system, to have more fluent communication with those who are actually involved. However, when we report something to the company we don't receive a timely communication. So one of the amendments was about the designated person, and before the designated person, it was really confusing whether we were talking to a person from the company. I don't know human resources, but after the amendment it was clear that we're talking about a designated person from shore who deals with the crew issues and safe management issues. So, while this one is clear, however, when seafarers, or the master as person in charge of the ship communicates to the designated person there's no response. Then we don't really feel the effectiveness of this Code." [SR1]

5.4.8.3.2

"ISM code should focus on minimum safe manning requirements in relation to additional hands when needed." [Seafarer survey]

"Changes need to be made in ISM. Don't leave responsibility on the shipping company to ascertain manning." [Seafarer survey]

"Depends how serious you are about improving safety. I think it's a very emotive topic. I would say the safety of the vessel is guaranteed. The safety of the people, not so much. And certainly, an area where if you look at fatigue and hours of work and rest breaches and the demands that the modern seafarer is facing, I think that is somewhere where the IMO could take a much more robust position. And leave less to the decision of the ship owners." [Co1]

"The ISM code needs to say that the manning should be equivalent to what's in [Assembly] resolution 1047. That's all it needs to do. Because that's anyway part of SOLAS…I think the step-by-step process if you can introduce a requirement to have a risk assessment, an actual risk assessment of what the number of crew required and the shift patterns etc. Then that could maybe lead to amendments to the others." [SR6]

"[There should be] A method to check falsification of rest periods" [Seafarer survey]

5.4.8.4

"Flag states should be more involved and take onus [responsibility] if the vessel's condition is not found up to the mark." [Seafarer survey]

"Very often the auditors are not sufficiently knowledgeable to be able to visually identify a deficiency in equipment they're looking at, and instead maybe pick up on the likes of a single missed fire extinguisher inspection tag 4 months ago. A non-seafarer auditor might not be able to correctly identify the piece of equipment they are looking at, and seafarers onboard are strongly encouraged (implied) to hide any defects from auditors under commercial pressure to maintain their own standing within the company. My thought is that because of the intentionally vague wording, auditors need to be better trained to recognise the difference between a defect on paper and in practise. Auditors need the experience and understanding of the equipment they're looking at to recognise where a paperwork exercise is hiding a safety defect." [Seafarer survey]

5.4.8.6.1

"If something fails in our industry it creates a snowball effect. So we really need to look at the ISM Code from the very holistic point of view, talk to human factor specialists and think how can we actually create a document which will influence safety culture, to promote positive actions taken by organizations, that would be a fabulous document." [Co8]

"The requirement in section 11 should be strengthened to ensure that the SMS and other shipboard documents contain ONLY information relevant to shipboard operation - some SMS manuals contain information like how to reverse park which adds unnecessary complexity" [Seafarer survey]

5.4.8.6.2

"Look at the air industry. Somehow they came up with idea that it doesn't pay to be untrained. It doesn't pay to be lying. It doesn't pay to be cheated. It's not the perfect industry, far from that, but it's the industry where people look after each other at the lower level. Captain of the plane knows that he cannot hide things because everyone after the flight is reporting and all the reports have to match." [Co8]

"A majority of companies now probably do BRM [bridge resource management] you know. Mostly they do it poorly. We spend a reasonable amount of time on ships, but one of the things that we're pushing is non-technical skill. And it's really useful. Bridge teams and engineering teams just to inform your decision making. I think that's the type of stuff [that] would be really useful and allied with that, maybe there's a need for ship managers to show that they've got competence assurance plans for their management." [CI1]

5.4.8.7.1

"Aviation has this thing called the 'significant 7'and they come together internationally, the seven big hazards they share from data - they might provide good practice guidelines or examples of good technology." [CI1]

6 Recommendations

6.1.1

"I think it's quite broad at the moment. There's some flag States have, you know, given their own interpretation, which we kind of sometimes refer to, which is quite useful, but not all companies and you know people are aware of that. And so it's kind of up to them to make their own interpretation. So, I think it's probably useful if there was some kind of other guidance documents as well that would go with it." [PSC7]

"In our view, it is unlikely that there is anything 'wrong' per se with the ISM Code and therefore it be more useful from an IMO standpoint to look at the relevant guidance concerning 'implementation' of the ISM Code or examine enforcement processes." [Co9]

"The idea of model legislation, so we can't dictate specifically what you do, but this is an idea of what we think is an acceptable standard and that's what we should be working toward, yeah, with examples of a company and what it means in practice, not just tick the form to say you've got it." [SR6]

"This can be even certain guidance that can be given under the new feature of what exactly uh, we need on the short side, as far as the competence level of or the skill sets of the shore managers is concerned." [Co4]

6.1.1.1.2

"We recognize the IMO guidelines, however there is no harmonized checklist, which has been used for the harmonization, certification and service system. It might help, of course. The harmonization check list may not be able to solve this problem but it will help." [FS7]

"Flag states, classification s[ocieties] should now quality check the contents of these systems and deem if they are lean, efficient and able to be fully complied with to ensure ships are safe. Not simply about making the paperwork correct." [Seafarer survey]

6.1.1.1.3

"One of the decisions we made 20 years ago was to allow the option to have different ROs for various certifications and another for ISM issues. This has proven to be effective." [FS2]

"I think it's a good suggestion to have different RO for ISM and other statutory functions to avoid the conflict. So even if you're not the same class, you're still trying to get the business point of view as well. There will be always a challenge. It's not 100% foolproof, but obviously it's a step forward." [FS8]

"ROs, or IACS for that matter, cannot increase audit times unilaterally, as there are other ROs that will capitalize on this approach. IMO needs to establish a clear guideline as to the time required to complete an effective ISM audit." [RO1]

"IMO should make it mandatory to separate the organization who's doing the ISM auditing to all the other statutory certificates. It gives them that little bit of separation and independence from the construction, you know, and equipment aspects. And they're allowed to think purely from a systems point of view." [PSC7]

"RO for ISM certification and RO for class should be different to limit conflict of interest. It doesn't need to be one of the RO to be honest with you. It just needs to be someone who acts, I mean, is independent of the process. The whole point of an auditor is someone who's independent of the process that is being audited." [V1]

6.1.1.2.1

"In the Code it is required that the [designated person] needs to have a direct linkage to the highest level of the ship management, but it didn't suggest any way that the [designated person] will or how do we put to and also how to ensure the management provide sufficient resources to the DPA to implement the item code for the whole company. This is one of the issues and the ISM Code also not addressing the qualification and experience of the DPA." [FS7]

"There should be something in the ISM Code to say that the [designated person] works "within reasonable expectations" or something like that, that excessive workloads will be avoided, not "should" be avoided, because the wording "should be avoided" is a get out of jail card." [V1]

6.1.1.3

"I think it's quite broad at the moment. There's some flag States have, you know, given their own interpretation, which we kind of sometimes refer to, which is quite useful, but not all companies and you know people are aware of that. And so it's kind of up to them to make their own interpretation. So, I think it's probably useful if there was some kind of other guidance documents as well that would go with it." [PSC7]

"In our view, it is unlikely that there is anything 'wrong' per se with the ISM Code and therefore it be more useful from an IMO standpoint to look at the relevant guidance concerning 'implementation' of the ISM Code or examine enforcement processes." [Co9]

"The idea of model legislation, so we can't dictate specifically what you do, but this is an idea of what we think is an acceptable standard and that's what we should be working toward, yeah, with examples of a company and what it means in practice, not just tick the form to say you've got it." [SR6]

"This can be even certain guidance that can be given under the new feature of what exactly uh, we need on the short side, as far as the competence level of or the skill sets of the shore managers is concerned." [Co4]

6.1.1.5

"Need direct online anonymous grievance complaint registering procedure with flag state by ships crew." [Seafarer survey]

6.1.2.1

"I think definitely guidance on how to do risk assessment properly would be helpful…Guidance to companies and onboard staff on how to implement that effectively." [SR6]

"There is a couple of IMO [documents], is it circulars about implementation, I can't remember the number off the top of my head, but they are certainly something that could be revisited potentially." [Co6]

"Please to consider my remark for ism : please to reduce paper works and documents, try to find easy way for seafarers to apply ism code and requirements , such as electronic devices or tablets for officers, have inside it the minimum required check lists and no need to print out and filling every time, the same to engine department regarding maintenance schedules…etc." [Seafarer survey]

"More legal requirements of Digitalization and paperless ISM systems to give more pressure to companies to enhance such systems" [Seafarer survey]

"And for the company, if we make the regulation clear, then we have no option other than follow, because that's the standard." [FS9]

6.2.3.1

"*This is not clear in the ISM Code how they conduct the risk assessment and even the ISM can suggest any minimum ISO standard or a common industrial practice for carrying out the risk assessmen*t." *[FS7]*

"If we emphasize enough on that risk assessment, you know hopefully people start taking more notice of it and you know if they are made to provide evidence of that risk assessment for each element of the Code, then it's like OK." [PSC7]

"*Risk has come a long way and there probably is value in including an acceptable level of risk assessment and management inside the Code, but even if it was just a point, to say ISO 31000." [CI1]*

"It needs to get more to the point and practical .- Any c/l or permit if more than a page Long - loses its purpose." [Seafarer survey]

6.2.5.1

"In the Code it is required that the [designated person] needs to have a direct linkage to the highest level of the ship management, but it didn't suggest any way that the [designated person] will or how do we put to and also how to ensure the management provide sufficient resources to the DPA to implement the item code for the whole company. This is one of the issues and the ISM Code also not addressing the qualification and experience of the DPA." [FS7]

"There should be something in the ISM Code to say that the [designated person] works "within reasonable expectations" or something like that, that excessive workloads will be avoided, not "should" be avoided, because the wording "should be avoided" is a get out of jail card." [V1]

6.3.2

"We recognize the IMO guidelines, however there is no harmonized checklist, which has been used for the harmonization, certification and service system. It might help, of course. The harmonization checklist may not be able to solve this problem but it will help." [FS7]

"Flag states, classifications should now quality check the contents of these systems and deem if they are lean, efficient and able to be fully complied with to ensure ships are safe. Not simply about making the paperwork correct" [Seafarer survey]

