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Dr./Capt. Raphael Baumler, Ms. Yvette De Klerk, Prof./Capt. Michael E. Manuel and Prof. Laura Carballo Piñeiro of the World Maritime University join their social science and legal expertise with their seafaring background to participate in interdisciplinary research to enhance occupational safety and health and safety at sea.



The ITF Seafarers' Trust was established in 1981 as a body with charitable status under UK law. It is dedicated to the welfare of seafarers, irrespective of nationality, race or creed.

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Contents

Abbreviations and Acronyms	2
Acknowledgements	3
Disclaimer	3
Recommended citation for the full report	4
List of Tables	4
List of Figures	4
Executive Summary	5
1 Introduction	14
2 Methodology	16
3 Adequacy of Regulations	20
3.1 Perception of the significance of fatigue	21
3.2 Intricacies of determining manning levels and hours of work	22
3.3 Regulation thresholds	24
3.4 6 hours on/6 hours off watchkeeping schedules	26
3.5 Summary	29
4 Recording of work/rest hours	30
4.1 Onboard recording practices	31
4.2 How are work/rest hours recorded?	33
4.3 Onboard compliance challenges	36
4.4 Summary	41
5 Recording malpractices	42
5.1 Prevalence of work/rest hour recording malpractices	43
5.2 Adjustment of other records	45
5.3 Justification of recording malpractices	49
5.4 Summary	52
6 Compliance monitoring and enforcement (CME) of work/rest hours	53
6.1 Scope of PSC inspections related to hours of work and hours of rest	56
6.2 Work/rest hours inspections within limited framework	58
6.3 Inspectors under time constraints	60
6.4 Challenges to assessing accuracy of work/rest hour records	63
6.5 Summary	70
7 Systemic failures in shipping	71
7.1 The influences of shipping culture	72
7.2 Sleep time versus recreation/leisure time	74
7.3 Seafarers locked in tradition and fear	75
7.4 Inadequate responses from companies	77
7.5 Challenges in compliance monitoring for authorities	85
8 Conclusions	92
9 Recommendations	97
10 References	103
Appendices	108
Appendix 1: Methodology	109
Appendix 2: Background discussions with ITF inspectors and checklist preparation	114
Appendix 3: Case study	122

Abbreviations and Acronyms

C/E	Chief Engineer
C/O	Chief Officer
CIC	Concentrated Inspection Campaign
CME	Compliance Monitoring and Enforcement
DMLC	Declaration of Maritime Labour Compliance
DOC	Document of Compliance
DPA	Designated Person Ashore
FSI	Flag State Inspector
III	IMO Instruments Implementation Code
ILO	International Labour Organization
IMO	International Maritime Organization
ISM	International Safety Management Code
ISPS	International Ship and Port Facility Security
ITF	International Transport Workers' Federation
KPI	Key Performance Indicator
MARPOL	International Convention for the Prevention of Pollution from Ships
MLC	Maritime Labour Convention, 2006
MOU	Memorandum of Understanding
NGO	Non-Governmental Organization
PMS	Planned Maintenance System
PSC	Port State Control
PSCO	Port State Control Officer
PSCOFG	Port State Control Officer Focus Group
RO	Recognised Organization
SIRE	Ship Inspection Report Programme
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea, 1974
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978
UNCLOS	United Nations Convention for the Law of the Sea
WMU	World Maritime University

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The final report was prepared by Dr. Raphael Baumler, Ms Yvette de Klerk, Dr. Michael Ekow Manuel, and Dr. Laura Carballo Piñeiro.

Disclaimer

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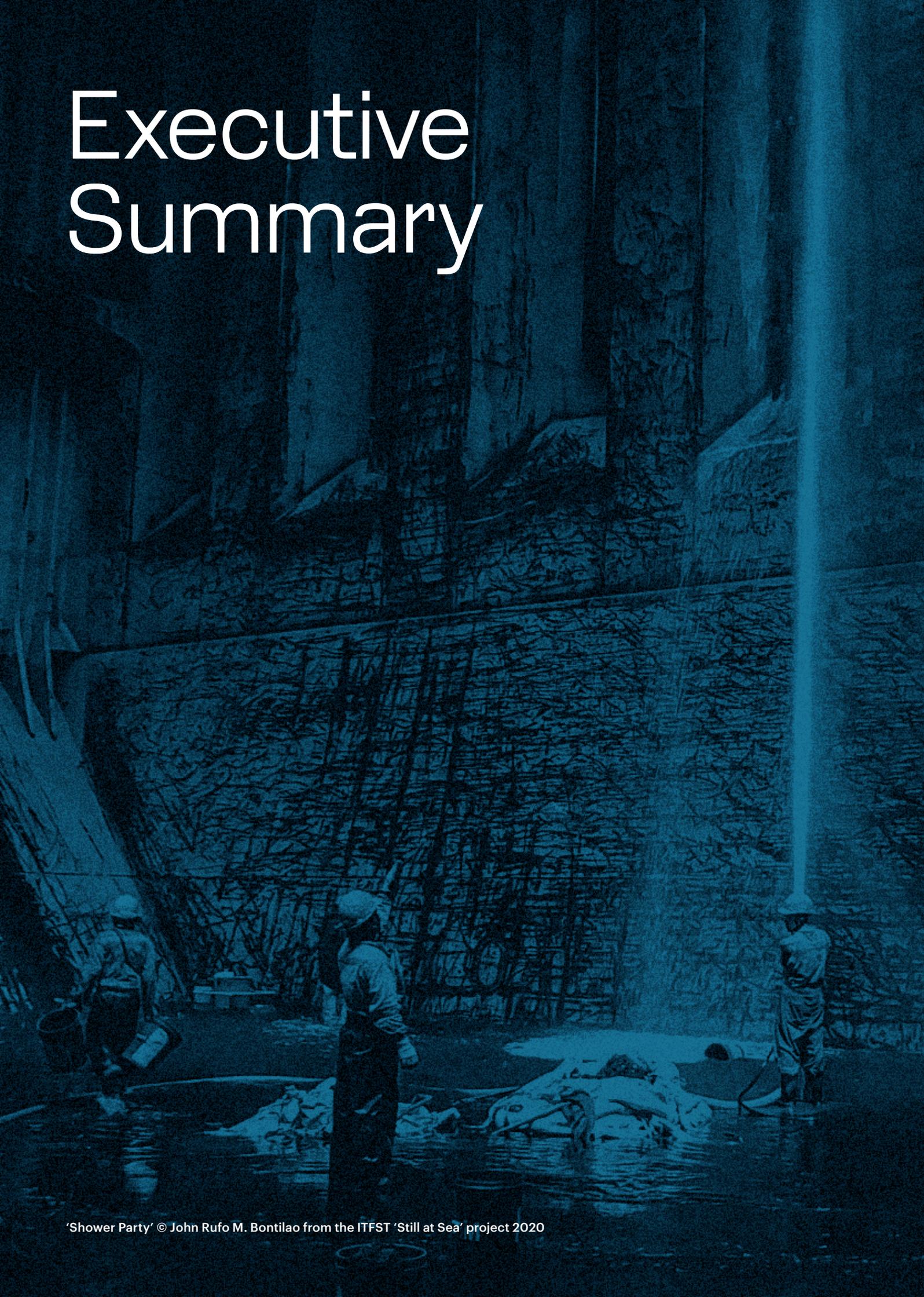
List of Tables

Table 1: Summary of Research Participant Stakeholder Groups	19
Table 2: Summary of results: Fatigue significance per stakeholder group	21
Table 3: Stakeholder response: Who should be penalised?	89

List of Figures

Figure 1: Summary: Fatigue significance	22
Figure 2: Summary: Who should be penalised?	90

Executive Summary



Underreporting of work hours or adjustment of work/rest hour records¹ has been suggested by previous research to be a common practice in the shipping sector.

With this starting point, the World Maritime University has conducted exploratory research into the implementation of the current regulatory and administrative framework on work and rest hours. The associated research activities broadly aimed to achieve the following:

1. Investigate stakeholder perceptions of the capacity of the current international regulatory framework to effectively prevent fatigue;
2. To assess the barriers to effective implementation onboard ships; and
3. To evaluate the level of compliance with the current regulatory regime.

Data collection approaches

This qualitative study made use of semi-structured interviews, focus group discussions and case studies, to gain in-depth appreciation of seafarers' recording practices, and a clear understanding of how different stakeholders deal with implementation, compliance monitoring and enforcement of the relevant provisions of the instruments of the International Labour Organization and International Maritime Organization.

To collect a diversity of views, the research sample used included maritime stakeholders such as seafarers, port State control officers (PSCOs) and representatives from shipowners' organizations, industry organizations, maritime non-governmental organizations, and casualty investigators.

Four (n=4) separate interview instruments were created according to the broad categorization of stakeholders: seafarers, shipping companies, maritime organizations, and port State control officers. In total, seventy-one (n=71) interviews were conducted with eighty-one (n=81) participants.

The interviews were complemented by two (n=2) separate focus group discussions. The first one was held with a group of International Transport Workers' Federation inspectors; the second focus group invited port State control officers and focused on compliance monitoring and enforcement.

Research findings

The clear convergence of empirical data collected confirms existing literature and suggests that recording malpractices are widespread.

On the relevance of the current international regulatory framework to effectively prevent fatigue and mitigate its effects, the research outcomes suggest that there is no scientific basis to ensure the effectiveness thereof. The thresholds of the existing regulations receive stark criticism across the entire range of stakeholders interviewed except for views expressed by a few shipowners' organizations.

¹ To monitor compliance, work/rest hours records are required by flag State legislation implementing the Maritime Labour Convention, 2006 and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended.

The determination of manning levels and their approval have been particularly questioned. The research findings indicate that the detailed principles listed in International Maritime Organization Resolution A.1047(27) for establishing minimum safe manning are not adhered to in most instances. It was apparent that flag States do not always fulfil their responsibilities, nor do they necessarily ensure that shipowners carry out theirs with regards to efficient and sufficient manning of ships. This results in an imbalance between workload and the number of personnel available to complete the diversity of onboard tasks. The analysis made indicates that insufficient safe manning levels are the root cause of violations and recording malpractices. The situation is exacerbated during peak workload conditions such as those experienced in relation to special operations and port-related activities. These findings corroborate previous research.

The effectiveness of recording practices to demonstrate compliance with regulations was widely questioned by research participants and viewed as purely a paper exercise for compliance purposes. Many of the recording software programmes are deemed to be “gamed for success” to ensure compliance with the regulations and “incentivise” crew to adjust their records.

The current research found a “culture of adjustment” among seafarers; work hours are either underreported or work/rest hour records are adjusted to facilitate compliance. As demonstrated in previous research, adjustment of records is found to extend beyond mere work/rest hour records. Participants were of the opinion that any record has the potential to be adjusted, pointing out a number of records that are susceptible to adjustment practices. They include records of planned maintenance, drills, oil record book entries, checklists and risk assessments, and even, official logbook entries.

Various factors are raised as contributing to seafarers adjusting their work/rest hour records. Eighty-five percent (n=17) of seafarers interviewed attribute adjustments to insufficient manning levels, particularly during activities in ports, quick succession of ports (in particular for short-sea shipping), and when their vessel operates (in port or at sea) on the 6 hours on/6 hours off watch system. Other factors indicated as encouraging

[Seafarers] seem unable to prioritise their allegiance: ship interests or regulations. They are trapped in cognitive dissonance, where deviance is normalised.

recording malpractices include fear of sanctions from shore management, especially considering employment insecurities, and consequences of failing third-party inspections. Financial incentives such as bonuses or overtime, meeting key performance indicators, and the nature of recording software were also mentioned as contributing factors resulting in recording malpractices.

For seafarers, the sole objective of recording work/rest hours is to confirm compliance to avoid disruptions to vessel operations and not to confirm actual working time onboard. They seem unable to

prioritise their allegiance: ship interests or regulations. They are trapped in cognitive dissonance, where deviance is normalised.

Most companies seem to neglect seafarers’ feedback about work/rest hours, which signifies that they operate with deficient safety management systems unable to allow circulation of information and proper response to shipboard difficulties.

Systematic adjustment of records indicate that flag States’ surveys and audits are ineffective in verifying the implementation of regulations beyond paperwork, which questions the overall effectiveness of the International Safety Management Code.

Participants also mentioned that the safety management systems often give rise to the bureaucratisation of safety and ship operation, which widens the disconnect between the sharp (ship) and blunt (company) ends.

Although port State control seems to be carried out according to the guidelines on harmonisation of activities and procedures in most instances, the fact is that only two

The participants suggested that inconsistencies in implementation and non-dissuasive enforcement measures of flag and port States create an environment for the normalization of deviance.

items are systematically checked - the watch schedule and the records of work/rest. This reduced scope of initial inspection has been found to be a limitation to effective compliance monitoring and enforcement. Indeed, inspectors reported that they rarely assess the accuracy of records. The extent of the items to be checked on ships, the lack of resources (in time and personnel) and difficulties to find incontrovertibly clear grounds justifying detailed inspections, have been highlighted as the main obstacles.

The participants suggested that inconsistencies in implementation and non-dissuasive enforcement measures of flag and port States create an environment for the normalization

of deviance. This results in widespread recording malpractices and failure by all stakeholders – seafarers, companies, flag and port States - to address the issue despite being recognized by all of them.

Consequently, there is an apparent inability to enforce existing work/rest hour rules which may seriously affect ship safety as well as seafarers' health and safety, cognitive performance, and their retention in shipping.

Finally, the failure to address violations and recording malpractices indicates systemic failures, which may, in the absence of significant reform in both industry and administrative practices, perpetuate, creating a cultural context and practices that will be increasingly detrimental to the shipping industry and international maritime governance.

The way forward: Three core directions

The study reveals three significant shortcomings in the extant situation.

First, the study confirms previous research that insufficient manning levels facilitate non-compliance with rest hours requirements. Subsequently, the adequacy of the current legal framework and associated practices may need to be reviewed to balance workload with manning, safe operations and safety culture on board, including accurate record-keeping. Therefore, it is suggested that:

- Maritime administrations should seek to collaborate on developing a stringent, objective, and research-based model for determining safe manning, allowing full compliance at all times and in all operational conditions.
- The safe manning level for each ship should integrate the diversity of ship operation and be thoroughly justified and documented to establish sufficient manning.
- ILO and IMO should start considering how manning provisions for the safe operation of ships could be developed in order to make them binding in nature.
- ILO and IMO should review the current work/rest hours regulations to align them with the evidence-based research on fatigue.