"One of the decisions we made 20 years ago was to allow the option to have different ROs for various certifications and another for ISM issues. This has proven to be effective." [FS2]

"I think it's a good suggestion to have different RO for ISM and other statutory functions to avoid the conflict. So even if you're not the same class, you're still trying to get the business point of view as well. There will be always a challenge. It's not 100% foolproof, but obviously it's a step forward." [FS8]

"ROs, or IACS for that matter, cannot increase audit times unilaterally, as there are other ROs that will capitalize on this approach. IMO needs to establish a clear guideline as to the time required to complete an effective ISM audit." [RO1]

"IMO should make it mandatory to separate the organization who's doing the ISM auditing to all the other statutory certificates. It gives them that little bit of separation and independence from the construction, you know, and equipment aspects. And they're allowed to think purely from a systems point of view." [PSC7]

"RO for ISM certification and RO for class should be different to limit conflict of interest. It doesn't need to be one of the RO to be honest with you. It just needs to be someone who acts, I mean, is independent of the process. The whole point of an auditor is someone who's independent of the process that is being audited." [V1]

6.4.5

"Safe Manning Requirement - This has significantly decreased although the work load has highly increased. We need more manpower especially on ships over 10 years of age. Safe Manning requirement should increase with age of the vessel." [Seafarer survey]

"I cannot imagine vessels having less crew than nowadays, OK? And especially with the integration of new systems of digitalization and of the numerous ways of communication and emails that the master is now receiving, I could also foresee the need for a secretary for the master, you know, for an IT guy that can maintain the seafarers on board the vessel and the equipment on board the vessel and the PCs on board the vessel. If we want the master to look more outside the window and see what's happening with the vessel, we should give him some assistance, otherwise he would be sitting in front of a screen the entire day." [Co11]

"Many companies rely on the minimum safe manning around the deck and the engineer watchkeeping, but there are other personnel doing other stuff, I think to try to make their ship as effective they must consider fatigue for all crew. In my opinion, more guidance would be very helpful." [FS1]

"We need to look at new ways of fatigue management too in regard to were other than the conventional sea watches and all that side, we need to start looking into reasons to that will maximize tables or minimize seafarers' fatigue." [SR2]

"Update minimum safe crewing resolution to consider all operational requirements and fatigue." [RO3]

"The minimum safe manning, the Assembly resolution under SOLAS that should be operational, that should provide operational aspects." [SR6]

"The safe manning, I think needs to actually be reviewed. Because modern vessels now have advanced technology and their safe manning doesn't actually put like the Electric Technical Officer (ETO), for instance, on the safe manning, which is a current position, it really should be mandatory in the current vessels manning." [SR2]

ANNEX D

DESCRIPTIVE STATISTICS OF ISM VERIFICATIONS

Table D-1: Number of Document of Compliance (DOC) and Safety Management Certificate (SMC) verifications in 2019-2023, based on data from ROs (A-D and F) and flag State (FS)

	A	B	C	D	F	FS
Number of DOC verifications	3,980	895	3,585	2,617	5,063	1,794
Number of DOC verifications with ISM-related NCs	362	448	689	559	1,322	541
DOC verifications with ISM-related NCs as % of total number of DOC verifications	9.1%	50.1%	19.2%	21.4%	26.1%	30.2%
Number of SMC verifications	18,800	7,715	14,641	8,090	21,696	5,579
Number of SMC verifications with ISM-related NCs	1,728	3,537	3,300	1,644	5,261	1,400
SMC verifications with ISM-related NCs as % of total number of SMC verifications	9.2%	45.8%	22.5%	20.3%	24.2%	25.1%

Table D-2: Number of minor and major non-conformities identified during ISM verifications for 2019-2023, categorized by ISM Code (part A) sections and sub-paragraphs. Based on data from ROs (A-E) and flag State (FS) [170]

	A		B		C		D		E		FS	
	DOC	***SMC***	***DOC***	***SMC***	***DOC***	***SMC***	***DOC***	***SMC***	***DOC***	***SMC***	***DOC***	***SMC***
1	**62**	**385**	**11**	**17**	**208**	**1014**	**144**	**320**	**267**	**783**	**71**	**130**
1.1	0	1	0	0	0	0	(*)	(*)	(*)	(*)	0	0
1.2	61	341	8	15	200	997	(*)	(*)	(*)	(*)	50	104
1.3	0	0	0	0	0	0	(*)	(*)	(*)	(*)	0	0
1.4	1	19	3	2	8	17	(*)	(*)	(*)	(*)	6	6
2	**4**	**49**	**1**	**1**	**8**	**36**	**25**	**58**	**1**	**15**	**2**	**13**
2.1	0	2	0	0	3	14	(*)	(*)	(*)	(*)	0	6
2.2	2	37	1	0	5	22	(*)	(*)	(*)	(*)	1	2
3	**8**	**28**	**10**	**17**	**33**	**22**	**52**	**70**	**41**	**68**	**14**	**6**
3.1	1	3	3	0	5	1	(*)	(*)	(*)	(*)	0	1
3.2	3	0	4	5	23	9	(*)	(*)	(*)	(*)	6	3
3.3	4	21	3	7	4	12	(*)	(*)	(*)	(*)	3	1
4	**6**	**11**	**9**	**4**	**8**	**3**	**19**	**25**	**11**	**14**	**10**	**1**
5	**9**	**55**	**14**	**96**	**11**	**82**	**38**	**216**	**55**	**125**	**12**	**41**
5.1	9	50	14	90	11	81	(*)	(*)	(*)	(*)	12	26
5.2	0	3	0	1	0	1	(*)	(*)	(*)	(*)	0	0
6	**68**	**329**	**168**	**843**	**98**	**426**	**148**	**479**	**167**	**632**	**166**	**328**
6.1	7	48	10	6	1	21	(*)	(*)	(*)	(*)	8	8
6.2	24	67	49	36	62	111	(*)	(*)	(*)	(*)	43	25
6.3	7	49	8	125	6	133	(*)	(*)	(*)	(*)	17	38
6.4	13	34	18	96	4	50	(*)	(*)	(*)	(*)	16	58
6.5	16	80	78	520	17	73	(*)	(*)	(*)	(*)	43	120
6.6	0	21	2	20	0	15	(*)	(*)	(*)	(*)	1	16
6.7	0	26	0	2	4	22	(*)	(*)	(*)	(*)	1	5
7	**20**	**459**	**157**	**1753**	**26**	**491**	**68**	**515**	**111**	**884**	**142**	**569**
8	**58**	**357**	**81**	**1257**	**64**	**279**	**70**	**372**	**136**	**436**	**73**	**319**
8.1	5	69	4	45	4	35	(*)	(*)	(*)	(*)	3	19
8.2	44	212	67	798	51	177	(*)	(*)	(*)	(*)	48	182
8.3	7	22	8	218	8	62	(*)	(*)	(*)	(*)	8	37
9	**133**	**237**	**71**	**177**	**126**	**400**	**163**	**335**	**247**	**367**	**148**	**152**
9.1	41	124	14	43	68	241	(*)	(*)	(*)	(*)	43	49
9.2	88	103	55	115	58	159	(*)	(*)	(*)	(*)	73	49
10	**134**	**1222**	**256**	**2724**	**231**	**1246**	**267**	**1421**	**343**	**1340**	**304**	**949**
10.1	45	407	23	57	47	354	(*)	(*)	(*)	(*)	66	121
10.2	68	613	184	2057	134	747	(*)	(*)	(*)	(*)	150	517
10.3	16	79	23	275	26	66	(*)	(*)	(*)	(*)	31	62
10.4	0	4	10	52	23	71	(*)	(*)	(*)	(*)	9	19
11	**45**	**295**	**67**	**151**	**66**	**410**	**97**	**376**	**153**	**467**	**67**	**118**
11.1	20	120	9	10	29	167	(*)	(*)	(*)	(*)	13	18
11.2	24	147	26	66	32	230	(*)	(*)	(*)	(*)	33	52
11.3	0	11	26	11	5	12	(*)	(*)	(*)	(*)	11	7
12	**162**	**193**	**47**	**47**	**172**	**173**	**127**	**188**	**241**	**211**	**102**	**42**
12.1	41	86	19	12	84	85	(*)	(*)	(*)	(*)	33	13
12.2	25	3	12	7	7	5	(*)	(*)	(*)	(*)	13	2

[170] The numbers in the rows highlighted in bold grey show the total number of references that were made to the ISM Code section as a whole or to any of the sub-paragraphs in that section. The numbers in the rows highlighted in white show the number and percentage of references to specific sub-paragraphs for those cases where such specific information was available. Note that this specific information was not always available, as some references were made to the section in general, rather than to a specific sub-paragraph; therefore, the numbers in the white rows for a particular section may not add up to the numbers in the grey rows for that section. (*) = Data not available.

12.3	45	17	8	0	35	9	(*)	(*)	(*)	(*)	20	6
12.4	25	28	7	2	23	34	(*)	(*)	(*)	(*)	15	7
12.5	9	14	0	1	1	4	(*)	(*)	(*)	(*)	2	0
12.6	11	34	1	0	5	9	(*)	(*)	(*)	(*)	2	0
12.7	4	7	0	2	15	25	(*)	(*)	(*)	(*)	3	2
Multiple sections	**0**	**8**	**6**	**88**	**0**	**7**	**0**	**0**	**0**	**0**	**2**	**15**
Missing / unclear	**2**	**30**	**1**	**5**	**0**	**3**	**0**	**19**	**0**	**0**	**0**	**5**
Total	**711**	**3658**	**899**	**7180**	**1051**	**4592**	**1218**	**4394**	**1773**	**5342**	**1113**	**2688**

Table D-3a: Number of minor and major non-conformities for 2019–2023, categorized by ISM Code section (part A). Based on data from ROs (A–E)

ISM Code section and descriptor (Part A)	*DOC*		*SMC*	
	Number of NCs	***NCs as % of total[171]***	***Number of NCs***	***NCs as % of total[172]***
1 General	692	12.2	2,519	10.0
2 Safety and environmental protection policy	39	0.7	159	0.6
3 Company responsibilities and authority	144	2.5	205	0.8
4 Designated person(s)	53	0.9	57	0.2
5 Master's responsibility and authority	127	2.2	574	2.3
6 Resources and personnel	649	11.5	2,709	10.8
7 Shipboard operations	382	6.8	4,102	16.3
8 Emergency preparedness	409	7.2	2,701	10.7
9 Reports and analysis of NC, accidents, and hazardous occurrences	740	13.1	1,516	6.0
10 Maintenance of the ship and equipment	1,231	21.8	7,953	31.6
11 Documentation	428	7.6	1,699	6.8
12 Company verification, review, and evaluation	749	13.3	812	3.2
Multiple sections[173]	6	0.1	103	0.4
Information missing/unclear	3	0.1	57	0.2
Total	5,652		25,166	

171 Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCs (n = 5,652). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

172 Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCs (n = 25,166). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

173 Multiple sections = the non-conformity references multiple sections of Part A of the ISM Code.

Table D-3b: Number of minor and major non-conformities for 2019–2023, categorized by ISM Code section (part A). Based on data from flag State (FS)

ISM Code section and descriptor (Part A)	*DOC*		*SMC*	
	Number of NCs	***NCs as % of total[174]***	***Number of NCs***	***NCs as % of total[175]***
1 General	71	6.4	130	4.8
2 Safety and environmental protection policy	2	0.2	13	0.5
3 Company responsibilities and authority	14	1.3	6	0.2
4 Designated person(s)	10	0.9	1	0.0
5 Master's responsibility and authority	12	1.1	41	1.5
6 Resources and personnel	166	14.9	328	12.2
7 Shipboard operations	142	12.8	569	21.2
8 Emergency preparedness	73	6.6	319	11.9
9 Reports and analysis of NC, accidents, and hazardous occurrences	148	13.3	152	5.7
10 Maintenance of the ship and equipment	304	27.3	949	35.3
11 Documentation	67	6.0	118	4.4
12 Company verification, review, and evaluation	102	9.2	42	1.6
Multiple sections[176]	2	0.2	15	0.6
Information missing/unclear	0	0.0	5	0.2
Total	1,113		2,688	

[174] Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCs (n = 1,113). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

[175] Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCs (n = 2,688). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

[176] Multiple sections = the non-conformity references multiple sections of Part A of the ISM Code.

Table D-4: Number of major non-conformities in Document of Compliance (DOC) and Safety Management Certificate (SMC) verifications for 2019–2023, by ISM Code section (part A). Based on data from ROs (A–E)

ISM Code section and descriptor (part A)	DOC		SMC	
	Number of major NCs	***NCs as % of total[177]***	***Number of major NCs***	***NCs as % of total[178]***
1 General	67	44.7	286	19.1
2 Safety and environmental protection policy	1	0.7	39	2.6
3 Company responsibilities and authority	7	4.7	13	0.9
4 Designated person(s)	2	1.3	3	0.2
5 Master's responsibility and authority	0	0.0	16	1.1
6 Resources and personnel	15	10.0	140	9.3
7 Shipboard operations	0	0.0	167	11.1
8 Emergency preparedness	2	1.3	173	11.5
9 Reports and analysis of NC, accidents, and hazardous occurrences	15	10.0	107	7.1
10 Maintenance of the ship and equipment	14	9.3	479	32.0
11 Documentation	4	2.7	42	2.8
12 Company verification, review, and evaluation	21	14.0	18	1.2
Multiple sections[179]	2	1.3	10	0.7
Information missing/unclear	0	0.0	6	0.4
Total	150		1,499	

177 Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCs (n = 150). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

178 Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCs (n = 1,499). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

179 Multiple sections = the non-conformity references multiple sections of Part A of the ISM Code.

Table D-5: Number of minor non-conformities in Document of Compliance (DOC) and Safety Management Certificate (SMC) verifications for 2019–2023, by ISM Code section (part A). Based on data from ROs (A–E)

ISM Code section and descriptor (part A)	DOC		SMC	
	Number of minor NCs	***NCs as % of total[180]***	***Number of minor NCs***	***NCs as % of total[181]***
1 General	625	11.4	2,233	9.4
2 Safety and environmental protection policy	38	0.7	122	0.5
3 Company responsibilities and authority	137	2.5	190	0.8
4 Designated person(s)	51	0.9	54	0.2
5 Master's responsibility and authority	127	2.3	558	2.4
6 Resources and personnel	634	11.5	2,569	10.9
7 Shipboard operations	382	6.9	3,935	16.6
8 Emergency preparedness	407	7.4	2,528	10.7
9 Reports and analysis of NC, accidents, and hazardous occurrences	725	13.2	1,409	6.0
10 Maintenance of the ship and equipment	1,217	22.1	7,474	31.6
11 Documentation	424	7.7	1,657	7.0
12 Company verification, review, and evaluation	728	13.2	794	3.4
Multiple sections[182]	4	0.1	93	0.4
Information missing/unclear	3	0.1	51	0.2
Total	5,502		23,667	

[180] Number of NCs referring to a particular section of the ISM Code, as percentage of the total number (n = 5,502). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

[181] Number of NCs referring to a particular section of the ISM Code, as percentage of the total number (n = 23,667). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

[182] Multiple sections = the non-conformity references multiple sections of Part A of the ISM Code.

Table D-6a: Number of minor and major NCs for 2019–2023, by ISM Code (part A) sub-paragraphs. Based on data from ROs A–C[183]

ISM Code section and sub-paragraph reference and descriptor (Part A)	*DOC*		*SMC*	
	Number of NCs	***NCs as % of total[184]***	***Number of NCs***	***NCs as % of total[185]***
1 General	**281**	**10.6**	**1,416**	**9.2**
1.1 Definitions	0	0.0	1	0.0
1.2 Objectives (incl. risk assessment)	269	10.1	1,353	8.8
1.3 Application	0	0.0	0	0.0
1.4 Functional requirements for a SMS	12	0.5	38	0.2
2 Safety & environmental protection policy	**13**	**0.5**	**86**	**0.6**
2.1 Policy	3	0.1	16	0.1
2.2 Implementation of policy	8	0.3	59	0.4
3 Company authority & responsibility	**51**	**1.9**	**67**	**0.4**
3.1 Full name and details of company	9	0.3	4	0.0
3.2 Define personnel responsible for SMS	30	1.1	14	0.1
3.3 Adequate resources to support DPA	11	0.4	40	0.3
4 Designated person(s)	**23**	**0.9**	**18**	**0.1**
5 Master's responsibility and authority	**34**	**1.3**	**233**	**1.5**
5.1 Master responsibility documentation	34	1.3	221	1.4
5.2 Overriding authority	0	0.0	5	0.0
6 Resources and personnel	**334**	**12.6**	**1,598**	**10.4**
6.1 Master competency	18	0.7	75	0.5
6.2 Appropriate manning	135	5.1	214	1.4
6.3 Familiarization	21	0.8	307	2.0
6.4 Adequate understanding of SMS	35	1.3	180	1.2
6.5 Training procedures to support SMS	111	4.2	673	4.4
6.6 SMS training in working language	2	0.1	56	0.4
6.7 Support effective communication	4	0.2	50	0.3
7 Shipboard operations	**203**	**7.6**	**2,703**	**17.5**
8 Emergency preparedness	**203**	**7.6**	**1,893**	**12.3**
8.1 Procedures	13	0.5	149	1.0

183 The numbers in the rows highlighted in bold grey show the total number of references that were made to the section as a whole or to any of the paragraphs in that section. The numbers in the rows shown in white show the number and percentage of references to specific sub-paragraphs, where such specific information was available. Note that this specific information was not always available, as some references were made to the section in general rather than to a specific sub-paragraph; therefore, the numbers in the white rows do not add up to the number in the corresponding grey row for that section.

184 Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCSs (n = 2,661). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

185 Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCs (n = 15,430). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

8.2 Programmes of drills and exercises	162	6.1	1,187	7.7
8.3 Response	23	0.9	302	2.0
9 Reports and analysis of NC, accidents, and hazardous occurrences	**330**	**12.4**	**814**	**5.3**
9.1 Procedures	123	4.6	408	2.6
9.2 Corrective actions	201	7.6	377	2.4
10 Maintenance of the ship and equipment	**621**	**23.3**	**5,192**	**33.6**
10.1 Procedures	115	4.3	818	5.3
10.2 Inspections, corrective actions and records	386	14.5	3,417	22.1
10.3 Ensuring reliability	65	2.4	420	2.7
10.4 Routine maintenance	33	1.2	127	0.8
11 Documentation	**178**	**6.7**	**856**	**5.5**
11.1 Procedures	58	2.2	297	1.9
11.2 Relevance	82	3.1	443	2.9
11.3 SMS Manual	31	1.2	34	0.2
12 Company verification, review and evaluation	**381**	**14.3**	**413**	**2.7**
12.1 Internal Audits	144	5.4	183	1.2
12.2 Control of ISM delated functions	44	1.7	15	0.1
12.3 Evaluation of SMS effectiveness	88	3.3	26	0.2
12.4 Conforming to documented procedures	55	2.1	64	0.4
12.5 Personnel conducting audits	10	0.4	19	0.1
12.6 Sharing audit results	17	0.6	43	0.3
12.7 Timely corrective actions	19	0.7	34	0.2
Multiple sections[186]	**6**	**0.2**	**103**	**0.7**
Information missing / unclear	**3**	**0.1**	**38**	**0.2**
Total	**2,661**		**15,430**	

[186] Multiple sections = the non-conformity references multiple sections of part A of the ISM Code.