Second, fully in line with previous research, the study suggests that the ISM Code faces challenges in achieving some of its fundamental objectives, such as full compliance with regulations and effective feedback mechanisms. Therefore, it is advocated that maritime administrations should engage in assessing the effectiveness of, and considering amending, the ISM Code accordingly, as appropriate.

Third, also confirming previous research on ship/shore relationships, the study considers the negative impact of chronic mistrust between shore and ships combined with the job insecurity characteristic of numerous seafarers' working contracts, as triggers of a culture of adjustments to, in particular, records of work/rest hours. Maritime administrations should prevent such a culture by putting in place protection mechanisms that secure seafarers' employment and to promote the concept of just culture.

To a certain extent, all maritime stakeholders seem aware of the existence of a culture of adjustment. This de facto connivance needs to be unlocked to avoid the culture of adjustment becoming uncontrollable and irreversible. Therefore, in the context of work/rest hours, maritime stakeholders should engage in high-level discussions to review comprehensively the existing safety culture and applicable legal framework and identify potential gaps and areas for improvement.

Aware of the obstacles and time necessary to achieve such a significant revision of major IMO and ILO instruments, the report proposes a number of short-term and follow-up recommendations to pave the way forward and set the stage for the necessary paradigmatic shifts.

Short-term recommendations for national regulators and regional organizations²

1. Flag States and port State control (PSC) regimes should recognize the importance of the human element and the detrimental impacts of insufficient rest on ship safety, work performance, and occupational safety and health. Therefore, flag State surveyors and PSCOs should be trained accordingly. Furthermore, inspections should target work/rest hour and ensure records' accuracy.
2. Flag States should review the guidance given to their surveyors and those authorized to act on their behalf, as appropriate, to include systematic verification of work/rest hours records' accuracy. In addition, flag States should ascertain that all relevant personnel are fully cognizant of the appropriate guidance and strictly apply it. Furthermore, national PSC organizations and PSC regimes should amend their guidance and instructions to include systematic verification of the accuracy of records during the initial inspection. The Procedures for PSC (Resolution A.1138(31)) should be amended accordingly.
3. Tailor-made tools to facilitate detection of violations and malpractices in recording work/rest hours are recommended for flag State and port State inspectors. Such tools should be supported by training such as those developed in association with MARPOL Annex I inspections.
4. National PSC organizations and PSC regimes should initiate Concentrated Inspection Campaigns (CICs) focusing on work/rest hour regulations with emphasis on assessing records' accuracy. Before launching such CICs, the PSCOs should be instructed on cross-checking methods.
5. General PSC inspections should be complemented with focused inspections outside CICs. Such focused inspections allowing cross-checking should be randomly launched or determined via targeting using risk assessment frameworks. For example, PSC regimes should modify their targeting system to enhance inspection of work/rest hours on ships operating a two-watch system.
6. Relaying the concerns expressed in Annex 3 of the Resolution A.1047(27) on Principles of Minimum Safe Manning, flag State authorities, national PSC organizations and PSC regimes should amend their guidance to include the presence of a two-watch system as clear grounds immediately prompting detailed inspections, since this watch system is, in practice, incompatible with the provisions on hours of rest set out in the STCW Convention, 1978, as amended, and the MLC, 2006.

2 It is important to recall some practical differences between flag State inspection and port State control. Flag State or Recognized Organization acting on their behalf, carry out surveys and audit ships to certify them. Their inspectors are mandated to thoroughly monitor ships' compliance levels with respect to every instrument ratified/enacted by the flag State. Therefore, flag State inspectors are positioned to conduct multiple and in-depth inspections.

On the other hand, port State control regimes emerged to protect national waters from substandard ships and to compensate for the failures of certain flag States as well as to organize the conduct of inspections regionally. In this context, the PSCO does not certify the ship but verifies its compliance with the international conventions. Usually, a PSCO verifies at once all conventions but do not have time for in-depth verification during the initial inspections. Therefore, in principle, the flag State inspector/surveyor is expected to complete the bulk of inspection tasks with port States simply carrying out verifications of compliance.

7. Flag State surveyors and PSCOs should register adjustments of records as a major non-compliance to specific instruments and evidence of ISM Code non-conformity.
8. At present, PSC inspections' outcomes consider, inter alia: no deficiency, deficiency(ies), requiring inspection in the following port, detention in port, or inspection suspended. In the context of violations of work/rest hours or adjustment of records, PSC regimes should develop innovative responses such as delaying the ship to allow the crew to rest without recording it as a detention. Additionally, PSC regimes should strengthen co-operation with the flag States of ships with related deficiencies, for them to take relevant actions on the safety management system. The relevant flag State could be invited to expand the current reporting mechanism regarding "flag comments" following detention for all deficiencies related to adjustments of records.
9. When conducting ISM external audits, flag State surveyors should not exclusively rely on paperwork. Other forms of data collection, such as confidential interviews with seafarers, should be promoted.
10. During the renewal of the Document of Compliance (in respect of the ISM Code), surveyors should cross-check the information provided in ISM records and investigate the effectiveness of feedback mechanisms.

Short-term recommendations for companies

1. Companies should acknowledge and address any feedback from ships which may be of concern and respond to violations of working time standards or any justified request for additional crew. Besides, companies should regularly assess their ships' manning levels with the crew's input. Finally, non-routine events or situations such as canal/channel crossing or heavy maintenance should immediately trigger pro-active company's response with a manning level increment.
2. Companies should train their shore managers and decision-makers to recognize the importance of human factors and the detrimental effects of fatigue on ship safety and occupational safety and health and show evidence of such training (such as the shore-based training records required by the IMDG Code).
3. Companies should initiate fatigue management programmes incorporating work/rest hours data verification.
4. Companies should establish a genuine link with their crews and strive to incorporate stable employment conditions in seafarer contracts.
5. Companies should promote the concept of a just culture to strengthen their reporting systems.
6. Companies should empower DPAs to, inter alia, initiate substantial change enabling trustful feedback and initiate/support research on the bureaucratization of ship operation and its impacts on safety and working conditions. Internal audit guidance should be adjusted to become an opportunity to assess safety beyond mere paper exercises.
7. Companies should test and implement innovative methods for record-keeping as long as they are ethically acceptable. Good practice in record-keeping should be reported to international trade organizations and other industry stakeholders.

Short-term recommendations for seafarers

1. Campaigns targeting seafarers should urge accurate record-keeping and the reporting of violations of the work/rest hours to companies.
2. Seafarers should be encouraged to use existing reporting procedures such as per ISM Code and the MLC, 2006 complaint procedures to report any violations and malpractices. Where there is a fear of victimization, seafarers should report to any framework allowing sufficient confidentiality and protection such as CHIRP maritime.

Short-term recommendations for international organizations on implementation and enforcement

1. ILO and IMO should initiate discussions on the implementation and enforcement of work/rest hours regulations and related instruments.
2. Considering the concerns about the two-watch system expressed in Annex 3 of the IMO Resolution A.1047(27) and the research on fatigue, IMO member States should consider amending the provision 6.3.2 of Appendix 11 to resolution A.1138(31) on Procedures for Port State Control, 2019 to include the two-watch system as clear grounds prompting detailed inspections.
3. IMO should amend Appendix 11 chapter 6.2 of Resolution A.1138(31) to expand the scope of the initial inspection and allow systematic cross-checking of records.
4. The ILO Guidelines for Flag State Inspections and Port State Control Officers should be revised to include systematic verification of records' accuracy during initial inspections.
5. Resolutions MSC.255(84) and A.1075(28) related to the Casualty Investigation Code should require the systematic assessment of manning levels and report the adjustments of records and particularly those related to work/rest hours. Furthermore, the resolutions should require the evaluation of the effectiveness of the ISM Code beyond its paperwork.
6. ILO and IMO should review tamper-proof monitoring technologies limiting manual input and forging attempts. Ethically acceptable technology guaranteeing seafarers' dignity, and data confidentiality should be identified.

Other short-term recommendations for international organizations

1. Considering that the current 14-hour workday and 10-hour rest (split into two periods) in maritime employment do not align with fatigue research, ILO social partners and IMO member States should re-examine the thresholds included in MLC, 2006 Regulation A2.3 and STCW Section A-VIII/1. Additionally, ILO social partners and IMO member States should discontinue the two-watch system as an acceptable arrangement.

2. The MLC, 2006 Guideline B2.3 should include an explanation of “compensatory rest” as used in Standard 2.3 paragraph 8, and STCW Section A-VIII/1.4 should establish limits to “overriding operational conditions”.
3. The requirement of ILO and IMO instruments related to working time should be strictly aligned.

Further recommendations

1. Regulators, maritime education and training institutions, professional organizations, trade unions, and shipping industry organizations (including P&I Clubs and insurance entities) should initiate and strengthen programmes on human factors for seafarers and shore managers (including DPAs). Among other things, such programmes should create substantive awareness of the importance of maintaining accurate work/rest hour records and seeking, ascertaining and using feedback.
2. The maritime and labour communities should debate using ethical, fair and efficient sanctions or other measures as a last resort to address systematic violations and recording malpractices. Any form of sanctions should additionally focus on those who hold power to determine manning quantity and quality.
3. Further research to assess and identify options to overcome the detrimental impacts of adverse working conditions and victimisation for accurate recording and feedback should be initiated. The mechanisms and practices that engender fear and hinder trustworthy recording as well as impact seafarers’ mental health should be researched and counter-measures proposed and implemented.
4. Long-term contractual agreements and protection of seafarers should become a primary objective and norm in shipping. Mutual engagement is a necessary condition for implementing a just culture and building confidence between seafarers and their companies. Flag States should promote social security measures enabling confidence.
5. Legal practitioners should be encouraged to research the impact of work/rest hour violations and adjustment of records on the concept of seaworthiness.

01

Introduction



Fatigue has a significant potential to impact negatively on ship safety as well as on seafarer occupational safety and health [1],[2],[3]. The 2019 International Maritime Organization (IMO) Guidelines on Fatigue point out that fatigue has cognitive, physical and behavioural aspects that impair seafarers' performance and has long-term negative effects on health.

Despite the many research projects undertaken and industry guidance that is widely available, the issue of fatigue at sea remains a challenge [4], [5]. It seems that the current regulatory framework and its enforcement regime are failing to effectively address the specific problem.

Contemporary seafarers' work and rest hours are detailed in two influential international instruments:

1. Section A-VIII/1 of the Seafarers' Training, Certification and Watchkeeping Code of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as amended. These provisions were updated in 2010 to align them more closely with the relevant International Labour Organization (ILO) requirements.
2. Regulation 2.3 of the Maritime Labour Convention (MLC), 2006, as amended follows the provisions of the Seafarers' Hours of Work and the Manning of Ships Convention, 1996 (No. 180). This Convention was the first instrument to introduce the requirement for seafarers to record their hours of work or rest to monitor compliance.

Accurate record-keeping is required to enable flag State inspectors (FSI) and port State control officers (PSCOs) to assess the actual hours seafarers work, detect violations and enforce appropriate sanctions to prevent recurrence of violations and recording malpractices. Accurate feedback on workload and rest is also needed for continuous improvement of the regulatory framework.

However, several maritime research efforts [6], [7],[8],[9],[10],[11],[12] suggest the existence of widespread adjustment or under-reporting of work/rest hours, which in the long run undermines the effectiveness of the current recording system and affects the implementation of related regulations.

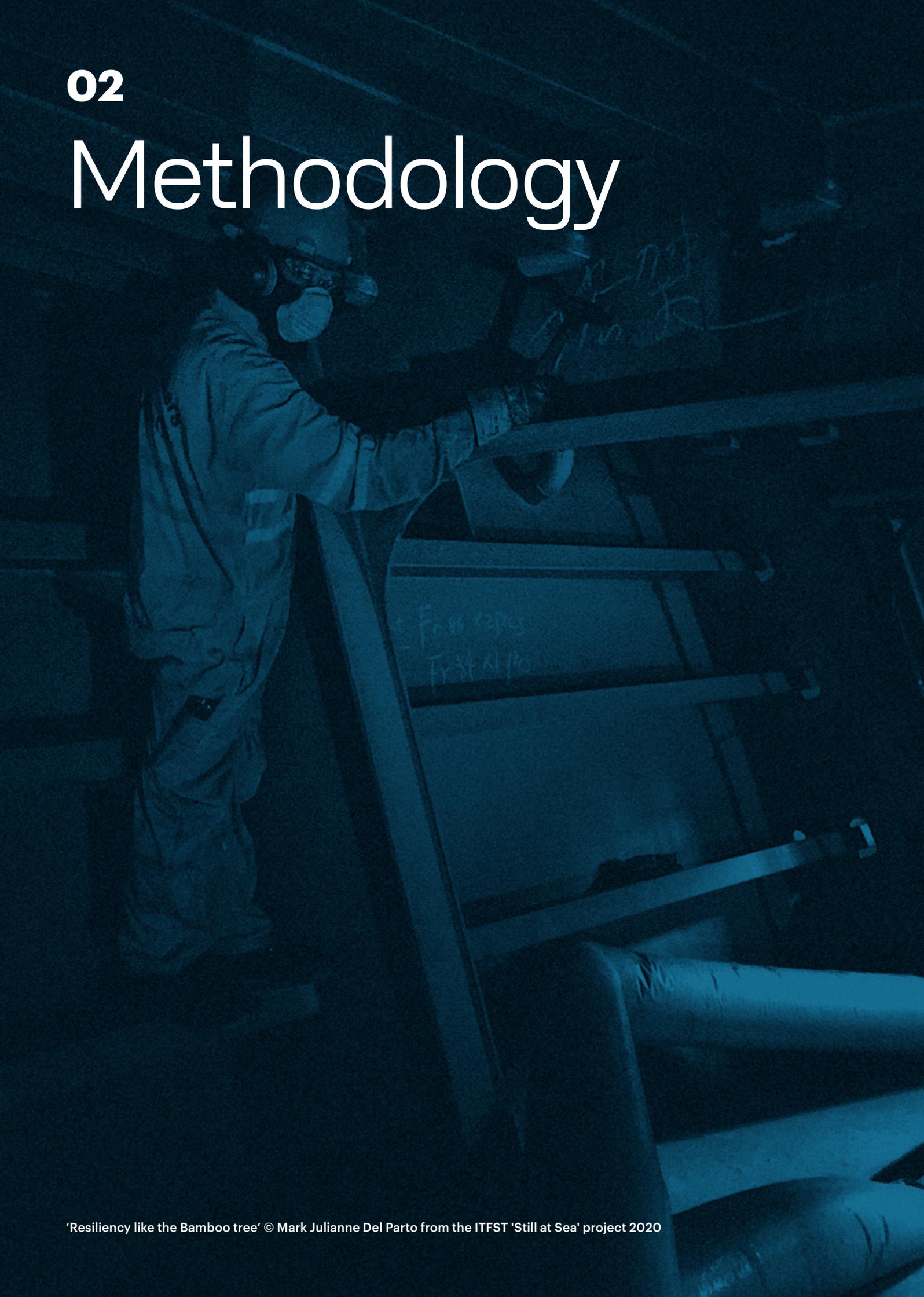
The World Maritime University (WMU) has undertaken an exploratory research project funded by the International Transport Workers' Federation (ITF) Seafarers' Trust, which involves an evaluation of the implementation of the current regulatory framework on rest and work hours.