Table D-6b: Number of minor and major NCs for 2019–2023, by ISM Code (part A) sub paragraphs. Based on data from flag State FS[187]

ISM Code section and sub-paragraph reference and descriptor (Part A)	*DOC*		*SMC*	
	Number of NCs	***NCs as % of total[188]***	***Number of NCs***	***NCs as % of total[189]***
1 General	**71**	**6.4**	**130**	**4.8**
1.1 Definitions	0	0.0	0	0.0
1.2 Objectives (incl. risk assessment)	50	4.5	104	3.9
1.3 Application	0	0.0	0	0.0
1.4 Functional requirements for a SMS	6	0.5	6	0.2
2 Safety & environmental protection policy	**2**	**0.2**	**13**	**0.5**
2.1 Policy	0	0.0	6	0.2
2.2 Implementation of policy	1	0.1	2	0.1
3 Company authority & responsibility	**14**	**1.3**	**6**	**0.2**
3.1 Full name and details of company	0	0.0	1	0.0
3.2 Define personnel responsible for SMS	6	0.5	3	0.1
3.3 Adequate resources to support DPA	3	0.3	1	0.0
4 Designated person(s)	**10**	**0.9**	**1**	**0.0**
5 Master's responsibility and authority	**12**	**1.1**	**41**	**1.5**
5.1 Master responsibility documentation	12	1.1	26	1.0
5.2 Overriding authority	0	0.0	0	0.0
6 Resources and personnel	**166**	**14.9**	**328**	**12.2**
6.1 Master competency	8	0.7	8	0.3
6.2 Appropriate manning	43	3.9	25	0.9
6.3 Familiarization	17	1.5	38	1.4
6.4 Adequate understanding of SMS	16	1.4	58	2.2
6.5 Training procedures to support SMS	43	3.9	120	4.5
6.6 SMS training in working language	1	0.1	16	0.6
6.7 Support effective communication	1	0.1	5	0.2
7 Shipboard operations	**142**	**12.8**	**569**	**21.2**
8 Emergency preparedness	**73**	**6.6**	**319**	**11.9**
8.1 Procedures	3	0.3	19	0.7
8.2 Programmes of drills and exercises	48	4.3	182	6.8

187 The numbers in the rows highlighted in bold grey show the total number of references that were made to the section as a whole or to any of the sub paragraphs in that section. The numbers in the rows shown in white show the number and percentage of references to specific sub paragraphs, where such specific information was available. Note that this specific information was not always available, as some references were made to the section in general, rather than to a specific sub paragraph; therefore, the numbers in the white rows do not add up to the number in the corresponding grey row for that section.

188 Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCSs (n = 1,113). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

189 Number of NCs referring to a particular section of the ISM Code, as percentage of the total number of NCs (n = 2,688). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

8.3 Response	8	0.7	37	1.4
9 Reports and analysis of NC, accidents, and hazardous occurrences	**148**	**13.3**	**152**	**5.7**
9.1 Procedures	43	3.9	49	1.8
9.2 Corrective actions	73	6.6	49	1.8
10 Maintenance of the ship and equipment	**304**	**27.3**	**949**	**35.3**
10.1 Procedures	66	5.9	121	4.5
10.2 Inspections, corrective actions and records	150	13.5	517	19.2
10.3 Ensuring reliability	31	2.8	62	2.3
10.4 Routine maintenance	9	0.8	19	0.7
11 Documentation	**67**	**6.0**	**118**	**4.4**
11.1 Procedures	13	1.2	18	0.7
11.2 Relevance	33	3.0	52	1.9
11.3 SMS Manual	11	1.0	7	0.3
12 Company verification, review and evaluation	**102**	**9.2**	**42**	**1.6**
12.1 Internal Audits	33	3.0	13	0.5
12.2 Control of ISM delated functions	13	1.2	2	0.1
12.3 Evaluation of SMS effectiveness	20	1.8	6	0.2
12.4 Conforming to documented procedures	15	1.3	7	0.3
12.5 Personnel conducting audits	2	0.2	0	0.0
12.6 Sharing audit results	2	0.2	0	0.0
12.7 Timely corrective actions	3	0.3	2	0.1
Multiple sections[190]	**2**	**0.2**	**15**	**0.6**
Information missing / unclear	**0**	**0.0**	**5**	**0.2**
Total	**1,113**		**2,688**	

190 Multiple sections = the non-conformity references multiple sections of part A of the ISM Code.

ANNEX E

DESCRIPTIVE STATISTICS OF TOKYO MOU ISM DEFICIENCIES

Table E-1: Tokyo MoU port State control inspections, deficiencies and detentions 2013–2023

	2013	2014	2015	2016	2017	2018
Number of inspections[191]	31,018	30,405	31,407	31,678	31,315	31,589
Number of inspections where deficiencies were found[192]	18,790	19,029	19,142	18,943	18,113	18,091
Inspections where ISM-related deficiencies were found[193]	2,329	2,147	2,254	1,772	1,570	1,312
Inspections with ISM-related deficiencies as % of number of inspections where deficiencies were found	12.4	11.3	11.8	9.4	8.7	7.3
Number of deficiencies[194]	95,263	86,560	83,606	81,271	76,108	73,441
Number of ISM-related deficiencies[195]	3,100	2,700	2,801	2,068	1,859	1,530
ISM-related deficiencies as % of total number of deficiencies	3.3	3.1	3.4	2.5	2.4	2.1
Number of detentions[196]	1,395	1,203	1,153	1,090	941	934
Detentions with ISM-related deficiencies[197]	577	533	525	423	365	320
Detentions with ISM-related deficiencies as % of inspections with ISM-related deficiencies	24.8	24.8	23.3	23.9	23.2	24.4
Detentions with ISM-related deficiencies as % of total number of detentions	41.4	44.3	45.5	38.8	38.8	34.3

191 Tokyo MoU Annual Report 2023, figure 9.
Available at https://www.tokyo-mou.org/publications/annual_report.php. Accessed 26 June 2024.

192 Tokyo MoU Annual Report 2023, figure 11.
Available at https://www.tokyo-mou.org/publications/annual_report.php. Accessed 26 June 2024.

193 Based on Tokyo MoU data.

194 Tokyo MoU Annual Report 2023, figure 12.
Available at https://www.tokyo-mou.org/publications/annual_report.php. Accessed 26 June 2024.

195 Based on Tokyo MoU data.

196 Tokyo MoU Annual Report 2023, figure 13.
Available at https://www.tokyo-mou.org/publications/annual_report.php. Accessed 26 June 2024.

197 Based on Tokyo MoU data.

Table E-1 (continued)

	2019	2020	2021	2022	2023	Total 2013-23
Number of inspections	31,372	19,416	22,732	24,894	30,887	31,6713
Number of inspections where deficiencies were found	18,461	9,763	11,567	12,768	18,806	183,473
Inspections where ISM-related deficiencies were found	1,241	791	792	909	1190	16,307
Inspections with ISM-related deficiencies as % of number of inspections where deficiencies were found	6.7	8.1	6.8	7.1	6.3	8.9
Number of deficiencies	73,393	34,924	39,838	46,769	75,867	767,040
Number of ISM-related deficiencies	1,372	825	827	923	1,190	19,195
ISM-related deficiencies as % of total number of deficiencies	1.9	2.4	2.1	2.0	1.6	2.5
Number of detentions	983	493	526	725	1,334	10,777
Detentions with ISM-related deficiencies	313	203	212	329	447	4,247
Detentions with ISM-related deficiencies as % of inspections with ISM-related deficiencies	25.2	25.7	26.8	36.2	37.6	26.0
Detentions with ISM-related deficiencies as % of total number of detentions	31.8	41.2	40.3	45.4	33.5	39.4

Table E-2: Tokyo MoU ISM-related deficiencies identified between 2013 and 2023

Deficiency code	**Number**	***Percentage*[198]**
15101 Safety and environment policy	306	1.6
15102 Company responsibility and authority	717	3.7
15103 Designated person(s)	49	0.3
15104 Master's responsibility and authority	361	1.9
15105 Resources and personnel	2,335	12.2
15106 Shipboard operations	3,969	20.7
15107 Emergency preparedness	1,735	9.0
15108 Reports of NC, accidents and hazardous occurrences	1,053	5.5
15109 Maintenance of the ship and equipment	4,388	22.9
15110 Documentation ISM	688	3.6
15111 Company verification, review and evaluation	371	1.9
15112 Certification, verification and control	140	0.7
15150 Multiple elements of the ISM Code	831	4.3
15199 Other (ISM)	2,252	11.7
Total	19,195	

198 Number of deficiencies referring to a particular deficiency code, as percentage of the total number of deficiencies (n = 19,195). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

Table E-3: ISM deficiencies recorded during port State control inspections by Tokyo MoU member authorities, 2013-2023, by deficiency code[199]

Deficiency code	2013		2014		2015		2016	
	Number	%	Number	%	Number	%	Number	%
15101 Safety and environmental policy	56	1.8	30	1.1	36	1.3	35	1.7
15102 Company responsibility and authority	101	3.3	97	3.6	104	3.7	67	3.2
15103 Designated person(s)	10	0.3	8	0.3	11	0.4	3	0.1
15104 Master's responsibility and authority	74	2.4	61	2.3	50	1.8	31	1.5
15105 Resources and personnel	557	18.0	488	18.1	334	11.9	236	11.4
15106 Shipboard operations	622	20.1	552	20.4	630	22.5	504	24.4
15107 Emergency preparedness	343	11.1	229	8.5	451	16.1	180	8.7
15108 Reports of non-conformities, accidents and hazardous occurrences	166	5.4	174	6.4	165	5.9	156	7.5
15109 Maintenance of the ship and equipment	708	22.8	608	22.5	559	20.0	486	23.5
15110 Documentation ISM	164	5.3	119	4.4	106	3.8	64	3.1
15111 Company verification, review and evaluation	101	3.3	73	2.7	44	1.6	32	1.5
15112 Certification, verification and control	29	0.9	21	0.8	54	1.9	10	0.5
15150 Multiple elements of the ISM Code	0	0.0	0	0.0	0	0.0	0	0.0
15199 Other (ISM)	169	5.5	240	8.9	257	9.2	264	12.8
Total	**3,100**		**2,700**		**2,801**		**2,068**	

199 Percentages were rounded to one decimal. Due to rounding, the percentages may not add up to 100 %.

Table E-3 (continued)

Deficiency code	2017		2018		2019		2020	
	Number	%	Number	%	Number	%	Number	%
15101 Safety and environment policy	40	2.2	34	2.2	25	1.8	19	2.3
15102 Company responsibility and authority	94	5.1	71	4.6	55	4	21	2.5
15103 Designated person(s)	7	0.4	6	0.4	1	0.1	1	0.1
15104 Master's responsibility and authority	45	2.4	26	1.7	24	1.7	23	2.8
15105 Resources and personnel	229	12.3	192	12.5	143	10.4	43	5.2
15106 Shipboard operations	486	26.1	366	23.9	278	20.3	130	15.8
15107 Emergency preparedness	132	7.1	101	6.6	103	7.5	56	6.8
15108 Reports of non-conformities, accidents and hazardous occurrences	122	6.6	68	4.4	66	4.8	37	4.5
15109 Maintenance of the ship and equipment	395	21.2	377	24.6	309	22.5	150	18.2
15110 Documentation ISM	63	3.4	61	4	51	3.7	20	2.4
15111 Company verification, review and evaluation	31	1.7	23	1.5	31	2.3	11	1.3
15112 Certification, verification and control	10	0.5	3	0.2	6	0.4	3	0.4
15150 Multiple elements of the ISM Code	0	0	0	0	0	0	0	0
15199 Other (ISM)	205	11	202	13.2	280	20.4	311	37.7
Total	**1,859**		**1,530**		**1,372**		**825**	

Table E-3 (continued)

Deficiency code	2021		2022		2023		Total 2013-2023	
	Number	%	Number	%	Number	%	Number	%
15101 Safety and environment policy	8	1	14	1.5	9	0.8	306	1.6
15102 Company responsibility and authority	36	4.4	34	3.7	37	3.1	717	3.7
15103 Designated person(s)	1	0.1	0	0	1	0.1	49	0.3
15104 Master's responsibility and authority	11	1.3	10	1.1	6	0.5	361	1.9
15105 Resources and personnel	49	5.9	30	3.3	34	2.9	2,335	12.2
15106 Shipboard operations	165	20	116	12.6	120	10.1	3,969	20.7
15107 Emergency preparedness	51	6.2	42	4.6	47	3.9	1,735	9.0
15108 Reports of non-conformities, accidents and hazardous occurrences	32	3.9	25	2.7	42	3.5	1,053	5.5
15109 Maintenance of the ship and equipment	143	17.3	226	24.5	427	35.9	4,388	22.9
15110 Documentation ISM	13	1.6	14	1.5	13	1.1	688	3.6
15111 Company verification, review and evaluation	7	0.8	13	1.4	5	0.4	371	1.9
15112 Certification, verification and control	1	0.1	3	0.3	0	0	140	0.7
15150 Multiple elements of the ISM Code	0	0	382	41.4	449	37.7	831	4.3
15199 Other (ISM)	310	37.5	14	1.5	0	0	2,252	11.7
Total	**827**		**923**		**1,190**		**19,195**	

Table E-4: Comparison between ISM Verification NC and port State control ISM-related deficiencies, 2019–2023

Verifications' references to sections of ISM Code (Part A)	Verifications: minor and major NCs 2019–2023, ROs A-E[a]		Verifications: minor and major NCs 2019–2023, flag State FS[b]		PSC deficiencies 2019–2023[c]	References to deficiency codes used by Tokyo MoU
	DOC	*SMC*	*DOC*	*SMC*		
1 General	12.2	10.0	6.4	4.8	N/A	
2 Safety and environmental protection policy	0.7	0.6	0.2	0.5	1.5	15101 Safety and environmental policy
3 Company responsibilities and authority	2.5	0.8	1.3	0.2	3.6	15102 Company responsibility and authority
4 Designated person(s)	0.9	0.2	0.9	0.0	0.1	15103 Designated person(s)
5 Master’s responsibility and authority	2.2	2.3	1.1	1.5	1.4	15104 Master’s responsibility and authority
6 Resources and personnel	11.5	10.8	14.9	12.2	5.8	15105 Resources and personnel
7 Shipboard operations	6.8	16.3	12.8	21.2	15.7	15106 Shipboard operations
8 Emergency preparedness	7.2	10.7	6.6	11.9	5.8	15107 Emergency preparedness
9 Reports and analysis of NC, accidents and hazardous occurrences	13.1	6.0	13.3	5.7	3.9	15108 Reports of NC, accidents and hazardous occurrences
10 Maintenance of the ship and equipment	21.8	31.6	27.3	35.3	24.4	15109 Maintenance of the ship and equipment
11 Documentation	7.6	6.8	6.0	4.4	2.2	15110 Documentation
12 Company verification, review and evaluation	13.3	3.2	9.2	1.6	1.3	15111 Company verification, review and evaluation
	N/A	N/A	N/A	N/A	0.3	15112 Certification, verification and control
Multiple sections	0.1	0.4	0.2	0.6	16.2	15150 Multiple elements of the ISM Code
	N/A	N/A	N/A	N/A	17.8	15199 Other (ISM)
Information missing/unclear	0.1	0.2	0.0	0.2	0.0	Information missing/unclear

Notes: Percentages of non-conformities with references to different sections of the ISM Code. Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %. n = number.
[a] Based on data from five ROs (Table D-3a).
[b] Based on data from one flag State (Table D-3b).
[c] Based on Tokyo MoU data for 2019–2023.

Table E-5: ISM Code section referenced for detained vessels (Tokyo MoU, 2013–2023)

ISM Code element	Number	*Percentage* [200]
1 General	9	0.2
2 Safety and environmental protection policy	134	3.2
3 Company responsibilities and authority	35	0.8
4 Designated person(s)	4	0.1
5 Master's responsibility and authority	17	0.4
6 Resources and personnel	266	6.3
7 Shipboard operations	441	10.4
8 Emergency preparedness	139	3.3
9 Reports and analysis of NCs, accidents and hazardous occurrences	39	0.9
10 Maintenance of the ship and equipment	684	16.1
11 Documentation	14	0.3
12 Company verification, review and evaluation	8	0.2
Reference to more than one section of the ISM Code	930	21.9
Reference to the ISM Code in general (no section specified)	170	4.0
Other, unclear or missing	1,357	32.0
Total number of detentions	**4,247**	

[200] Number of detentions with reference to a particular section of the ISM Code, as percentage of the total number of detentions (n = 4,247). Percentages are rounded to the nearest decimal; due to rounding, percentages may not add up to 100 %.

ANNEX F

ANALYSES OF MARINE ACCIDENT INVESTIGATION REPORTS

Table F-1: Summarized outcomes of analyses for each of the 65 investigation reports