The associated research activities broadly aimed to achieve the following:

1. Investigate stakeholder perceptions of the capacity of the current international regulatory framework to effectively prevent fatigue and to mitigate its consequences relating to ship safety and security, as well as seafarers' health;
2. To assess the barriers to effective implementation onboard ships; and
3. To evaluate the level of compliance with the current regulatory regime.

02

Methodology



In order to evaluate the implementation of the current maritime regulatory framework on rest and work hours, the study deployed a qualitative approach. This methodological approach was deemed to be best suited for gaining deeper insights into onboard reporting, compliance monitoring, and enforcement practices.

Previous studies concerning fatigue and work and rest hours have mostly focused on gaining the perspective of seafarers through the use of surveys; this method proved to have certain limitations. As Allen et al.[12] indicate, “the figure (number of adjustments) is however almost certainly higher with many seafarers reluctant to admit regulation infringement even in an anonymous questionnaire.” To overcome this barrier, a ship captain conducted the seafarer interviews in this study, as the researchers deemed it a more appropriate method to gain the trust of seafarers. Furthermore, semi-structured interviews with seafarers were conducted using neutral vocabulary; i.e. ‘adjustment’ as opposed to ‘under-reporting’/ ‘forging.’ In addition, the views of broader stakeholder groups were considered, as they represent different interests and diverse approaches to implementation, resource allocation and monitoring to comply with the regulations.

In total, the research team conducted seventy-one (n=71) interviews and two (n=2) focus group discussions.

Semi-structured interviews enabled the researchers to probe participant responses in more detail where relevant, in order to better understand the individual perspectives being presented. The first focus group discussion was held with ITF inspectors to map the extent of the problem with persons conversant with labour inspections, and the second with PSCOs to collect first hand data.

Multi-stakeholder sample

The stakeholders represent six distinct groups. The research team engaged, in addition to seafarers, participants from shipping companies, trade-, industry-, governmental- and non-governmental organizations (NGOs), as well as PSCOs. The research team concentrated much of their research efforts on seafarers and PSCOs as the first group records while the second verifies.

Throughout the report, quotations from participants will be indicated in italic font and are quoted verbatim. For readability and clarity purposes, some quotations have been adjusted without altering their substance. Following each of the quotations will be an indication of the stakeholder group the respective participant represents.

Table 1 presents a breakdown of the stakeholder groups that participated in the study. Additional details about the research methodology are available in Appendix 1.

Table 1: Summary of Research Participant Stakeholder Groups

Stakeholder group	Number (n) of interviews	Research contribution and justification for inclusion
Seafarers	n=20 consisting of: seven (n=7) masters, two (n=2) chief engineers, four (n=4) chief officers, four (n=4) second officers, two (n=2) third officers and one (n=1) third engineer.	Deck and engineer officers with experience of implementing and recording work/rest hours as required under MLC, 2006 as amended and STCW, 1978 as amended.
Shipowner organizations	n=8	Shipowners, ship management companies, shipowner associations and trade organizations. The latter two groups have consultative status at the IMO.
Industry organizations	n=7	Private individuals and companies as well as public enterprises and international associations, some with consultative status at IMO.
NGOs	n=10	NGOs that represent marine professionals and seafarers, some of which have consultative status at IMO.
Special government organizations	n=5	International organizations and national maritime accident investigation boards.
PSCOs	n=21	PSCOs representing sixteen different countries (n=16) and nine (n=9) different port State control (PSC) inspection regimes .

03

Adequacy of Regulations

3.1 Perception of the significance of fatigue

The various groups of stakeholders differ in their perception of the significance of fatigue.

During the interviews, non-seafarer participants were asked to rate the significance of fatigue at sea, on a scale of 0 to 10; zero (0) meaning there is no fatigue problem, and ten (10) that fatigue is a very serious problem. Shipowner organizations had the lowest average rating of 6.6, whilst NGOs and special governmental organizations deemed it most serious at 8.8 and 8.4 respectively. The combined average rating of the significance of fatigue, as perceived by the responding non-seafarer stakeholder groups, is 8.

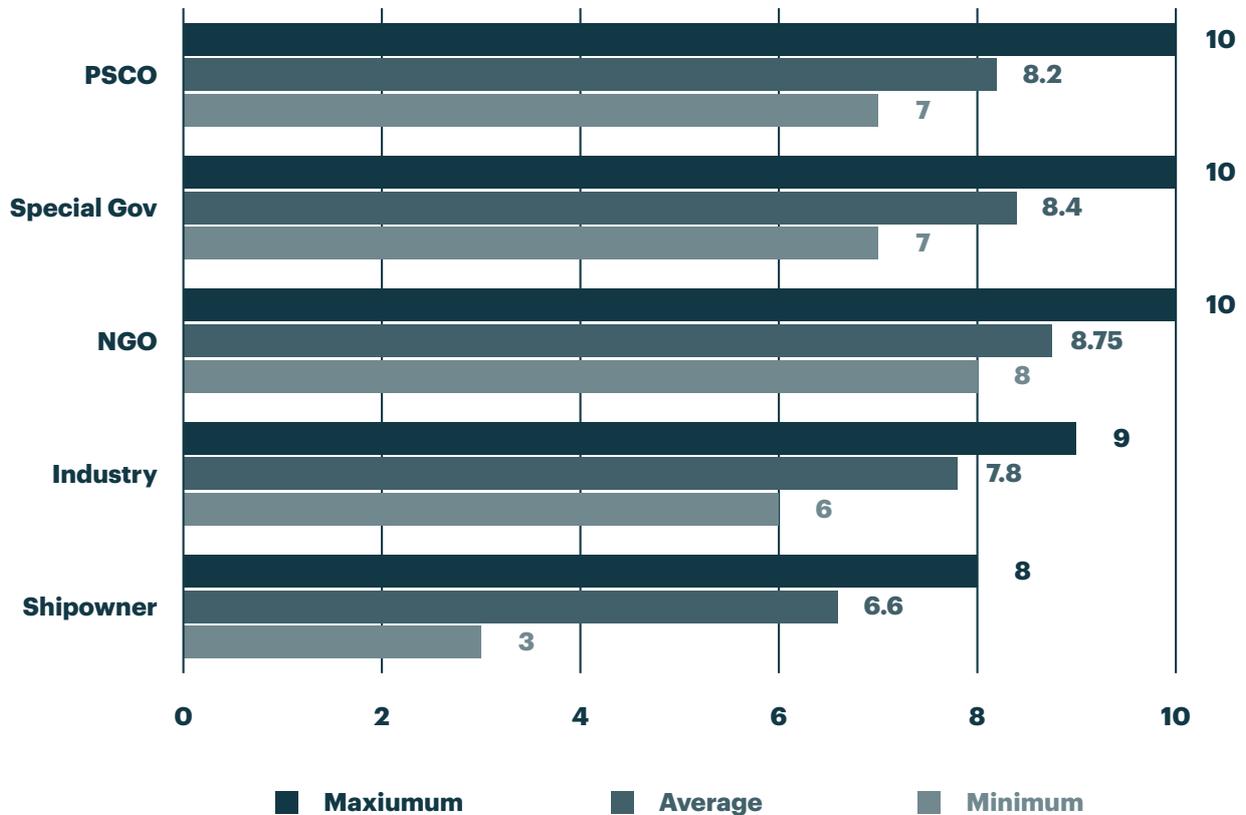
The ratings/results per stakeholder group are presented in summary form in Table 2 (descriptive statistics) and Figure 1 provides an illustration of same.

Table 2: Summary of results: Fatigue significance per stakeholder group

	Shipowner Organizations	Industry Organizations	NGOs	Special Government Organizations	PSCOs
Mean	6,6	7,8	7,1	8,4	8,2
Trimmed mean	6,6	7,8	8,8	8,4	8,2
Minimum	3	6	8	7	7,0
Maximum	8	9	10	10	10,0
Range	5	3	2	3	3
Median	7,5	8	8	8	8,0
Mode	8	8	8	8	8
Standard Deviation	1,7	1,1	1,0	1,1	1,2

Note: The descriptive statistics related to NGOs are based on a trimmed mean. See footnote 4.

Figure 1: Summary – Fatigue significance



3.2 Intricacies of determining manning levels and hours of work

The first ILO Convention dealing with working time at sea - the Hours of Work and Manning (Sea) Convention, 1936 (No.57) - associated hours of work with manning levels because a seafarer’s individual workload directly depends on the work distribution between a fixed number of crew members available on a ship. Accordingly, the workload of any individual seafarer tends to increase as total crew numbers are reduced. The impetus for such reduction in crew arise from the desire for increased cost savings on the part of shipowners as well as increased competition among flag States for gaining shipping tonnage (which leads to increased tax revenue for the flag States). Continuing expansion in seaborne trade continues to drive this competition among flag States to satisfy shipowner desire for low manning scales.

This situation, which directly leads to increased workload and fatigue, is exacerbated by an industry context and stakeholder balance that reduces crew capacity to bargain in respect of numbers of crew members and their own workloads, with serious implications for fatigue and the safety of vessel operations [13], [14],[15].

In the commercially competitive environment characteristic of the 20th and 21st centuries, shipowners tend to intensify the tempo of operations and quite often seek to reduce crew expenses.

In the commercially competitive environment characteristic of the 20th and 21st centuries, shipowners tend to intensify the tempo of operations and quite often seek to reduce crew expenses. Consequently, individual seafarer workload can increase significantly through the multiplication of tasks/activities in tandem with crew reduction. The technological promise has not necessarily compensated for this increase in workload because its primary objectives are to enhance speed of operations and productivity and to justify additional manning reduction. On the contrary, in some cases, the steep learning curves associated with using some new technology,

has increased the mental workload of seafarers both on and off the ship, the latter with respect to training during leave periods.

Furthermore, regulatory “inflation” motivated by safety, security and environmental protection has been associated with an increase in the administrative workload on board [5],[16],[17],[18],[19]. The combined effect of a reduced number of crew members and an increase in workload stresses crew capacities to the limit, which may lead to violations in the work/rest hour requirements, under-reporting and/or the adjustment of records compromising the health and welfare of seafarers as well as the safety of the ship.

The persistence of unrealistic manning levels forcing seafarers to work excessive hours has been highlighted by research, papers submitted to IMO [20], casualty investigation reports (e.g. Exxon Valdez [21], El Faro [22]) and the like. This imbalance between workload and manning was unanimously highlighted by the participants of this research including shipowner representatives:

"I mean in my opinion it is, the safe manning on board ships is in my opinion not enough; it is the number of persons on board. Because in the past, crews used to be quite big. But right now, they are very limited. I think that is the most crucial aspect, that people are simply overloaded with tasks." [Industry Organization_Orgz2]

"Yes; as PSCO it was obvious that the number of persons onboard was not enough to be able to comply considering the work schedule." [Special Government Organization_Orgz5]

"The biggest challenges, I think the analysis that needs to be made is, 'can the job be done with the number of people that they have onboard?'" [NGO_Orgz14]

"And also, it works the other way as well, if the master feels that he doesn't have the people to do the job without adjusting the records then he should be honest enough to go up trying to say, "Look we need another, we need another AB or whatever it is." [Shipowner Organization_Orgz7(e)]

Shortcomings in determination of manning levels

While shipowners propose manning levels, there is a requirement in international law for flag States to be held ultimately responsible for the level of manning (see for example, United Nations Convention for the Law of the Sea (UNCLOS) Article 94, International Convention for the Safety of Life at Sea, 1974 (SOLAS) Chapter V, Regulation 14 and Principles of minimum safe manning³. Owners are responsible for guaranteeing that the minimum safe manning is sufficient at all times and in all respects, including meeting peak workload situations, conditions and requirements [1].

As suggested by the participants, the lack of prescriptive quantification in manning levels and the flag States' desire to attract additional tonnage creates a context where the lowest possible levels of manning translate into a major comparative advantage commercially:

"[...] I worked for various flag States.... The procedure is like that: when you register the vessel, the company – the owner applies for the minimum safe manning document and declares that such number of people is enough for the vessel. And flag State is obliged to verify this information, but in most cases – they simply agree for suggestion from the owner [chuckles]." [PSCO_9]

"I was in [European country name] Administration more than 10 years ago; I was someone who give acceptance of safe manning. So, you decide something, and in few minutes when you say 'No', you have the company, union, administration over you - '...but we already accepted one month ago, or one year ago something like that; why you say no?' 'Because it's not possible' 'But...'; if you say 'No' it would be a problem, you would be attacked by the justice. 'Ah, ok' So, I write, 'Yes, but you can't navigate by night' – something like that, ok. And in the end, you accept something you didn't want to accept in the beginning - and I am in [European country name] [chuckles]." [Special Government Organization_Orgz21]

3.3 Regulation thresholds

In 1919, the very first ILO Convention on hours of work⁴ adopted the eight-hour workday and 48-hour workweek principles. These standards have been appreciated as "the legal standard closest to the point beyond which regular work becomes unhealthy, which is identified in the health literature as 50 hours [23]."

From 1936 to 1958, the ILO adopted Conventions to regulate hours of work in maritime using the 8-hour workday yard stick (C057⁵; C047⁶; C076⁷; C093⁸; C109⁹). However, none of these instruments entered into force.

³ Resolution A.1047(27)

⁴ C001 – Hours of Work (Industry) Convention, 1936 (No. 001).

When the 1995 conference revising the STCW Convention introduced the notion of minimum hours of rest, the strict quantification of seafarers' work periods through IMO legal instruments began. These 1995 revisions to the STCW Convention (which entered into force in 1997) required a minimum of 10 hours of rest per day meaning the possibility of 14 hours of work per day.

On a weekly basis, the current standard permits seafarers to work up to 91 hours or, under certain circumstances described in STCW Code A-VIII/1, up to 98-hours.

Subsequently, ILO Convention 180 and the MLC, 2006, included hours of rest to complement the prior ILO focus on hours of work standards.

Since the STCW 78 as amended, the reference standard for seafarers, limits working time to a 14-hour workday as compared to an 8-hour workday for shore-based workers [24]. The seafarer standard limit is almost double the number of hours set as a limit for shore-based workers. On a weekly basis, the current standard permits seafarers to work up to 91 hours or, under certain circumstances described in STCW Code A-VIII/1, up to 98-hours.

This later standard attracted bitter comments from a participant who was part of the 2010 STCW Conference in Manila:

"[...] what we did was we then took the ILO 180, we put it in the Maritime Labour Convention, and they all come away from Geneva with a little piece of paper like Neville Chamberlain from Munich; like little Chamberlain from Munich, right? And then the very same shipowners go down to the building down here [IMO] and undermine everything that has been done with the MLC, everything – by shifting the goalposts. And shifting it quite substantially. [...] I was there in Manila, we ended up there with what was known as the Norwegian exception¹⁰, right? Where actually it is permitted for a 2-week period the working of a 98-hour working week – 14 hours per day. So, everything that was done at the MLC, was on the mat. But also, the MLC allowed the social partners to delegate. Now, some social partners delegate more than others; they'll agree to anything." [NGO_Orgz4(c)]

It is worth recalling that these daily and weekly parameters were meant as the absolute maximum limits because "[...] normal working hours' standard for seafarers, like that for other workers, shall be based on an eight-hour day with one day of rest per week and rest on public holidays" (MLC, 2006, Regulation 2.3, paragraph 3). However, their very existence appears to have normalised them and implicitly imposed the 14-hour workday [20] standard in shipping.

5 C057 – Hours of Work and Manning (Sea) Convention, 1936 (No. 57).

6 C047 – Forty-Hour Week Convention, 1935 (No. 47).

7 C076 – Wages, Hours of Work and Manning (Sea) Convention, 1946 (No. 76).

8 C093 – Wages, Hours of Work and Manning (Sea) Convention (Revised), 1949 (No. 93).

9 C109 – Wages, hours of Work and Manning (Sea) Convention (Revised), 1958 (No. 109).

10 STCW Section VIII/1 Paragraph 9: Parties may allow exceptions from the required hours of rest in paragraphs 2.2 and 3 above provided that the rest period is not less than 70 hours in any 7-day period.

Exceptions from the weekly rest period provided for in paragraph 2.2 shall not be allowed for more than two consecutive weeks. The intervals between two periods of exceptions on board shall not be less than twice the duration of the exception.

The hours of rest provided for in paragraph 2.1 may be divided into no more than three periods, one of which shall be at least 6 hours in length, and neither of the other two periods shall be less than one hour in length. The intervals between consecutive periods of rest shall not exceed 14 hours. Exceptions shall not extend beyond two 24-hour periods in any 7-day period.

Exceptions shall, as far as possible, take into account the guidance regarding prevention of fatigue in section B-VIII/1.

Such a substantial deviation from the hundred-year-old 8-hour workday standard questions the capacity of the current international legal regime to address the safety, health and wellbeing of seafarers as illustrated both in literature [7], [9], [10], [25],[26],[27],[28],[29],[30],[31] and by research participants. It is not surprising then that industry organizations and NGOs put forward comments like the following:

"Again, that [current work/rest regulations] should be kicked into touch [laughing]. It's not based on any scientific evidence; it's a social agreement between Parties at IMO – it has nothing to do with human physiology. [...] So, it's a useless instrument really – if I have to be that black and white about it. Who does it help?" [Industry Organization_Orgz11]

"But I still maintain that demanding that many hours working from people on a week on, week on, week on basis, is too much. I think they've got to lighten up on the hours, they have got to make it less. You know, no other industry would be allowed to get away with it, anywhere. And the maritime industry is one of the most dangerous industries in the world, and yet we run the most dangerous working hour regime." [NGO_Orgz6(a)]

"That was a smokescreen; prior to Manila, because I was there at the intersessional¹¹, and I was there in Manila. It was a smokescreen, to take away from the fact that working 91 - and they wanted 98 hours a week - was not safe. It was a distraction. In naval terms it was a 'chaff for distraction', and that's what it was. The scientific evidence will tell you working 91 and 98 hours a week is not safe, not safe at all." [NGO_Orgz4(c)]

The combined effect of working excessive hours and various other risk factors can lead to the increased likelihood of fatigue [2] and contribute to its negative impact. Particularly concerning is the issue of the 6 hours on/6 hours off watch system [7],[10],[25],[32],[33],[34], [35],[36],[37],[38],[39].

3.4 Six hours on six hours off watchkeeping schedules

Following recent research reports, IMO Member States and NGOs with consultative status at IMO debated the inherent risks of the 6 hours on/6 hours off watchkeeping system and its inability to allow sufficient rest for watchkeepers [33],[34],[40],[41],[42],[43].

Proposals to prohibit the two-watch arrangement were discussed but rejected. It seemed that the preservation of outdated practices and a myopic focus on economic gains prevail

¹¹ Intersessional meeting of the STW Working Group, 2009. See STW/ISWG 2/8

over seafarers' health, ship safety and environmental protection. One respondent representing a shipowner organization summarises this point as follows:

"If you are able to go 6/6 as you are, then that needs adjusting because that is not healthy or safe – that's just the way of cutting costs. No human being can live a healthy life like that." [Shipowner Organization_Comp1(b)]

It is also interesting to note that another participant representing shipowners highlights that the current limits are acceptable because the maximum number of hours allowing 6 hours on/6 hours off result from free negotiations in international organizations and at a national level between social partners:

"The 'Manila exceptions [allowing up to 98-hour workweek]' are only possible if you have a Collective Bargaining Agreement that allows it under MLC, and everyone understands that..." [Shipowner Organization_Org7(c)]

On the other hand, an NGO representative is of the view that the power (im)balance favourable to ship-owning nations hinders the abolishment of 6 hours on/6 hours off system:

"And we have tried for maybe ten years to try and stop 6/6 at IMO; so, we have done it many times. I think we've had three or four submissions and every time it gets thrown out because there are no flag States that want to fight that battle; there are a lot of flag States that won't allow it in their own flag, but they won't go up against the other flags who want to do that." [NGO_Org3]

Whatever the legal debates, numerous participants including those from Governments, note the impacts of such 6 hours on/6 hours off schedules on ship safety and fatigue of seafarers:

"I'll point you towards some reports that we've produced – this is [in] the [casualty investigation] website [...]. Because we saw 6 on/6 off as the biggest risk – continuous 6 on/6 off watchkeeping is the biggest risk to accidents involving fatigue. [...] So, our recommendation was that [country name] take to the IMO a proposal that all ships should have a minimum of three watchkeepers; bridge watchkeepers – so, it could be the master and two, or whatever. But two watchkeepers only, is a recipe for disaster in our view." [Special Government Organization_Org20]

"From a cognitive perspective and sleepiness, it will – that's indefinite. When we talk to these sleep Professors at the University Hospital of [country name], they say, 'If you go 6 on/6 off', they have no doubt in their mind – 'you will fall asleep at some point.' Because it takes you 45 minutes to fall asleep to deep sleep, and that's if you do that right away. So, you get a maximum of 3 to 4 hours, and that would not be enough; it would accumulate." [Special Government Organization_Org18]

The two-watch system does not only lead to fatigue, it also undermines physiological and psychological needs of workers as reported by seafarers:

"What does it mean if it considers that you have a real rest of 6 hours, you can survive? The 6 hours of rest should be 6 hours of sleep, that is the real rest. But in reality, when you finish your watch in a port with 6 on/6 off, you just can't go and sleep. You are human, you have to eat something. It takes some time. [...] In best situation, you need to eat, have a shower. You sleep and you have to wake up at least half an hour early. You have to be 15 minutes earlier before taking over the watch, so I mean you don't effectively get 6 hours of rest. So effectively is very less number of hours that we actually sleep. It's not a rest. It's the time that you don't work." [3/Officer_2]

"Like people are busy with 6 on/6 off and then most of them do their duties, so they have rare chance to go ashore to enjoy their life... I don't remember when I've been ashore." [C/Officer_2]

Considering the magnitude and diversity of activities on ships, watchkeepers do not restrict their work to the strict watchkeeping schedule, switching on and off like automatons from full work mode to full sleep mode every 6 hours. They engage in other tasks which may never be reported in order to avoid recording violations:

"Normal working days there's no problem. But if there's any cargo operation we are doing, 6 on/6 off this become a problem. Because during normal days, we are doing 4 on/8 off and 2 hours overtime then there is no problem, but 6 on/6 off and then I have to spend extra time to do the route plan on the bridge. After 6 hours cargo watch, I have to get the passage plan ready before the ship sailing. So, this is extra time and I cannot record every time. I have to indicate that extra time as rest hours otherwise there will be a violation." [2/Officer_3]

Despite not solving the fatigue resulting from long hours of work, some companies suggest working 7 hours on/5 hours off schedules to facilitate compliance and avoid risks of violations:

"So, that helps and sometimes the crew are not really aware of the rules of the work/rest hours, so that is another challenge. So, we need to tell them that you need to actually keep your watches 7, 5, 7, 5 rather than 6 on/6off to actually meet the work/rest hours and at the same time do a proper pre-planning with the master and chief engineer, and look at what we call sim-ops – simultaneous operations and see what is less priority – take that away." [Shipowner Organization_Comp4]

However, another participant did not agree with such a simplistic approach to resolving fatigue issues:

"One thing that was suggested in our company was that instead of working 6/6, work 7/5. Because with 7/5 you comply, because you have one 6-hour period in 24. However, that doesn't really cure the problem of fatigue. But people will bow to that and I have had people say to me, 'Why don't you work 7/5?' And I'll say to them, 'No, I won't do it, it is just you trying to cover up the real reason.'" [NGO_Orgz6(b)]

3.5 Summary

The initial observation is that it is debatable among participants whether the current regulatory framework is fit for purpose in terms of determining manning levels that ensure vessels are sufficiently and efficiently manned. The reason behind this notion is as follows: excessive working hours are facilitated by the regulations currently in place, which in their letter allow for extreme practices such as the 6 hours on/6 hours off arrangements and has led to a normalization of deviance in the standard references for hours of work and rest. The result has been that crew onboard are not guaranteed the scientifically-verified amount of rest needed to function properly as humans and to be fit for duty in an extremely high-risk environment.

04

Recording of work/rest hours

4.1 Onboard recording practices

The requirements of maintaining work/rest hour records are established in both the MLC, 2006 and the STCW Code A-VIII/1. Companies typically require seafarers to comply with the obligation through procedures inserted in their Safety Management Systems (SMS).

However, the research shows that the recording practice of seafarers, particularly in relation to the frequency of updating the records, sometimes differs from company requirements. Participants had the following to say:

"Ideally, they are supposed to update it daily online [software solution name], but not everybody does that – we have a challenge with that." [Shipowner Organization_Comp4]

"It depends on the job. If I have time, I will do it in one week. If I don't have time, then after 20 days or one month. It basically depends how busy we are. Not every day we can do this, it's like a waste of time. [...]" [Captain_6]

In addition to irregular record-keeping, participants highlighted that in many cases the records are not completed by individual seafarers but by an appointed crew member as reported below:

"[...] we don't get time to do all these things [record-keeping of hours] because we know that this, these things are not really effective and not of any use....so these records are being filled by cadet and then I had checked it at the end of the week before we sent the information or the file to the office..." [C/Officer_2]

Additionally, the input by research participants reveal that senior officers often record or clean up records of others to ensure compliance on paper. Some of the participants' recollections include:

"But I've also come across ships and examples where the chief officer actually writes the rest hours of the crew member and sometimes it does not go; it is not exactly true. Because he must have worked a little more than what was actually reported, but then they come to an agreement and say, 'This is what we do because of regulations and to avoid violations and things' and then it is done." [Shipowner Organization_Orgz1]

"One time [...] we had an emergency and I violated my rest hours. I filled in company's software as it was [explanations included]. At the end of the month he [the Master] changed [the record] so there was no violation. I do not know if he had done [the same for] other crew members. I have a talk with him and afterwards he didn't do it [adjusting records] anymore." [C/Engineer_2]

Shipowners and seafarers also recognize the existence of such practices, as well as PSCOs, who raised the following issues:

"So, there was a practice earlier that crew would write it on a piece of paper and every week they'll show it to the chief officer, and he will input that in the computer. So, if he sees something 'RED' [violations indicated by the software], he will adjust it." [PSCO_16]

"[...] because as I know for a long time either they just only fill up – an officer fills up only online, without the awareness of the crew." [PSCO_20]

Pointless paperwork

By not updating records as required and by adjusting them in certain situation, seafarers indicate little consideration/regard for this type of recording operation. The record-keeping itself may be seen as a time consuming and purposeless/pointless paper exercise, since the accuracy and effectiveness of using this reporting tool as a compliance mechanism to mitigate fatigue is widely questioned by various stakeholders. Participants shared their views:

"It's a nonsense; if they're tired, they are tired – do something about it. Don't just expect them to record how many hours they've worked." [Industry Organization_Orgz11]

"We went onboard on small coasters with the two navigators onboard only, and the rest of the crew of course, and made some unofficial inquiry of how they do this [...] We explained for them, 'This is just an unofficial, little inquiry and we will not use it towards you; we will not mention any names and ships and so on – but could you please just answer our questions, if you care for that.' And I think almost everyone did, and they were very frank, 'Yes, we do keep one record for the PSCO, and we work another record.'" [Special Government Organization_Orgz19]

"Yes. There are two different records - rest hours for official purpose and overtime sheet for payment of overtime which has to be actual. These things are happening." [Captain_5]

"Because until MARTHA project, it was all anecdotal; people were saying, 'Oh, well yes, you say so, but do you have statistics on that?' 'Yes, we do.' Yes, we have shown them; yes, we have a problem with reporting and adjusting reports, because we have proven it." [Industry Organization_Orgz12]

It is noteworthy that the recording exercise itself, in its current form, tends to add to the administrative workload of the crew, particularly when recording is allowed to accumulate to the end of a week or month and depending on the recording method used.