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
1	Yes	Lack of properly implemented SMS; no identification of enclosed spaces; not following SMS procedure; poor safety culture		Yes, by identifying risks and comparing to vessel's needs; to check with crew the knowledge about SMS		A
2	Yes		Lack of common language	Yes, by checking existence of proper maintenance		A
3	Yes	SMS was inconsistent in one aspect; SMS procedure was not followed fully		Yes, by comparing different documents regarding the same aspects		A
4	Yes	Checklists missing certain information; insufficient risk analysis; new crew not orientated on SMS procedures		Yes, insufficient risk analysis - should have been identified; insufficient checklists - should have been identified		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
5	No. However, the report says poor BRM, non-compliance with SOLAS, MLC and COLREG was accepted on board	It was accepted to not follow regulations; hence SMS was not effectively implemented	No	Yes. E.g. the habit of not using BNWAS and the fact that the OOW was not duly certified should have been detected		A
6	Yes	Lack of written procedures (i.e. BNWAS activation not on checklist); key to BNWAS connected to BNWAS at all times contrary to company rules, available for anyone to switch on/off; all OOW's daily coding in log that BNWAS was in use	Report states "indicative that the entries were a 'paper exercise'to show compliance"	Yes, e.g. by checking the whereabouts of the BNWAS key; checking the knowledge of officers and crew by interviews – should be simple in an audit		A
7	Yes	No Safety Analysis or Safety Procedure had been done for the job (rigging pilot ladder)	No	Yes, the lack of Risk Analysis and Safety Procedure should have been identified		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
8	Yes	The SMS was providing procedures for preparing navigation in situations with a heavy workload situation but was not adhered to. A simpler instruction, like a matrix, would have been simpler for OOW to follow	Yes, it notes that in one aspect the SMS and the master's standing orders were contradicting another part of master's standing orders (slow down when necessary but keep to the timetable)	Yes, the contradiction should have been possible to notice. Furthermore, a proper audit could have resulted in better procedures and checklists.		A
9	Not really, but suggests development of the system		The report claims that the procedures for navigation should be more detailed	No, there seems to be no apparent correlation to the accident and poor SMS		A
10	Yes	No supervision of new crew, not following procedure (acceptance of crew riding on pontoon when lifted by crane)	Not effectively implemented in regard to risk assessment and supervision	It should have been possible to identify this issue when interviewing		A
11	Yes	SMS was lacking instructions for preventing typhoon damage	No	It should be possible to foresee a need for an action plan in case of a typhoon		A
12	Yes	There should have been a procedure for that specific cargo (ANBF)	No	No, unlikely to identify. ANBF was under		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
				circumstances given not dangerous cargo		
13	Yes	Actions by bridge team were not following internal procedures		Yes, with a proper audit it should be possible to identify deficiencies		A
14	Yes, but indirectly (the report does not mention SMS)	The watchkeeping standards were non-existent (mate doing paperwork instead of looking out, while the lookout was working on deck)		Yes, an audit would have identified the habit of doing paperwork during watches		A
15	Yes	SMS was not including enclosed spaces: internal audit was incomplete, insufficient, and not signed	Yes, the implementation seems to have been sloppy	Yes. The implementation of SMS was clearly insufficient and would easily have been discovered		A
16	No, not directly	The accident was investigated by two authorities, and one concludes that fall in the cargo hold was not	No	Yes, it would have been possible to identify that a risk assessment of cargo hold work was not done. That is		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
		identified as a risk in the SMS risk assessments		confirmed by Safety Actions, which includes an update of SMS accordingly		
17	Yes	There was no procedure for the job done. Risk Assessment forms were generic in nature and did not identify dangers to individual tasks	Risk Assessments were near identical for all jobs, and a tick-box culture onboard had developed	Yes, the absence of individual assessments should have been identified		A
18	Yes	The SMS did not cover appropriate inspection and verification procedure. Furthermore, crew did not follow SMS procedures as they should have	Yes, common English language was not used in between other nationalities, making others out of information loop.	Yes, the deviation from procedures should have been identifiable		A
19	Yes	Bridge team did not follow ship's safety manuals regarding making engine ready for manoeuvring i.e.	Yes, voyage plan was not prepared or executed properly. Even irrelevant boxes were ticked, and some checked items had in fact not been performed	Yes, voyage plan irregularities had been possible to identify		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
20	Yes	OOW on vessel A did not follow SMS with regard to call master after collision	No	Unlikely, it is not possible to foresee how an individual will react. The report automatically refers to "follow regulations", which is not so constructive as preventive action		A
21	Yes	The SMS does not cover safety procedure for crew walking on deck	No	No. The case is concerning an OOW walking on bridge wing to have a smoke and not returning. It is assumed that he fell overboard.		A
22	Yes	The SMS did not contain information about limiting forces with regard to wind and ship manoeuvring when ballasted	No	Yes, it would have been possible to see that a fair instruction for anchoring when ballasted was in place		A
23	Yes	No formal training or follow-up if the deceased was doing the job safely.	Yes, the SMS was not fully operational or even understood	Yes. A thorough audit would have discovered the flaws of the system		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
		The tasks were not subject of Risk Analysis				
24	Yes	Failure of two senior officers to follow simple documented procedures by entering an enclosed, locked space	Yes, detailed shipboard operation regarding enclosed spaces was not in place. The type of cargo (timber) was not taken into consideration in the SMS	Yes, it would be expected to find these shortcomings in an audit		A
25	Yes	The entrance to the enclosed space was done by CHO even though he was warned by other crew due to gas smell. No PTW was executed. Still, this work was following directly after another closed space entry, where a PTW was in place	Yes, the internal company report states that the PTW to the previous entrance was not properly done "Paperwork exercise only"	Hard to say since there was non-compliance with the procedures. But yes, it should have been possible to identify the attitude from the senior officers		A
26	Yes	No risk assessment nor procedures for recovery were existent	Yes, a recommendation is that the company should focus on crew familiarization with SMS	Yes, the lack of references in the SMS could have been identified		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
27	Yes	The cargo, wooden logs, was not lashed according to Cargo Securing Manual	Yes, the SMS was not completed and well implemented in regard to sailing in rough seas	Probably, since a recommendation is that SMS and DOC have to be reviewed, amended and audited		A
28	Yes	The crew of one vessel in the collision, according to the report, did not know their duties in an emergency. The report concludes that the ISM Code was not implemented efficiently	No	Probably if a lifeboat drill had been performed during auditing		A
29	Yes, but not very clear	Clearer procedures for connecting electricity to trucks is needed	Yes, the SMS says no passengers were allowed on car deck. Still there were drivers sleeping in their trucks	Yes, e.g. it would have been easy to see that passengers were resting in their trucks		A
30	Yes	PTW was deliberately not issued. Risk Assessment was not performed	Yes, common language, English, was not understood by all	Yes, e.g. language issues would be easy to identify		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
31	Yes	"... identified that the ship's safety management system procedures for working over the ship's side were not effectively implemented"	"The ship's crew routinely did not take all the required safety precautions when working over the side. It was also found that the crew had differing attitudes to taking safety precautions during work and recreation times as the safety culture on board was not well developed"	Yes	"In practice, however, crew members had not made the connection between this risk, and using the permit to work system to mitigate the risk. The vessel's safety management system (SMS) procedures for working over the side of the ship were not effectively implemented. As a result, the ship's crew routinely did not take all the required safety precautions when working over the side. Furthermore, they did not consider that any such precautions were necessary if going	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
					over the side when not working. [Safety issue] • The safety culture on board was not well developed and the ship's managers had identified it as such. A consequence of this inadequacy was the ineffective implementation of working over the side procedures, including the general belief by its crew that safe work practices applied only when working, and not during recreational activities. [Safety issue]"	

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
32	No, but written procedures were not followed	"The cargo inside cargo holds were not secured properly in accordance with cargo securing manual; some of the cargo collapsed and shifted to the port side and resulted in heavy listing of the vessel to port side"	"the master and crew did not follow the abandon ship procedure; without having switched off the engines, the vessel was still moving at sea without crew on board until she went aground"	Maybe, if asked about cargo securing routines		B
33	Yes	"While not specifically relevant to the event, the damage suffered or the onboard planning and response, it was the opinion of the investigators that the documented safety management system requires comprehensive review and, consequently, that the effectiveness of the ISM audit regime should be reviewed"		No	"While not a causal factor in this event it is the opinion of the investigators that there were long-standing weaknesses in the survey regime performed by the Classification Society in respect of the International Convention on Load Lines."	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
34	Yes	Lack of written procedures	Not following written procedures. Lack of risk analysis	Yes	Recommendation to "Make implementation audits towards ISM more effective"	B
35	Yes	Inadequate written routines	Sailed with not approved charts, sailed with ECS without proper training, paper charts in the wrong scale, amended voyage plan without following procedures	Yes, some of the officers did not have flag-approved licences		B
36	Yes	Not following written procedures	One recommendation to "conduct at least once every two months the enclosed space entry and rescue drill"	Yes	The crew member entered the enclosed space alone, without enough ventilation or checking the atmosphere. When found by two other crew members, they made the same mistake but fortunately survived	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
37	Yes	Not following written procedures	Lack of risk analysis	Probably not		B
38	Yes	There were a lot of things not working as they should and there were some uncertainties in the information in the report, but some of the crew stated that not all drills were conducted as they should even if they were documented as done. The crew did not have enough knowledge to understand how the equipment worked and the routines to activate the CO^2 was not followed, as one example	Yes. The ISM required the fire main to be kept under pressure at all times. This was not being implemented	Yes, i.e. if the inspector asked the crew to perform a fire drill	Flag State inspection that was submitted before the accident, a large number of discrepancies was observed, regarding the maintenance of their equipment, especially in the main and auxiliary machinery, electrical system and general cleanliness of machinery spaces	B
39	Yes	"It was unsafe to let the fitter to go into the hawse pipe to carry out the work, the safety management system failed to provide safe	"It was unsafe to work in the hawse pipe with the anchor and chain stuck inside during voyage. Obviously, the working team failed to conduct a	Maybe not since the crew did a risk assessment	The crew did a risk assessment but among other recommendations the report says "internal audits and	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
		instruction to the fitter to carry out the job"	risk assessment as required by ISM Code prior to the work with potential hazards"		management reviews are conducted systematically to reveal system deficiencies for improvement in earlier stages"	

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
40	Yes	The vessel and its management had several problems. The equipment was not of an approved type and the crew was not familiarized with the ship's equipment	The emergency exit door was not identified with reflective signs and arrows required by an SMS. The crew provided inadequate training and exercises for emergency escape routes to crew members. They were not familiar with the engine room, unable to escape from the nearest emergency escape routes. Unfamiliarity caused the third engineer to fall down from the stairs when he escaped from the engine room with normal exit route	Yes, especially as the equipment was not type-approved		B
41	Yes	The investigation found weaknesses in the company SMS related to risk assessment and SMS review process	Yes, this was the fourth accident in less than one year in the company (two were fatal)	Yes. The SMS risk assessment related to working on deck was insufficient. It did not identify the specific hazard of a crew	Manning was 17 (safe manning 13). The identified weakness of the risk assessment regime and ineffective SMS	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
				member being crushed by a moving container, the potential severity of resulting harm, and the need to address the increased risk of an unsighted crew member being positioned in the container's path	review processes on board the vessel would probably have been addressed before the accident had the company given a higher priority to the issues and had the MCA's management of ISM Code audits and follow-up action been more effective	
42	No, though improvement of ISM is suggested			No, not likely		B
43	Yes	The ship's safety management system did not contain any procedures on the embarkation and disembarkation of personnel at sea. The	The launch that transported the crew from the ship was not suitable for the task. No risk assessment was made. After the chief engineer fell, he got a lifebuoy with a line, but	Yes. Lack of written procedures for crew change at sea	When the chief engineer reached the last step, a crew member in the launch got hold of him in order to help him down on the deck. The chief	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
		crew members did not wear any lifejackets	despite that he drowned and was not given CPR in the launch		engineer did not let go of the pilot ladder as expected and shortly after, the launch went down due to swell. As the boat went down, the crew member in the launch had to let go of his grip. At the same moment, the chief engineer lost his foothold and fell down the pilot ladder until his waist was in the water. He managed to get a grip of the ropes at the last step of the ladder. As the water rose due to swell, he was submerged in water to his chest and, when it fell, he was almost out of the water. The chief	