4.2 How are work/rest hours recorded?

Companies use different methods for recording work/rest hours. Manual inputs on paper or software dominate. The recording method seems to influence the frequency and attitude toward recording and planning the work/rest hours as some software include such functionalities. One seafarer shared his/her experience as follows:

"It is a computer-based software. You can fix and pre-program normal duty hours if you don't want to [record] every day. But when there is some change, you are going out; away of your normal schedule, then you have to modify accordingly. Otherwise, if you are doing normal watchkeeping duties as pre-programmed hours that you don't need to do anything; it will update automatically in the system." [Captain_1]

Engineered record-keeping to facilitate adjustments

In particular instances, the design capabilities of software programmes spotlight violations:

"It indicates the violation; it is approved software and it checks if you are complying with STCW Convention." [3/Officer_2]

This functionality seems to, unfortunately, incentivise seafarers to adjust their work/rest hours to ensure conformity with regulations. One of the seafarers had the following to say:

"Software indicates the violations. When we try to put the actual hours for example during bunkering, then it will show 'RED' [indication violation]." [3/Engineer_1]

The colour (red) warnings of entries indicating violations seem to influence seafarers towards giving "good answers" based on false entries. The ease of eliminating the violations indicated in the software – not by ensuring the rest needed – but by adjusting entries with just a few clicks, further encourage this behaviour. Seafarers shared their experiences in this regard:

"I have to adjust a little bit sometimes... Basically, I don't like any 'RED' colour [indicating violations] in my record. [...] Sometimes I adjust myself, because I just don't like to bring trouble. I feel like I'm asking for trouble. Sometimes it is the concept that the crew members are having. Sometimes we just don't want to make any trouble.... So, I just make all 'GREEN' colour [indicating no violations]." [2/Officer_4]

Some software, however, indicate when an adjustment has been made.

"If you do that assessment you will [be] able to see in the [software name], you have done [adjustment] so many times at certain times, the colour will change to BLUE, GREEN and RED and BLUE. And then if this is not normal, then it will be RED [indicating violations]. If you have made adjustments it will be BLUE." [Captain_1]

It is noteworthy that, even where this is the case, it is not possible to determine whether an adjustment is inherently fraudulent or arises from a genuine entry error.

Other functionalities or software settings also facilitate the erasing of certain violations when associated with ill-defined factors such as ‘overriding operation conditions’ (STCW) or ‘emergency’ or ‘compensatory rest’. Such factors, being highly subjective, can be invoked to eliminate otherwise legitimate indications of violations. One accident investigator elaborated on this point:

“So, for example, if we are maintaining a seawater pump in the engine room, ‘Well, that is certainly an emergency matter, because if you don’t have that we cannot go anywhere’, or ‘We cannot operate the fire hydrant.’ So, everything is a matter of emergency on a ship. So, that category we would often see as prevalent as an excuse for why; and then they close the programme.” [Special Government Organization_Orgz18]

When establishing electronic reporting systems, the companies allowed the possibility to remotely check the records and query the entries when deemed necessary. Consequently, each seafarer feels that the shipmaster or his/her delegate or the company can scrutinize, adjust, and sanction inappropriate inputs, as highlighted, by some respondents.

“Yes, actually in our company, we have to replicate the rest hours record every week to the office, so they get the data. And if there is any non-compliance they usually come back with the question – ‘Why there is a non-compliance and give us the reason.’ In order not to get such messages from the company the adjustments [are] being made on the ship to the rest hours record of all the crew.” [2/Officer_2]

“The pressure from the company. I was saying the fear of not complying with the regulation and complying with the company. Every seafarer has a fear of losing berth. If the company does not call you to come back for another contract, you are going to struggle. So, if the policies say that you should sign up for 10 or 8 hours of rest, then you should sign up for that.” [3/Officer_1]

Additionally, software administrators such as senior officers and the company’s shore-based management can easily monitor and independently (and in an exercise of perceived/purported authority) adjust records to advance their own agenda. Such possibilities detract from the effectiveness of the record-keeping requirements and compromise the reasons for which they are set up. It also frustrates seafarers’ will to report actual figures because it implicitly denies them the possibilities and even the right to give accurate feedback on their workload. One seafarer offered the following solution:

“Software improvement, to limit the super user’s rights to change other users’ records; to record the history whenever there is a change of record - when, who, why the record is changed?” [2/Officer_4]

This solution can only be considered as a first step in an environment that supports free and accurate reporting. However, the culture of implicit intimidation that is sometimes perceived to be present in certain organizations means that seafarers may still, themselves, falsify records so as to be in the ‘good books’ of the company, particularly with regards to future employment.

One of the participants referred to some software as being ‘gamed for success’. [Special

Government Organization_Orgz18]. Industry stakeholders support this sentiment, as highlighted by some:

"[...] the really crazy thing also is that some of the tools they use to report these things won't allow them to actually report the truth. So, if you had a 12-hour shift and you say, 'Well actually I worked 13 hours', it comes out with an error message. So, everything is geared towards upholding this lie." [Industry Organization_Orgz9(a)]

"[...] some shipping companies have elaborate computer programmes where it calculates by itself [and] where [...] you cannot [...] save and close the application unless it is in compliance." [Special Government Organization_Orgz18]

[...] the system of recording work/rest hours has, in some cases, been engineered to allow deviance and paper compliance.

Therefore, it seems that the system of recording work/rest hours has, in some cases, been engineered to allow deviance and paper compliance. Consequently, the verifiers face a challenging situation of perfectly cleaned records because the software facilitates fictitious accounts of seafarers' work and rest and in the extreme denies them the possibility of entering accurate data.

Alternative solutions to manual inputs

To address the issue of wrong entries, two participants highlight the availability of magnetic cards on some ships.

"[...], but I think that maybe it isn't only the problem of adjustment but recording 'not true figures' from the beginning." [Industry Organization_Orgz2]

Such cards automate the inputs but the software collecting the data remains open and thus may be subject to further manipulations.

"You went to the bridge and next to the bridge there was a screen that you scanned your crew card on, and you clocked in before work and then you clocked out, and if you went to the forecandle you clocked that. And you couldn't change your hours of rest, only your manager could." [Shipowner Organization_Orgz7(d)]

Considering the limitations of existing record-keeping methods, respondents clearly demand changes in monitoring systems. Real-time input and high-tech tools were recommended to safeguard records against manipulations, as highlighted by one participant:

"We need better tools. [...] I would think more real-time recording and there should be a very clear idea – so you know that you are going to violate the port arrival when you reach there because you have a 10-hour pilotage. How are you planning for that, who is going to sleep and those kinds of things?" [NGO_Orgz4(d)]

Of course, this raises questions of privacy and whether it is ethically appropriate to track every movement of seafarers on board ships. In most cases this may not be acceptable for workers ashore. A secure solution, which is ethically acceptable, has not yet been identified despite the push for high-tech options as has been proposed by one of the participants:

"I think the answer to that is digitalisation." [Shipowner Organization_Orgz1]

Addressing what is fundamentally a social issue with advances in technology is debatable at best and may be argued to be wholly inappropriate at worst.

4.3 Onboard compliance challenges

All respondents recognise that meeting the legal requirements for working time is an on-going challenge. Paukstat [36] and subsequently Shan and Neis [39] refer to reduced manning levels on vessels engaged on short-sea shipping as significant in limiting seafarers' hours of rest, particularly when one considers the prolonged working hours and interrupted break periods which arise when transiting locks, and during manoeuvring and port operations. Workload, especially in port and related to other special operations, as well as administrative burdens were mentioned by participants as a barrier to complying with the work/rest hour regime. One such example by a PSCO follows:

"Because the burden, the workload. Because today the ship calling is very fast and then they just have 2 hours and then after that operation finish and they need to sail again. So, they don't have the time to rest properly. And I see also now when they're passing, they're busy sailing, they need to maintain the lookout. So, that's very tense." [PSCO_1]

The current balance between manning levels and workload (especially with the on-going expansion of administrative duties) seriously puts in question the possibility of compliance, as particularly highlighted by one of the seafarers:

"Practically, compliance with rest hour requirements has become the seafarer's worst nightmare these days. Not only you need to comply with the requirements, but you also need to prove it to the authorities. [...] implementing work/rest hour requirements becomes a very difficult task onboard - keeping in the view the shipboard operations; as the same set of crew is expected to perform multiple tasks." [Captain_7]

Contributors to high workload and peaks

The crew size tends to shrink while the workload increases and the diversity of activities expand (navigation, maintenance and repair, cargo operation, safety and security duties, environmental protection requirements, pre-arrival and departure duties, administrative duties, etc.). The lack of resources to complete multiple tasks increase individual stress levels and overall risks for the ship because of the resort to multitasking even during sensitive operations. One of the participants gave the following example:

"Now, the situation looks like that to you – you are not keeping the watch in the normal way like it was for example, 20 years ago; 20 years ago, I remember, even I sat in the chair, the captain was already very angry. And you didn't do anything extra; just only the watch and the sea; the sea conditions and situation. But now, the people look around maybe 10% of the navigational watch. For example, me also – sitting by the computer, just cast a glance at the radar monitor and again type, and type, and type, to paper, and paper, and paper..." [C/Officer_SEA2]

The operational profile and port operations are recognised stressors, but other tasks contribute to increase the workload. One such example is highlighted by a participant:

"For instance, on the small container ships, they sometimes do the lashing which the port workers are supposed to do [...]" [NGO_Orgz17]

The multitude of activities to perform during short port stays particularly affect seafarers' workload and often prompt violations, as highlighted by one of the seafarers:

"If you are at sea or at anchor, then there won't be any violation. But if you are in port and you have to do so many activities at one place - the audit, surveys, cargo operations. Schedule will change and there's so many activities to handle.[...] Bunkering operation, stores, provisions, inspections, audits, long pilotage, crew changes. You have to be there. You will certainly get violation there." [Captain_1]

Additionally, some segments of the industry seem particularly affected such as tankers and chemical carriers because they have to prepare tanks and are subject to numerous inspections. Participants' responses include:

"Almost [always] we found about the rest hours many deficiencies especially in the oil tankers. Because it is during the voyage, they are cleaning the tanks, preparing the tanks to load in the next port." [PSCO_15]

"So basically, I am not getting sufficient rest by working 16 hours per day. So, it was quite difficult. Besides, in port on oil/chemical tanker, there are inspections roughly every second port." [3/Officer_2]

Interestingly, some participants also revealed that the quality of the crew may detrimentally impact workload distribution. One of the PSCOs had the following to say:

"And the other thing is the quality, or I'll say the experiences of the seafarers of these days are not as it was before, you know. [...] So, officers sometimes feel like 'I really can't trust this young officer, I have to stay up.' And staying up, one way or the other is contributing again to the fatigue. Staying up – he is not sleeping or resting himself." [PSCO_19]

Seafarers' strategies to overcome commercial pressure

Crewmembers onboard seem to activate various strategies to balance commercial pressures with insufficient manning. They may mobilize trainees and senior officers in an attempt to counter violation of watchkeeping requirements. Seafarers gave the following examples, among others:

"Cadets are trainee officers but used as additional labour. [...] Moreover, [the] absence of [a] 4th engineer leaves only two watchkeeping engine officers i.e., 3rd engineer and 2nd engineer. In this case, [the] chief engineer has to step in to take watchkeeping [chief engineer has to keep a watch also]. This ultimately affects chief engineer's managerial and other routine." [C/Engineer_1]

"We have only 5 crew members. Well, there you can imagine, if you want to maintain the ship, it's just an impossibility to have him [a lookout] on the bridge, but if we do not record it, that we have one man on the bridge, then I; during port State control, I jeopardise the ship." [Captain_SEA1]

Insufficient manning and lack of feedback

As established in literature [17],[18],[19], the scarcity of human resources affecting operations results from insufficient capacity onboard. One of the industry participants considers this to be evidence of a race to the bottom resulting from flag State competition and shared this view:

"Now, if you think about flag States – they are in the position to set up minimum manning; but they are in a competition with each other. So, [...] what the flag States are saying, 'Oh well, it's up to the shipping company if they want to sail with safe manning; minimum manning. We are not recommending it, but we are saying it is possible to sail the ship without a cook. We would never recommend it, but...' So, it's that kind of legal talk that leaves ship managers in absolute proverbial deep [four-letter word] – because they cannot get out of it." [Industry Organization_Orgz12]

For that, the participants blame unrealistic processes for the determination of safe manning levels as well as commercial competition pressure encouraging the allowing of smaller crew sizes:

"So, problem lies in when the specifications of the vessel are not considered." [Chief Engineer_1]

"Minimum safe manning is the minimum necessary to get a ship from A to B; it does not talk about what the job of that vessel is, and what it is employed on. And so, if you were just going [from] A to B, then that's fine; but it doesn't happen, and so that tells you what the issue is." [NGO_Orgz6(a)]

However, all segments of the industry recognize that additional crew has immediate cost implications. Few organizations seem willing to challenge shipowners and demand increases in crew numbers. Some of the responses include:

"Yes, company requested us to adjust the records when there are violations as stated in the previous answer. The company does not respond appropriately, and the only real solution would be more crew, and that was not a solution that the company was willing to make." [2/Officer_1]

"I think their biggest challenge is convincing the owners that we actually need additional manpower; because as a third-party manager, we are constrained by the budget by [of] the owners." [Shipowner Organization_Comp4]

On the other hand, the absence of objective evidence of violations (accurate records) do not support requests for more crewmembers. Indeed, Designated Persons Ashore (DPAs) and top management need reliable feedback from seafarers to address the issue. One shipping company in particular shared its view on the matter:

“We’ve been having that discussion that we are short-handed and the only way the crew will ever be able to get additional colleagues is if they fill in their rest hours correctly, because otherwise you don’t have any proof.” [Shipowner Organization_Comp1(b)]

Contrary to what exists in the aviation industry, the quasi-absence of a just culture in shipping affects any form of reporting requirements.