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
					engineer tried to climb up the ladder but was unable to do so. After the fall, the launch moved away from the ship's side in fear of squeezing the chief engineer between the launch and the ship's side	
44	Yes (not in exact words, see next column)	The OOW, the master, fell asleep during bridge-watch when he was alone. Absence of lookout leading to situational unawareness, poor bridge resource management, inappropriate watch composition level, deviation from the original passage plan without making hazard identification and application of necessary controls while navigating	After the vessel hit the rock and grounded, she suffered significant damage resulting in flooding of many tanks which posed a risk of foundering, but the urgency message was not transmitted. Safety messages were also not transmitted on any frequency to warn passing shipping traffic. Master attempted to refloat the vessel by using stern propulsion	Maybe, hard to say from the information given	According to the master's rest-hours the day and night before the accident, he had been able to get a good night's sleep but it is not known if he went ashore or not. He had been on board for more than 7 months.	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
		close to coast in moderate weather during dark hours. It is not known if there were any written procedures that were not followed on board	without analysing the consequences. Number of water ballast compartments were damaged and flooded and the situation was not evaluated prior her re-flotation			
45	Yes (not in the accident itself, but in the aftermath, the rescue operation	Lack of knowledge, training in how to rescue persons from the water (including throwing lifebuoys)		Probably not	The bulk carrier turned to port in a close situation	B
46	Yes	The lack of a hot work permit meant no one had made a proper risk assessment for the work. The presence of shore workers may have confused the vessel's officers who may not have realized that it was their responsibility to supervise both the shore workers and crew members. In the lower	It was stated in the report that "The vessel's officers as well as the landside working gang, contracted to perform hot works on board, were lacking fundamental safety awareness and acted unprofessionally".	Yes. The report says that the SMS was working as it should when it comes to extinguishing the fire, even if they used CO^2 when one shore personnel was missing. Lack of safety awareness and risk assessment.	The shore contractor was found in the vessel's lower cargo hold. It is not known if he died from the fire or from the fall. He was missing at an earlier stage, but for some reason not searched for. There were some language barriers prior to the hot work between	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
		hold there was inflammable material.			the onboard personnel (chief officer) and the shore personnel. To extinguish the fire, the ship's CO2 was used despite one shore personnel being missing	
47	Not in words, but proper safety routines were not in place	Confined space entry procedures not in place, no procedures when open manholes are left unattended	The master left the injured person with personnel without any formal medical education. The injured person was given painkillers without informing the master or medical officer and without instruction on what to look for, i.e. symptoms of shock	Yes. Lack of written procedures		B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
48	Yes	Lack of competence (stated in the report) and lack of controls to check that the personnel was competent to handle the task (start the boiler after service). Company procedure not followed by crew and the shipyard staff blanked off a safety valve by mistake		Probably since there seems to have been a poor safety culture	The ship management company of the vessel is required to review its safety management system and implement appropriate measures, such as crew training, internal audits and reviews, etc., in order to ensure that: i) staff are competent, experienced and well-trained prior to assigning them for the relevant jobs; ii) staff should be asked to follow company procedures for the safe operation of all equipment and machinery on board	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
					their ships; iii) staff should follow manufacturer's instructions in the operation and maintenance of all equipment and machinery on board; iv) proper culture of communication is to be established between field staff and company staff in that safety becomes the company's top priority	
49	Yes	None of the vessels had a lookout as they should, and this seemed to be "normal" but was not noted during any of the vessels ISM audits	Onboard the oil/chemical tanker the general cargo vessel was spotted by the previous watch but not handed over to the OOW (and the lookout, who had been informed about the other vessel, was sent back to his cabin to be able to help	No, if not detected during interviews with the crew that they did not keep a proper lookout during hours of darkness	The general cargo vessel sank after 70 minutes. The rescue of the crew of 7 went well, they escaped in two life rafts and were picked up by a third vessel	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
			the bosun during daylight later on). The general cargo vessel had the oil/chemical tanker in sight for about four hours prior to the collision. She was the stand-in vessel and was overtaken by the other			
50	Yes	The enclosed space hatch did not have a visible warning notice in place in accordance with the SMS	Even if there had been warning signs in place, some crew members did not speak English and may not have understood the warning	Yes, since the enclosed space entry did not have warning signs	The vessel has enclosed space entry procedures and safety equipment as prescribed by the SMS concerning the identification and safe entry into enclosed spaces. The crewmen did not follow the safety procedures on board and made an unauthorized entry into the enclosed space. Following the	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
					SMS procedures is likely to have prevented injury and death. The cargo information supplied to the master was inadequate and inaccurate relating to the dangers of the transportation of coal by ship. Ship staff and managers should continue to rely on the relevant information contained within the IMSBC Code. The cargo information supplied was not a direct factor in crewman entering the space.	

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
51	Yes	"The ship's safety management system did not provide the crew with appropriate guidance in relation to the operation and maintenance of the OBA sets"	The ship's firefighting manual referred exclusively to fire fighting in the vehicle decks of a car carrier and was not ship- specific	Maybe, if the surveyor had looked at routines with non-mandatory equipment	It was possible to connect an oxygen cylinder to an air-compressor. If this was not the case, the explosion would have been avoided (lack of engineering safety measures)	B
52	No	Procedures were in place and followed		No. Procedures were in place and followed	The ladder from the aft manhole of the centre deep tank was set inside the perimeter of the access manhole rim thus limiting the space available to pass a person's body though the manhole. This design requires a person to pull closer to the ladder in order to prevent hitting the ceiling of the tank (tank top) with their hard hat or head before passing through the manhole.	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
53	Yes	"The usefulness of internal and external ISM audits and other ship visits by superintendents in identifying competency issues among bridge watchkeeping officers was extremely limited." Lack of competence among the company officers, they had poor knowledge of COLREG. After the collision, the master undertook actions but did not raise any alarm outside the vessel which should have been done. No risk analysis was done given that the OOW was alone on the bridge in high density traffic, the ship speed or alternative route (the lookout was conducting a fire-round when the collision happened)		Maybe, as there were no written instructions to handle the procedures (fire-round) in dense traffic		B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
54	Yes	The problems onboard were in many areas. Malfunctioning bridge equipment for example. A lot of areas		Yes	The report indicates that the crew went to sleep after the problems (grounding) started to occur, can this be right?	B
55	Yes	The report does not say if there were written procedures in place or not, but it says "it is strongly recommended that the company invests in intensive enlightenment and training on all shipboard safety issues to establish and support a safety culture. The company safety management system has to be enhanced accordingly." Training (?), risk assessment, procedures not in place or not followed	No	Maybe. It is hard to say from the report if there were any procedures not followed, but if the procedures were missing, this could have been noted		B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
56	The report states that "To express the ISM Code in broad terms (see ISM Code Preamble 5) specific human demands of vessel crews related to coexistence and cooperation in a multicultural complex technical environment in a narrow, isolated workplace remote of their home country and families need to be emphasized as per Part A 6 of the Code (Resources and Personnel)			No	The cook was missing one morning, MOB alarm was raised, and days later the cook was recovered by another ship, wearing his survival suite and personal belongings. Most likely trying to leave the ship on purpose, not understanding the risks involved	B
57	In one way. The deceased conducted hot work without a hot work permit	The crew member did not understand the risks of the hot work but should have known it required a hot work permit	Yes. A hot work permit was not needed for hot work in the engine room workshop, but this accident happened due to hot work on a sealed drum for oil and the	No. The procedure was to have a hot work permit and this was not done		B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
			accident would have happened even if the hot work (grinding) was done in the workshop			
58	Yes	The report states things like "bad procedures", "inadequate or ineffective barriers", "poor communication", "poor organization"		Maybe. Hard to say from the report, but it seems to be a poor safety culture on board and maybe the lifeboat should not be lifted 30 metres with personnel onboard		B
59	Yes	This was the third fatal accident in the company over a period of 8 months. A number of areas, such as written procedures not fully implemented, written procedures not followed, risk analyses did not cover all areas	See previous comments. It was also noted that previous accidents and near-misses had not been reported. There were also 11- month contracts and poor communication, both onboard the vessel but also between company and ship. The safety culture needed improvement	Yes. There were several ways to see signs that the SMS was not fully implemented such as very few work procedures and minimal guidance on how to work safely, circular letters to the fleet not routinely incorporated onboard and no, or very few, near misses reported from the crew	Evidence from this and the two previous fatal accidents demonstrates that poor working practices and inadequate control of risks were systemic problems on company's vessels	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
60	No	The SMS seems to have been well implemented but sadly not followed by the bosun who decided to work alone with the mooring winches and got trapped on the winch drum. Procedures seem to have been followed normally, but not in this case		No	Maybe better risk awareness /training could have helped	B
61	Yes	Text from the report says: "It appears evident that a striking gap existed between objectives defined and the practical shipboard execution of the company safety and environmental policy. The master's decision to run a one-man job on the bridge while departing from a busy port point towards lack of a sound and effective safety culture		Maybe, because the checklist (in this case departure-checklist but possible others too) were not "checked"	Excessive workload & stress were underlying factors	B

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
62	Yes	The accident happened due to a lot of factors, but a fully implemented SMS should have made sure that the inspections and maintenance of the non-cargo handling crane was done in a more thorough way. The non-cargo handling crane was not suited for a rough environment, it was not installed to be easily accessed for inspections and the Planned Maintenance System was not suited for lifting devices	The training and qualification of the crane operator was not in accordance with the company's instructions	Maybe, since the PMS was not suited for a lifting device		B
63	Yes	SMS was not sufficiently mature, nor effectively or consistently implemented. Ship's managers had not been effective in monitoring and ensuring compliance with the SMS		Yes. Master thought it was CO^2 instead of water mist system, fire drills had not been undertaken, crew members were unfamiliar with system operation, vessel was		A

No.	Does the report identify SMS as a contributing factor?	In which area was the SMS a contributing factor (lack of risk analyses, written procedures not ship-specific, etc.)?	Does the report relate to the implementation of ISM/SMS in any other way? If "yes", how?	In your opinion, was there ever a possibility to identify this ISM-deficiency (if any) during an inspection prior to the accident?	Other comments	Analyst
				not adequately manned - all of this would have been possible to identify during an inspection		
64	Yes	SMS was not fully implemented, lack of complete risk analyses	Yes, SMS was regarding deck operations referring to general maritime safety instructions, not adjusted for the individual vessel	Yes, it would have been possible to define the lack of risk analyses, and the non-vessel-individual reference to deck operations		A
65	Yes	SMS was not properly implemented, thus a number of safety barriers overridden		Yes, the VDR was out of order, and the deviations from regulations and SMS constituted a standard operating procedure on board, which was known to the vessel command. It would most likely have been possible to detect during an inspection		A

ANNEX G

EXAMPLES OF ACCIDENT CASES THAT INCLUDE POORLY IMPLEMENTED ISM/SMS

Case 1: Fatality on cement carrier during deck operations
Ref: GISIS C0013072

Narrative

In calm weather in the evening the cement carrier left the port. There was no rush since the arrival quay in next port was occupied. At the aft, the vessel was moored with one rope on each of the two winches and an extra rope that had been brought up from the rope store. The reason for the extra aft rope was wind conditions at arrival, pressing the vessel from astern. No linesmen from shore were used during the departure, though it was a team of linesmen available. Instead, one of the crew members let go of the ropes on the quay. During the unmooring operation, the poop deck was manned with only one AB (able-bodied seaman) in contradiction to vessel's procedure, and since they did not single up by taking the extra rope in in advance, he had to handle three ropes on his own. The AB tried to perform the task by engaging the maneuver lever on the port side winch to high speed by using a piece of loose equipment and thus simultaneously collecting the rope on the winch and the extra rope on the wrapping drum on the same winch.