However, the implementation of effective feedback loops requires trust and confidence. Contrary to what exists in the aviation industry, the quasi-absence of a just culture¹² in shipping affects any form of reporting requirements. Additionally, an inordinate bureaucratization of safety in shipping obstruct accurate reporting as demonstrated in literature [44],[45],[46],[47].

Therefore, shipping companies and regulators need to secure confidence by demonstrating a just culture. One seafarer shared his/her view on this:

“Company should encourage the feedback from the vessel, without blaming and should give particular attention to these issues.” [3/Engineer_1]

Making-up of records

In the present shipping context, seafarers do not wish to expose themselves to reproof and therefore the default option is to make up records. Additionally, it seems that intermediate management levels on board and onshore directly or indirectly and often implicitly send signals that encourage the misrepresentation of work and rest hours with the result that sensitive issues such as those related to inadequate crew levels remain unaddressed. These issues were clearly mentioned by participants:

“Company will never say it officially through mail or not even on the phone. They will say, “Please try to finish your paperwork so that we don’t have any deficiency or observation.” This indirectly means that company wants you to adjust your rest hours record in order to show compliance.” [Chief Engineer_1]

“I don’t think the idea of correcting the records is coming from the crew [laughs]. So, it starts with management [chuckles]; if the management allows or even enforces the correction of the records, then there is a huge problem.” [Shipowner Organization_Comp2]

12 European Commission Regulation 376/2014 defines just culture as ‘A culture in which front-line operators or other persons are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but in which gross negligence, willful violations and destructive acts are not tolerated.[70]’ Just culture encourages an atmosphere where employees have assurance to report safety concerns without fear of blame. Employees must know that confidentiality will be preserved and that the information they submit will be acted upon, otherwise they will decide that there is no benefit in their reporting [71].

Some good options

However, certain companies endeavour to identify solutions. Hiring additional crew for specific operations or allowing recuperative period of rest constitute some companies' response to overcome peaks of overload. Participants pointed out that:

"[...] from my personal experience, the experience has been very positive in terms of company trying to understand what the larger issue is. We went on to having a mini project about it; to look at the trade lanes of these particular types of ships which are hard hit; 'What can we do?' Find intermediate solutions... We also had extra seafarer joining especially the Panama Canal [...]" [Industry Organization_Orgz10]

"We have come across exceptional circumstances where we have had a fatigue issue, but then after the port State we have told the vessel to go at anchor, have the crew rested and then sail out." [Shipowner Organization_Comp3(a)]

Mistrust and shore/ship disconnection

The distance between ship and shore contribute to the difficulties in addressing the issue. This distance is not only physical, but more importantly, psychological. Furthermore, the unbalanced power relationship and the dynamics of human resource management in shipping companies seem to merge to establish a chronic atmosphere of mistrust between seafarers and shore-based management which affects relationships' open cooperation [48]. Encapsulated in its own universe and endeavouring to impose a shore-based agenda via blame/punishment-centred bureaucracy [48], shore management purposefully ignores (or at best does not appear to appreciate) the fundamental and unpleasant problems and the authentic information that may compromise commercial advantage. As a result, pushing the problem back to the ship remains the common solution. This is highlighted by the following comment:

"[...]then you have to write to the superintendent that 'I can't do the repair work because I am violating the rest hours' ...usually, I feel it like a pressure from office... because, they are coming back and saying, 'You can't do and blah blah...' then I make message on exactly what engine crew has to do during the port stay and then he [superintendent] does not help you anymore and orders repair...I feel pressure because they don't trust me." [C/Engineer_2]

Top down management prevails and ignores or denies problems. Facing the wall of a blame culture, genuine ship feedback is stifled and becomes rare. Another seafarer had the following to add:

"[...] whenever this violation is happening, we always reported to the company... but they don't take any action with this and it actually backfires [on] us and then we start manipulating these records." [C/Officer_3]

For some respondents, the distance generates a gap between the realities of ships and the companies/regulators' perceptions. Participants shared their views:

“So, IMO for example, people there are quite long out of the industry, they imagine how it was when they were still at sea, and quite often shipowners are the same. At the frontline you have how ships actually operate. So, the processes are quite often created by people who are not in line with how things are working.” [NGO_Orgz8]

“When we look at these work practices and then we look at the SMS – there’s no correlation. When we ask the crew about the SMS, we could say, ‘What’s the purpose of this procedure?’ Typical responses would be along the lines of ‘Well, we need to make sure that the paperwork is in order.’” [Special Government Organization_Orgz18]

Seafarers tend to report what the company wishes to see and to limit the unpleasant reports to avoid blame, denial or worse.

The main challenge in shipping therefore remains: the gap between sea and shore. Ignorance of actual contemporary ship operation and the denial of its complexities is exacerbated by the lack of accurate feedback provided by seafarers. Seafarers tend to report what the company wishes to see and to limit the unpleasant reports to avoid blame, denial or worse. Regrettably, the resulting accidents seem to be the only

stimulus that wakes up companies on the dire consequences of ignoring the realities of ship operation. While some companies look for answers and improvement, for many other companies the shortcut remains the preferred option: blame the ship, as indicated by one of the participants:

“[...] as an accident investigator, you always see the worst. [...] The difference is, when you have an accident, some companies take real measures to try to understand why that happened and accept that it may not be just the ship’s fault; it may be the system’s fault. They need to look at the way that they’re operating and see the support they are providing to their staff. The default position for many of the worst offenders is, ‘Okay, we’ve had this accident, let’s write another procedure.’ You know, the ship is wrong; send a nasty letter to the captain, ‘Be better; act safer...’ The worst offenders are normally those ships where you say, ‘Safety first’; that concept is rubbish you know, because it’s just platitudes...” [Special Government Organization_Orgz20]

4.4 Summary

In short, shipping remains reactive and reluctant to change. Limited resources, commercial pressure, a blame culture and an apparent divide between ship and shore are some of the barriers to effective implementation of existing instruments, which lead seafarers to take matters into their own hands by adjusting records (and not work and rest patterns) to appear to have no violations.

05

Recording malpractices



5.1 Prevalence of work/rest hour recording malpractices

Allen et al. [12] established through a survey that "seafarers who under-record are actually more fatigued and less healthy than their non-under-recording counterparts" and revealed that only about a third (37.3%) of participants do not under-record their working hours. After a survey, Simkuva et al. [9] concluded that only 31% say they never breach recording requirements.

The research method (survey) in the above mentioned studies was not, however, found to be the most suitable as Allen et al. [12] indicated that many seafarers may be "reluctant to admit regulation infringement even in an anonymous questionnaire." Moreover, it was noticed that the questions in both surveys used vocabulary that may have seemed offensive or unpleasant (use of terms such as "forging").

When collecting data from seafarers, the current research reported on here used a different methodology (semi-structured one-to-one interviews) and resorted to the use of more neutral vocabulary (such as "adjustment"). In addition, the chosen research method enhanced seafarer respondent confidence given that the interviewer is a serving shipmaster¹³. As anticipated by Allen et al. [12], the results reveal that all the responding seafarers had participated in or witnessed adjustment of records. On the question 'how often the adjustments [...] were done on a monthly basis', the respondents were not ambiguous:

"Wherever there is a violation... It is very often..." [C/Officer_3]

"Every time. All the violations during the period were adjusted in order to show compliance with the rest hours regulation." [C/Officer_4]

This indicates two systemic problems: under-manned ships and manipulation of records¹⁴.

Despite the significance of these issues, the industry and regulators do not seem to react vehemently despite being fully aware of the situation. Over eighty-five percent (85%, n=42) of the non-seafarer participants confirmed being aware of recording malpractices. The range of views and justifications for such adjustments differ among non-seafarer participants. On the one hand, members of the shipowners' group consider that recording errors and indolence trigger such wrong-doing:

¹³ The ethical challenges of this were rigorously addressed by assuring confidentiality/anonymity and by using an objective reference group. All research steps were ethically cleared by the WMU Research Ethics Committee.

"You mean flogging [adjustment of records]? Yes. You sometimes; people tend to make a clerical mistake, but sometimes it is adjusted to ensure the paper records look nice." [Shipowner Organization_Orgz1]

"Yeah, I've seen that. That's not very uncommon, [...]as it's supposed to be...coz it's easier." [Industry Organization_Orgz13]

On the other hand, other stakeholders consider that such adjustments are established practices to eliminate evidence of violations and deceive inspectors:

"Believe me, what we've got; this is just the tip of the iceberg. They're very smart and it's very difficult to catch one, two hours here and there." [PSCOFG_16]

"Yeah, you mean we have talked about it between the colleagues? As I said, it is a generally known problem [...]. But even onboard they admit this [adjusting records]; [...] So, they know themselves and they're not ashamed to admit [chuckles]." [PSCO_21]

"Bam, bam, bam, bam! – every time. Cut and paste, every month; Why? Because you have to do the month reports, fuel reports, signing on and off..." [NGO_Org4(a)]

"[...] Yes, because then we go through the logbook and we can see what kind of work they've been doing, and it correlates in no way with what is in the rest hours." [Special Government Organization_Orgz18]

Additionally, fifty-five percent (55%, n=11) of the seafarers interviewed believe that adjusting records has become part of the culture of shipping. As with any cultural practice, this phenomenon is being transmitted from one generation to the next. Some responses include:

"No, it came to me like, 'It's the way how you do it and you adjust.' [...] I got into this culture and it's normal now. On ship, you have work and have to be overloaded. So, it came to me kind of naturally." [3/Officer_2]

"[...] this [manipulating records] is what I've learned from my seniors....That is what I can say....this [manipulating records] has become a normal thing for us [...]and I think that is what my cadet is watching me now....like what I do and probably he's gonna do the same thing when he becomes the chief officer." [C/Officer_2]

Worryingly, the flourishing of the "culture of adjustment" seems apparent to all as recognised by stakeholders:

"I think the whole thing is a bit of a charade, and I think everyone is just playing their part in this charade. [...] But reality is that everyone is lying, and they are playing their part in this game. It's this self-deceptive little world we built, and as long as you have that you will always have issues with health and safety and well-being." [Industry Organization_Orgz9(b)]

"So, literally you go in and ok [tick off], in my mind I know that I will go check it [inspecting equipment] once a month or once every two weeks, but I'll be buggered if I'm going to go every week – because nothing is going to change. But I will check

14 In the context of an accident or incident, evidence of violations of work/rest hours, or manipulation of records, particularly when the seafarers have informed the company may question the due diligence of the shipowner to ensure the seaworthiness of the vessel towards cargo or any value carried on the ship owned by other interests.

[tick off] it every week, so I will do it [tick off] and my justification to that is that I am doing it [inspecting equipment] to a realistic, rather than some idealistic idea." [NGO_Orgz4(b)]

"I've also seen everyone trying to pressurise the person below him to ensure that there is no violation – on paper at least. So, it is mainly to do with the culture and that is something that the people in top management should realise." [Shipowner Organization_Orgz1]

5.2 Adjustment of other records

As stressed in other research ([16],[17],[44], [45],[49],[50]), the extent of adjustments appears to go beyond the work/rest hour records. A shipping company representative notes:

"Anything can be adjusted. If we find out that records are being adjusted, for us it's almost criminal – it's treated as a criminal offense, or act." [Shipowner Organization_Comp2]

A Port State Control Officers is very critical of the recording practice:

"All documents [are] adjusted, mostly [chuckles]. Some documents which we inspect, some documents [are] not adjusted [...] but generally, almost [all] documents [are] adjusted." [PSCO_12]

However, as reported by a representative of a shipping company, work/rest hours records seem particularly prone to adjustment:

"I think work/rest hour is the major one" [68:39_Shipowner Organization_Comp4]

Despite numerous cases of seafarers being penalized and PSCO being trained to detect MARPOL Annex I violations, the making up of oil record books seems to occasionally occur:

"I mean oil record book that is one, you know; okay now we have such severe penalties for oil record books." [PSCO_16]

Another participant suggest that any activity may induce wrong-reporting:

"The problem is, maybe for every record you put, you can imagine a reason to adjust it. That's a scary thought but you know, if for example, if you do illegal disposal of oil – are you going to record that? [...] But that's not something specific for shipping, you can [find it] in every organization everywhere." [Shipowner Organization_Orgz16]

The inadequacy between the company demands and the lack of resources (seafarers, time, spare parts) may trigger adjustments in the planned maintenance system (PMS).

A Participant shared this view:

*"I know that people are adjusting records for Planned Maintenance [Systems], because they haven't got enough time to do all the maintenance. [...] I wouldn't say that people are lazy, that they don't want to do it – not at all; but they have no choice – there is only 24 hours in the day; and they have to choose between something."
[Industry Organization_Orgz12]*

One participant pointed out the lack of capacity to address company demands and the gap in perceptions between shore and ship about what is achievable with limited crew size:

"Possibly also the computer-based maintenance records, planned maintenance. These are generated by people in the office who have nothing better to do. They live their lives, so they go to the office and for 8 hours a day [pretending to type], push a button and 'There you go', and all of a sudden the entire fleet must do this, that and the other check and they do it every week." [NGO_Orgz4(b)]

The risk assessments and numerous procedures seem justified only for superficial compliance purposes and are completed accordingly by seafarers. Indeed, operators question the relevance of such recordings as they do not align with actual work practice and safe operation needs. A participant details this point:

"So, if you have a 'start-up of bridge' checklist, it would say for example tick or any 'not applicable.' And then it says, 'Radar, Navtext, ECDIS, Echosounder', but then it says for example, 'Foghorn, Aldis lamp, Sextant' – but this ship has no sextant; so, it's ticked ['incorrectly' marked off as checked]. Now, this is the interesting part: so, it says, 'Radar' – what am I supposed to do with this radar? Turn it on? Making sure it works? What if it does not work? Am I supposed to put a minus? But there's not an option to put a minus, because I was told to make a tick mark or 'not applicable.' So, what do I do? What if I turn on the radar and there's a green line on the screen - is it working or not? How should I put that in? And then we go through all the checklists, and you can see when people check off quickly... and then you say, 'Was this an honest filling out of the checklist – yes or no?' Well no, it wasn't, but is that the purpose of it? So, it's difficult to answer, because the purpose of the checklist is not necessarily to have a match between the checklist and reality; to bridge that gap. No, this paperwork is meant for the auditor." [Special Government Organization_Orgz18]

However, the adjustment of such forms has fostered a critical attitude to reporting in general with some respondents questioning the real intention and rationale behind such forms:

"[...] people falsify things because they don't believe in reporting it, an example being risk assessments. We make a lot of use of risk assessments, it's a way of dumping the responsibility on people onboard the ship to say, 'Before you do this job, complete a risk assessment.'" [NGO_Orgz8]

The "impossible" obligation to complete irrelevant or inadequate records accustom seafarers to a culture of adjusting. Neglected by companies and unaddressed by enforcement agencies, the tendency to adjust records becomes normalised and deemed acceptable.