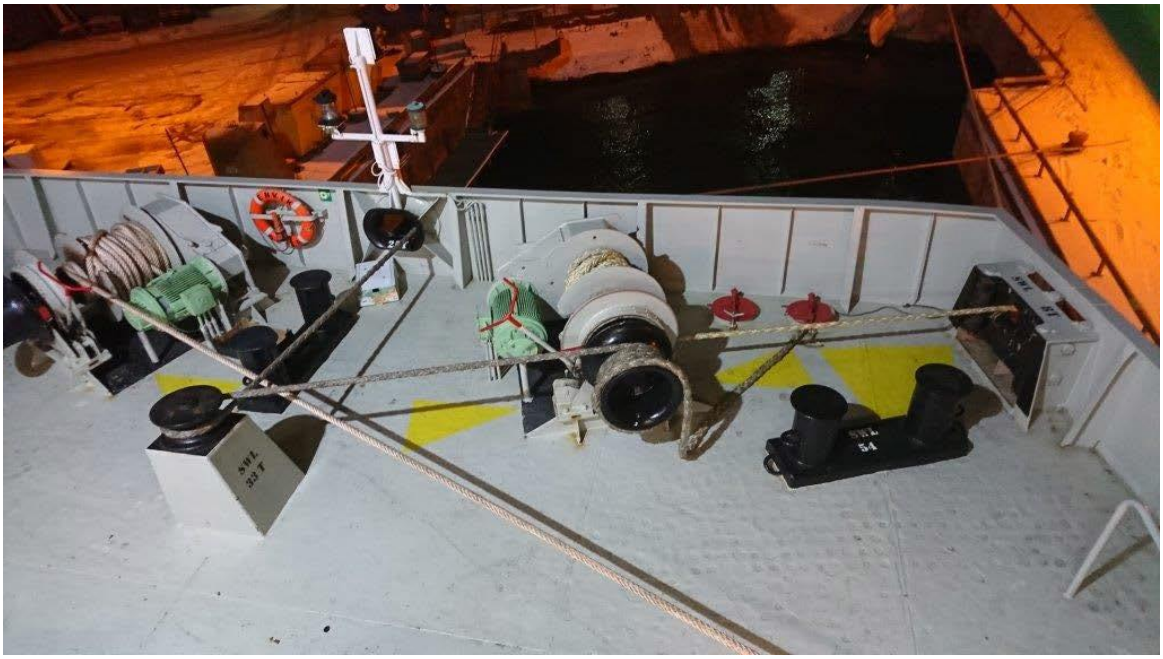

Photo 1: Image from the accident scene. In the very center, the black drum with the extra rope is seen. In the deck, towards the quay, two small red hatches are seen. The extra rope was to be put through one of these. Photo: SHK.

As the extra rope was being brought in, the AB stowed it away in the rope store. At some point, the AB lost control, probably by slipping on the frozen and slippery deck, and got stuck between the rope and the wrapping drum (which stopped due to overload). He was found there shortly after and sent to hospital, but passed away after a long hospital stay.
Investigative findings connected to SMS performance

Although there was a short briefing before the mooring operation, the circumstance that there would be only one crew fore and one aft while the third was on the quay did not lead to any suggestion to prepare by casting off the extra line in advance, nor was the absence of linesmen questioned. The risk analysis for mooring operations on the vessel consisted of rupturing ropes and handling of anchor chains only.

- This shows that there was a lack in the vessel's routines to perform risk analyses before any critical work operations.

Further, it was noted by the investigators that the on-the-job training documentation for the deck crew consisted of a reference to a book set of some 500 pages, generally describing working practices for merchant seafarers, i.e. not specific for any vessel. The relevant checklist for the deceased AB was signed as completed the very same day he arrived at the vessel. The routines and physical circumstances on the vessel did not comply with the standards described in the book set.

- This indicates that the vessel's SMS was rather considered to be a compulsory paperwork to be completed, than a useful everyday tool for preventing damage and accidents.

It was also discovered that the use of loose equipment to override the restrictions of maneuvering the winches was not unfamiliar, and that the officers had been rejecting that sort of behavior. The outcome of the officers' intervention was however not successful, since it was amongst some of the crew members not uncommon to do it anyway.

- This shows that it may exist a lack of safety awareness amongst the crew.

Photo 2: The picture shows the maneuvering lever. By putting a loose piece of equipment it was forced locked into high-speed position. Photo: SHK.

Conclusions

The outcome of the investigation shows that the vessel's SMS was not properly or fully implemented. It is likely that a proper SMS verification would have noticed this finding.

Case 2: Grounding of a car carrier
Ref: GISIS C0012188

Narrative

Under its voyage a car carrier grounded in the morning, whereupon i.a. the vessels bunker tanks were damaged. After the grounding, a 13-day environment rescue service operation was performed. Initially, only a small amount of oil was spilt, but was later followed by a larger spill, leading to oil ending up on shore. The decontamination efforts of the beaches lasted several weeks after the rescue service operation was ended. Planning of the salvage operation commenced early, but the salvage plan could not be approved until the sixth day after the grounding due to shortcomings in the calculations. Before the vessel was towed off the bank in a controlled manner, the vessel drifted uncontrolled, whereupon oil, so far mainly kept within booms, leaked. The car carrier was later towed to a port nearby. In total some 50 tons of oil leaked, according to the shipping company, whereof a little bit more than 28 tons of oil or contaminated material was collected.

The cause of the occurrence was the impaired ability of the chief officer to perform a safe navigation in combination with insufficient manning of the bridge. Underlying causes were inadequate practice and follow-up of the vessels safety management system.

Figure 1: The vessel's actual route, based on the AIS track. Figure: SHK**.**

Investigative findings connected to SMS performance

During the investigation, following factors were discovered:

- At the grounding the chief officer, who was on watch, was alone on the bridge due to the lookout doing a fire watch round.
- Before the grounding the vessel had made deviations from the planned route in order to reach the mobile telephone network without having the voyage plan updated.
- Position was checked only occasionally and only via electronic chart without follow-up or documentation.
- The BNWAS was turned off when the grounding occurred.
- The vessel's S-VDR was out of order since a repair had not been done because the technician called did not have the necessary repair kit available in last port of call.
- The evening previous to the grounding, the chief officer had consumed alcohol.

Photo 3. The vessel's BNWAS (Bridge Navigation Watch Alarm System). Photo: SHK.

Conclusions

All of these findings were breaches with the vessel's Safety Management System (which was in good order). Several of these breaches were known by the master. This leads to the conclusion that the SMS of the vessel was theoretically in good order, but was not used in practice.

Case 3: Fire on board a Multi-Purpose Vessel
Ref: GISIS C1000183

Narrative

A fire broke out in the port engine room of the 145 m multi-purpose vessel while en route in Antarctica with 37 crew and 72 staff on board. On the morning of the fire, the chief engineer manually initiated a routine fuel oil transfer from a storage tank to the port settling tank using the integrated automation system (IAS) in the ship's engine control room (ECR) to start the diesel transfer pump. The chief engineer then left the ECR to carry out repairs to a diesel generator in the starboard engine room. The unchecked transfer of fuel to the port settling tank resulted in the overflow of fuel from the tank's air pipe in the port engine room exhaust ventilation casing and provided the fuel for the fire. To be conducted safely, manual transfers required close supervision as the pump would continue to run and tank(s) would continue filling until the pump was stopped. The ship's SMS and fuel oil management plan offered no specific guidance on the risks, benefits or safety measures associated with manual or automatic fuel transfers.

The fire started when overflowing fuel from the port fuel oil settling tank ignited. The ignition was either due to overflowing fuel contacting a hot surface within the port engine room exhaust ventilation casing or due to an electrostatic discharge igniting a flammable vapour cloud, with the latter scenario considered more likely.

The ship's crew responded, and the fire was contained and eventually extinguished using the engine room's water mist fixed fire-extinguishing system about 2.5 hours later. The port engine room sustained substantial damage with most of the power generation equipment and machinery located within rendered inoperable. There were no reported injuries or pollution of the sea as a result of the fire. Power and propulsion were subsequently restored using the starboard engine room's machinery and the ship diverted and arrived in port without further incident about a week later.

Investigative findings connected to SMS performance

During the investigation, the following factors were discovered:

- There had been no fire drills conducted in the ship's engine rooms, nor was there evidence of training sessions covering the engine room's water mist fixed fire-extinguishing system. With a few exceptions, all the officers and crew were new to the ship.

- SMS incorrectly indicated that the ship's engine room was equipped with a CO2 fixed fire-extinguishing system. Instead, there was a water mist system.

- A realistic fire drill would have allowed an opportunity for the crew to understand the ship's ultra-high frequency (UHF) radio communication system. The fire resulted in power loss to the UHF system's repeaters, which effectively disabled the system.

- About 22 minutes before the port settling tank overflowed, a port drain tank high level alarm was generated. However, the alarm was silenced, most probably by a non-watchkeeping member of the ship's engineering team, without consideration of its significance, and without further investigation.

- The SMS identified the technical superintendent as a key member of the senior management team ashore with several responsibilities related to ensuring shipboard compliance with the SMS. However, the ship had largely operated without one.

- The ship's polar water operational manual, intended to support the master and crew when operating in polar waters, was aimed solely at operations in the Arctic and included no information on operations in the Antarctic.

- records of hours of rest for the crew were found to be inaccurate and unrealistic.

- SMS directions on drills and training and instruction in the use of firefighting equipment were also found to be inconsistently complied with.

Conclusions

The investigation found that the ship's SMS was not mature due to inadequate or ineffective review, with incorrect or incomplete information in several documents related to emergency response and firefighting. Furthermore, several elements of the SMS were not effectively implemented on board, resulting in inadequate management of fatigue, difficulty complying with the ship's Planned Maintenance System (PMS) schedule and an inadequate stock of spare parts and securing equipment on board.