The official logbook: a special case?

In the particular case of adjustments to records for entry into the official logbook, the research participants were divided. On the one hand, casualty investigators and a few participants highlighted the increasing unreliability of official logbooks. On the other hand, some claimed the trustworthiness of the official logbook.

The “impossible” obligation to complete irrelevant or inadequate records accustom seafarers to a culture of adjusting.

For investigators, the normalization of deviance¹⁵ reaches such levels that entries in the official logbook may not be reliable having been purposely twisted or omitted to make-up a purported reality. Such sentiments were indicated by the following as examples from accident investigators:

"So, in theory you look at the name in the logbook – he's [the lookout] on watch, but actually he is resting you know, because they can't comply with the hours of rest, and so have an additional watchkeeper." [Special Government Organization_Orgz20]

"I know some cases what is written in the logbook, it isn't really what happened. But when we perform an investigation, we collect facts mainly from other sources and not from the logbooks; I must admit." [Special Government Organization_Orgz19]

"But the fact is that now there is less and less information in the ship logbook. Some years ago, with ship logbook you could have a lot of information and you could cross it with all the other information [...] Now, there is no information in the logbook, and you [the officer on the bridge] adjust table of rest and working hours, and you [PSCO] don't know exactly [what is] going on onboard; 'What was the job of people during previous weeks and months?'" [Special Government Organization_Orgz21]

For other participants, the information contained in the official logbook may facilitate the tracking of certain adjustments such as those on hours of work and rest. Some participants maintain the integrity of the logbook and suggest that to verify other records, this particular document would serve as a reference to systematic cross-check against:

"That is interesting. I've never ever flogged a logbook, ever. So, the official logbook and the deck log was proper – I never adjusted, it was contemporary." [NGO_Orgz4(a)]

"So, that record [logbook] I'm not going to fudge, because you feel like it's a criminal offense, you know – that's what comes to your mind. But when it comes to this piece of paper [work/rest hour records], it is you only – these rest hours belong to me. So, even if I take it on me, if I've now fudged 1 or 2 hours, it is only me, no one else." [PSCOFG_16]

For another casualty investigator, it seems that this special legal status of the official logbook prevents massive adjustments:

"Yup. And one should not underestimate; we call it, we divide it between the normative tasks and what we call technical tasks. Normative tasks you will not be forgiven for; for example, falling asleep on the bridge, not seeing a ship on a collision course, grounding – those are normative errors for a ship master; they will never be forgiven. But the other stuff that you do that you can be forgiven for – doctoring some International Safety Management document; nobody cares about that; that's a technical error. You can

¹⁵ Interestingly, the notion of normalization of deviance, a term originally coined by Diane Vaughan with respect to NASA's Challenger disaster [72], was introduced in this work about work/rest hours record-keeping by an ITF inspector in the preparation phase of the research.

be forgiven. Doing some dishonest stuff with the rest hours, you can be forgiven. Logbook is part of what we call the normative; therefore, we view that data quite high." [Special Government Organization_Orgz18]

The logbook and its draft, the bell book, describe the critical aspects of the voyage and its steps. They contain the memory and sequence of operations for further reference. So, these records are viewed as reflecting and demonstrating the professionalism of seafarers in motion.

In addition, the documents remain traditional navigation tools. With their roots in the long tradition of maritime navigation, they generally remain well-accepted. They possess the credibility of the past and have a respected status among seafarers. The usefulness of such records is never questioned. In this respect, the official logbook is perceived as representing ancient professional practices and tradition contrary to SMS checklists, rest hour records, etc.

"Now, when I keep the logbook for example – I do that truthfully, why do I do that? Because it is part of my professionalism, understand what I mean? So, the other stuff is protecting someone from something; when I write the logbook – this is a normative task, meaning that it is part of my engrained professionalism as a seafarer." [Special Government Organization_Orgz18]

These new reporting systems do not benefit from the validation of long-term experience. They represent recent add-ons imposed from shore that contribute to sanctions and question seafarers' capacities, judgement and professionalism. Finally, seafarers question the relevance and validity of such documents and the latent intentions that led to their creation. Their utility and aims in a pragmatic professional context are seriously criticized. In short, these add-ons are perceived as a pure administrative burden to complete without additional crewmembers.

5.3 Justification of recording malpractices

The main drivers for adjustment seem to be the fear (real or perceived) to discontent the company, and to fail an inspection. Other motivations identified in the research are the pointless nature of such paperwork or the retention of bonuses.

The risk that flag or port authorities will detect, and sanction wrong reporting is minimal compared to the perceived risk of not satisfying the shipping management.

The risk that flag or port authorities will detect, and sanction wrong reporting is minimal compared to the perceived risk of not satisfying the shipping management. When visible on ships' records, the violation becomes evidence on the basis of which third-party inspectors can take action and proceedings negative to the interests of the shipping company. This was highlighted by one of the seafarers:

"If any violations are noted or verified by any port State or any official, then it becomes problematic and has negative impacts on the vessel. In order to avoid such consequences, corrections are done [made] and initiated by the ship officers." [Captain_2]

Negative impacts may include adverse consequences for the operation of the ship (e.g., delay, detention) and the company's and ship's loss of reputation (e.g. reduction in PSC score, unfavourable charterer's perceptions of the company). Seafarers endeavour to avoid troubles and to stay below the radar as indicated by the following statements from some research participants:

"Basically, it's a culture.... we are adjusting it [work/rest hour records].... First of all, if you don't listen to our company, there will be no employment; then we also need promotions. So, there are so many factors.... then if PSC will see these violations, they can detain the vessel that can lead to [the vessel being] off hire... then if the vetting inspectors come and see violations probably the vessel will not get the cargo..." [C/Officer_3]

"The primary reason [for manipulating records] is the company. Like I said, in our company there is a mail from the office asking the reasons why there's a violation. So, in order not to get any mail from the office we do the adjustment and the secondary is the external authorities when they come for inspection, if they see a lot of violations, they'll catch up the ship as well as the master for not complying with the MLC requirement. In order to get clearance from the external authority we do the manipulation in order to show that there's no violation on board." [2/Officer_2]

In short, the recording of violations may not only affect the ship but unnecessarily expose seafarers to queries and reprimands from the company. One of the seafarers recalls his/her experience:

"When we reported to the office on the rest hour status, the company started asking the reason for such violations and questioned our capability in managing the vessel." [C/Engineer_1]

In an unstable employment environment, the direct or indirect pressure to adjust records seems to be easily accepted and absorbed by the seafarer to please the company and everyone else. One of the seafarers elaborated on this point:

"It is a bad job market; everyone needs a job. And they [seafarers] have to do the adjustment, because, the record will be seen by the company and by the inspectors. The labour union can't protect us. If we fill the form without violation, company, inspectors and seafarer and everyone is happy. We just want to do [our] job, get money for our families and go home". [Captain_6]

Reporting accurately seems pointless for seafarers. It creates problems and does not trigger positive responses to enhance seafarers' working conditions. One of the industry organizations in particular supports this view:

"[...] we realize that we are doing something that is completely useless – ‘nobody reads that [work/rest hour records], but I still have to waste my time’ and that is frustrating, big-style, because we know that we are wasting time." [Industry Organization_Orgz12]

The impact of ‘can-do’ culture

On occasion, seafarers seem to be their own enemy in their willingness to complete the work with limited resources and without calling for additional support. This seems to result from a sense of professional pride on the part of some seafarers. Participants referred to this attitude as ‘macho’ or ‘can-do’ behaviour:

"Office management and on board the ship, because there is an element in here which is that the seafarer is his own worst enemy. For years we have had a culture of ‘we will get the job done’ and ploughing on and getting the job done, because the job needs to be done." [NGO_Orgz4(b)]

"[...] there is a kind of ‘macho’ approach; if you are at sea and you are not fatigued then you are not doing your job properly, so is kind of ‘I’m fatigued but I’m so proud of that’. There’s a kind of emotional engagement, which I think is still prevalent, and of course it’s bad news because fatigue will lead to accidents." [Shipowner Organization_Orgz7(e)]

Tokens that incentivise wrong reporting

A few participants shared their views that monetary incentives may lead to adjustment of records. Such incentives can be driven by overtime, bonuses, and Key Performance Indicators (KPI):

"I don’t have a solution for this because that’s also from my experience onboard, if the crew gets paid overtime onboard and they accept the crew/people onboard to get more money – they accept longer working hours; they usually accept also adjusting the records [laughing]. So, there is no way for someone coming from outside, to get proper verification; to prove anything. So, I don’t see really how we can improve the reporting; I cannot answer that [chuckles]." [PSCO_9]

"I know that captains receive bonuses when they have no non-conformities, but I’ve never heard that that is a reason for captains to fill in the rest hours; to put people under pressure to adjust the rest hours." [NGO_Orgz15(c)]

Dekker [47] described the impact of KPIs on reporting/recording behaviours. It seems that for seafarers, the satisfaction of meeting the KPI targets prevails over the accuracy of record-keeping. This establishes a system which encourages wrongful practices such as adjusting work/rest hour records. These sentiments are also supported by the non-seafarer participants:

"Yes, absolutely. And I think one problem that leads to that is the economic incentives that are put on masters for instance. I mean it could be one KPI that is reflected on his bonus [chuckles] which sort of says, ‘Ok, on my ship we cannot have ‘RED’ [indicating violations] numbers on the rest hours sheets, then I’m not going to get my bonus’ and it’s just paper in a sense." [Industry Organization_Orgz9(a)]

"So, there is a challenge in that as well and those companies that very directly sort of link the KPI to the rest hours or the violation, I think that is a problem, because once you do it, then you are actually building a system for people to sort of mis-declare what they've done." [Shipowner Organization_Orgz1]

In summary, motivations for adjustment are diverse. One participant suggested that the region seafarers are coming from and the contractual agreement are key determinants in records' adjustment malpractices:

"So, on first world ships people are inclined to getting motivated through bonuses and your reflection of life onboard and life ashore; in third world countries it tends to be more about fear, about having your livelihood, about going back to the same company or the same ship, and if you're making waves, and you're not on a permanent contract, you're making waves, then you're not going to get back onboard the ship. So, it's a bigger – it's not an issue specifically to do with work, it has to do with a fear culture on one hand and an inappropriate motivation on the other hand." [NGO_Orgz8]

Whatever the motivation to modify records, the objective of adjustment of records is to deceive third-party inspectors who base their assessment of ships and seafarers on paperwork.

Deceiving practices

Whatever the motivation to modify records, the objective of adjustment of records is to deceive third-party inspectors who base their assessment of ships and seafarers on paperwork. By producing 'nice and compliant pictures' of ships, seafarers demonstrate their understanding of the limits of current inspections. The making-up of records intend to overcome the very meaning of inspections using its own tools. The current form of assessment incentivises the erasing any unpleasant evidence visible on records. In short, this operation of

manipulation responds to the multiplication of inspections which judge crew, but do not have any substantial impacts on crew working conditions. One of the accident investigators clearly articulated this as follows:

"Remembering that when we interview companies, they would typically say, 'Well, when auditors, vetting officers, flag State administration officers come onboard, PSCOs – they are not seeing the ship in operation. So, what are they supposed to look at? Well, there's only the paperwork left. 'So, we are going to have to produce paperwork to show them'; and therefore, they manage the compliance issue with the SMS." [Special Government Organization_Orgz18]

Despite the possible consequences and sanctions imposed by Authorities for recording malpractices, seafarers seem to fear the company more than the Authorities. One seafarer explained that:

"If any deficiency is found, then the reputation of vessel master goes for a toss. The ship's name pops up and everybody on board a ship is known by the office - it begins to destroy the reputation built over the years. Nobody likes to do; it's actually due to repercussions or after-effects which makes it necessary to adjust the rest hours record." [Captain_2]

Hughes [51] observes the difficult position masters in particular find themselves in, being liable and held accountable if crew were to accurately report their working hours in excess of the regulations, whilst the company may condemn the master for not complying with the procedures set out in the SMS. In summary, erasing evidence of non-compliance is perceived as an effective and low risk self-protection strategy.

5.4 Summary

Recording malpractices are widespread and recognised as such by industry stakeholders, the public sector and administrations. The culture of under-reporting or adjusting records extends beyond that of work/rest hours, to the PMS, and other SMS compliance-based paperwork. The traditional navigational documents seem less affected as they have not been imposed from the outside. Fear (of unemployment) and reward (bonuses) as well as a 'can-do' culture are major drivers of seafarers manipulating records. This is to avoid unpleasant consequences, queries and sanctions from their employers or third-party inspectors. The reality remains that seafarers are not getting the rest that is reasonably to be expected for safe operation in a high-risk work context and for their health and wellbeing.

06

Compliance monitoring and enforcement (CME) of work/rest hours

Compliance monitoring is a prerequisite to any enforcement action. CME requires inspections by appointed officers from flag and port States. To monitor compliance, the inspector collects, and analyses information provided by and gathered on the ship.

Compliance monitoring objectives include the following:

- detect violations by verification of records available onboard (i.e. work/rest hours records and related documents);
- require correction and rectification of nonconformities to standards and requirements;
- provide evidence to support proceedings and enforcement actions;
- assess the efficiency of the CME regime in place.

Regarding the last objective, if requirements of the relevant Conventions are systematically violated but unaddressed, it suggests that the CME regime is inadequate and needs reform. This seems to be the case in respect of work/rest hours regulations.

Enforcement refers to the actions initiated by authorities to facilitate/impose compliance. Among other things, it may include actions such as delaying or detaining the vessel pending rectification of non-compliance. The purpose of such enforcement actions is not only to pursue conformity to regulations but also to avoid unrested crew compromising their own health, ship safety and the marine environment.

To guide enforcement authorities in detecting violation and implementing adequate actions, international organizations such as the IMO and the ILO, produce instruments and guidelines which are often the basis for the development of national or regional regulations/guidance for inspectors. In this respect, compliance monitoring and enforcement of the work/rest hour regulations are governed through particular IMO Regulations¹⁶, ILO framework¹⁷ and regional memoranda of understanding (MOUs) on PSC¹⁸.

During this research the compliance monitoring and enforcement focus was viewed from the perspective of port States as PSCOs. This was deemed appropriate as, in general, all PSCOs are experienced officers and also qualified as FSIs [52]. Further factors justify the PSCO focus. Whereas Administrations may outsource the flag State inspection function to Recognised Organizations (ROs), such as a Classification Society, this is not the case for PSC; in this instance the PSCOs are directly appointed officials [52], [53]. Moreover, PSC focuses on international regulations, as opposed to national laws which may differ from the STCW and MLC, 2006 frameworks.

The next section, therefore, considers compliance monitoring and enforcement of work/rest hours from a PSC perspective.

16 IMO Res. A.1070(28) IMO Instruments Implementation Code (III Code); IMO Res. A.1138(31) Procedures for port State control, 2017; A 31/Res.1138 Appendix 11 Guidelines for port State control officers on certification of seafarers, manning and hours of rest.

17 ILO Convention C147 Merchant Shipping (Minimum Standards) Convention, 1976; ILO Inspection of labour conditions on board ship: Guidelines for procedure; ILO MLC 2006 Guidelines for port State control officers; ILO Guidelines for flag State inspections under the Maritime Labour Convention, 2006.

18 i.e. Paris MOU; Tokyo MOU; US Coast Guard (USA PSC regime; not part of a regional MOU)

Perception of effectiveness of current CME

Participants were of the opinion that the current compliance monitoring and enforcement regime may be lacking in effectiveness. One shipowner commented as follows:

"Monitoring and implementation, or effective implementation, is still a major problem." [Shipowner Organization_Comp4]

It seems that two factors come together to further jeopardise the implementation of work/rest hour regulations.

The first factor is the apparent unwillingness of some flag States to monitor and enforce labour regulations. Strict flag State implementation is viewed as a competitive disadvantage when all flags strive to attract more shipowners and increase flagged tonnage. Participants shared their views:

"The catch is that flag States to a great degree do compliance, they don't really do enforcement. [...] remember you have the fundamental flaw with flag States, flag States are there to enforce the rules, but they're there to get as many ships onto their flags as possible. So, that's a fundamental problem. So, there is a limit to the enforcement that a flag State will instigate." [NGO_Orgz8]

"And flag, class, anybody in shipping industry hinges on owner; if owner decides to move, they move" [Industry Organization_Orgz12]

The second factor preventing the implementation of the regulation is the attitude of seafarers in not providing accurate feedback. One of the captains lists the reasons for adjustment of records:

"Trying to adjust themselves to the system / It is a requirement by the management / For inspection purposes / For employment / The crew performance and appraisal report at the end of the month" [Captain_5]

Participants recognised that such practices jeopardise the overall implementation of regulations and are detrimental to their (the regulations') aim, which is the mitigation of fatigue:

"Let's say, last week was not recorded [rest hours] or [they worked] extra time. [...] maybe the awareness onboard should be done also, it's also for the benefit of the seafarer whilst he may see it as an administrative task and another list to complete. It has to be done every day, particularly if you want to take into account within a 7-day period..." [Shipowner Organization_Orgz16]

"[For] seafarers I think [it] is very important to record the actual hours, and the reason why I would like to advise somebody strongly about that is, it [work/rest hours] is also tied to insurance [...]." [Industry Organization_Orgz10]

Despite accurate reporting being vital to the improvement of safety in shipping, the lack of feedback does not allow regulators and companies to identify risk areas and to eventually propose solutions. Such critical incapacity to collect data from ships has already been identified in literature in the context of near-misses, incidents and casualty investigations.

6.1 Scope of PSC inspections related to hours of work and hours of rest

The IMO procedures for PSC distinguish between initial¹⁹ inspections, and the more detailed²⁰ inspections, the latter conducted when there are clear grounds²¹ that warrant such an inspection [54]. It is understood that the practice of inspection should not result in ‘unduly’ detaining or delaying the ship.

The STCW Convention and MLC, 2006 initial inspections

The ‘initial inspection’ is a first and, generally speaking, limited step. Its purpose is to verify that there are no ‘clear grounds’ to initiate a ‘detailed inspection’. The IMO procedures (in A31/Res.1138) define the objective of the initial inspection as follows:

“A visit on board a ship to check the validity of the relevant certificates and other documents, the overall condition of the ship, its equipment and its crew [...]” (1.7.5)

It is noteworthy that the assessment of the ‘validity’ of documents belongs to this first stage.

In the context of STCW rest hours requirements, the PSCO should specifically examine the watch schedule and the daily hours of rest records and may verify the accuracy of records by inspecting the seafarers’ personal copy of the rest records [54].

The MLC, 2006, Regulation 5.2.1 recalls that the Maritime Labour Certificate and the Declaration of Maritime Labour Compliance (DMLC) constitute “prima facie evidence of compliance with the requirements of this Convention”. As highlighted in the ILO Guidelines for PSCOs [50], the initial inspection begins with the reviewing of certificates. Per the guidelines, three cases in which a more detailed inspection may be required: clear grounds, reasonable grounds, or complaints.

“Where the PSCO having come on board finds that the documentation is valid and complete, the inspection would come to an end at that point unless there are clear grounds for believing that the working and living conditions on the ship do not conform to the requirements of the Convention [...] or reasonable grounds to believe that the ship has changed flag for the purpose of avoiding compliance [...] or there has been a complaint [...]”

19 A visit on board a ship to check both the validity of the relevant certificates and other documents, and the overall condition of the ship, its equipment and its crew.

20 An inspection conducted when there are clear grounds for believing that the condition of the ship, its equipment or its crew does not correspond substantially to the particulars of the certificates.

21 Evidence that the ship, its equipment, or its crew does not correspond substantially with the requirements of the relevant conventions or that the master or crew members are not familiar with essential shipboard procedures relating to the safety of ships or the prevention of pollution.

Consequently, without clear grounds, initial inspections related to STCW and MLC, 2006 do not move beyond simple review of the certificates, watch schedule and the daily hours of rest records.

Notion of clear grounds²²

In general, the IMO through a resolution of its 31st Assembly (A31/Res.1138) on 'Procedures for Port State Control', defines 'clear grounds' (in section 1.7.2) as "Evidence that the ship, its equipment, or its crew do not correspond substantially with the requirements of the relevant conventions or that the master or crew members are not familiar with essential shipboard procedures relating to the safety of ships or the prevention of pollution. Examples of clear grounds are included in section 2.4" of the resolution. These examples (in section 2.4.2) include:

- evidence from a review of the ship's certificates that a certificate or certificates are clearly invalid;
- evidence that documentation required by the relevant conventions and listed in appendix 12 is not on board, is incomplete, is not maintained or is falsely maintained;

In addition to the examples found in section 2.4, Appendix 11 (section 6.3) lists further detailed examples among which the following are listed:

- missing illegible or fraudulent certificates and records;
- failure to comply with the rest hour/fitness for duty provisions;
- complaints received from a seafarer or knowledgeable party.

These are relevant to the requirements of the STCW Code Section A-VIII.

Similarly, the ILO Guidelines on PSC related to MLC, 2006 (in particular, regarding Regulation 2.3), lists the following as deficiencies warranting a more detailed inspection of maritime labour conditions on ships (see chapter 4, p. 51):

- Records of work or rest are not available or are not maintained.
- Evidence of exceeding the limits of work and no record of suspension of the schedule, in accordance with Standard A2.3, paragraph 14, have been noted in a logbook or other document.

In both guideline documents (and the associated Conventions, STCW and MLC) and due to "the danger posed by fatigue of seafarers" (STCW Code A-VIII/1 paragraph 1 and Standard A2.3 paragraph 4), inappropriate record-keeping would normally trigger detailed inspection.

Additionally, national and regional guidance sometimes elaborates further on such requirements²³.

22 To ease the readability of the report and avoid legal digressions, the expression "clear grounds" is considered only within the context of IMO and ILO definitions (together with complaints) that may trigger further detailed inspections.

Detailed inspection and action to be taken in case of non-compliance

In the event of record-keeping inaccuracy, a more detailed inspection of seafarers' daily hours of work or daily hours of rest records should be carried out. This would entail cross-checking the information with other documents and records (paper or electronic) or eventually interviewing the seafarers. If deficiencies are ascertained, the PSCO should take appropriate actions as required per the MLC, 2006 and/or the STCW Convention.

Resource-dependent processes

As with any other enforcement activity, the features and depth of the inspection depend on the resource allocation. The IMO procedures on PSC details the qualification and training requirements of PSCOs. However, resource capacity-building needs to also address the context of the inspection: time available, number of inspectors, national or regional priorities, and local pressures. Therefore, the practical context of the inspection determines its thoroughness and is very much defined by national authorities.

6.2 Work/rest hours inspections within limited framework

One of the key aspects of this research was to understand the practice of inspectors when verifying compliance with work/rest hour requirements.

The research indicates that the majority of PSCOs strictly follow the harmonised procedures on PSC. Inevitably, this limits the scope of the inspection to verifying watch schedule and the daily hours of rest records in addition to certificates. During the focus group one of the PSCOs highlighted the instructions given for PSC:

"[...] we don't make the focus; because [of] our instruction – we have to look to the shipboard [working arrangement], we have to look to the [work/rest hours] record; if all seems good, you have no proof – [we] don't go deeper, because there's no instruction about that." [PSCOFG_8]

Taken *stricto sensu*, the instructions provided by national and regional authorities facilitate the harmonisation of inspections on simple factors of compliance and protect inspectors

23 For example, the following instructions of an MoU provides a similar interpretation: "... Records of hours of work or rest are not available, not reasonably filled in or up to date, not properly maintained for all seafarers, incorrect, deliberately forged, not signed by the master or his representative and by the seafarer; ... Evidence of exceeding the limits of work hours and a record of suspension of the schedule has not been noted in a logbook or other document; ... Seafarer hours of work that are consistently at the upper limits or other factors, such as rest periods that are disrupted by callouts to work. ... No record of work or rest hours or evidence that records have been falsified to hide excessive working hours of the crew." Instructions from national authorities require to ask senior officer on how the rest records are being maintained and who updates the records.

from being perceived as affecting the flow of trade in ports due to misplaced zeal.

In addition, any clear grounds would initiate follow-up action and increase of workload as well as may cause undue delay to the ship. The consistent reference to avoiding such delays in IMO Conventions and inspection guidelines seems to pressure PSCO's to try to avoid such delays even against their better judgment.

"So more in our guidelines, you cannot unduly stop the operation, unless you have clear grounds." [PSCO_1]

"And nobody wants to delay the vessel; you know a 3, 4-hour delay, because if they lose the window; tidal window at the discharge port; then he also has to answer." [PSCO_16]

However, many PSCOs seem to regret that strict and narrow instructions are restricting their ability to effectively control by conducting in-depth investigations. It seems that exceptional circumstances may encourage in-depth verification. Participants responded as follows:

"Well, the problem with PSC is they have to have just cause to go deeper. Other than just checking certificates and you know, they may have a concentrated campaign on hours of rest for example, where they may go a bit deeper. [...] PSC is not in anybody's interest to keep a ship in port." [Special Government Organization_ Orgz20]

"If ship is standard risk profile, or low risk profile, [it warrants] just [an] initial inspection. Initial inspection includes: shipboard working arrangements [is] posted or not? And records, you have [completed/updated records] or not? If we find clear grounds, [then we would] change the inspection category to more detailed inspection. But, risk profile high risk – also we check all records and cross-check; because high risk inspection category – [warrants an] expanded inspection." [PSCOFG_12]

Additionally, an accident investigator, and former PSCO, stresses the examination restrictions of inspectors compared to the large possibilities accessible to investigators:

"And I don't have as much ability as a PSCO – I can [as an accident investigator] go in and I can immediately start conducting in-depth interviews. You know, pulling people aside, using various isolation tactics to conduct interviews and this is where things like that will come out. Whereas in the standard scope of a PSC exam, I'm not necessarily going to be able to do that." [PSCOFG_10]

Seafarers' awareness of inspections' limits

Seafarers are perfectly aware of such limitations; they understand that the PSCOs have restrictive instructions and limited time available to verify records onboard the ships. As a result, when certificates and records seem in order, the PSCOs would not investigate deeper and cross-check information. Seafarers prepare and clean-up documents accordingly, as one participant highlighted:

"PSC should check the record thoroughly. It's very easy to manipulate the records and not let other know. You see the master; he gets it between the enforcement agency like port State and the company." [C/Officer_2]

Interestingly, most seafarers seem to regret that PSCOs do not push their investigations because they leave traces. In a kind of 'hide and seek' game, the role of the PSCOs is to find discrepancies and supporting objective evidences. Seafarers shared their opinions:

"It [the work/rest hour record] is not of any use. The records are just kept for inspection purposes and for the company. They [inspectors] know how long we actually work. They [inspectors] can check logbook, everything is mentioned there. And, if you compare deck log and rest hour record, it is totally different and doesn't match, but they don't check the deck logbook but only the rest hours record. Deck log is the real document..." [Captain_6]

"The PSC when they come also, they check it [work/rest hour records], but they don't go too deep. They don't compare it with the logbook. If they want to check it, you have to pull up all the records and you have to compare so it's quite time-consuming and it's difficult to check. So, there must be a third party who is checking it." [3/Officer_2]

"Because they don't look, or they don't want to, or they don't know how to look for piece of evidence." [C/Officer_4]

6.3 Inspectors under time constraints

PSCOs are expected when exercising control, to complete multiple checks related to numerous instruments and to make all possible efforts to avoid the ship being unduly detained or delayed when carrying out their inspections.

Inspections during port operation

It is important to recall that PSC inspections are performed during normal operation and should not disturb the ship. Therefore, inspectors tend to interrogate the juxtaposition of optimum safety and the promotion of commerce. During the PSCO focus group, one participant elaborated on this as follows:

"Yeah, I mean we all know that the ships are on a schedule, they want to get in and out and we want to promote commerce but also promoting safety. So, there's this balance – how long you want to keep a ship there and dig into their records; so far that you're extending the examination by another 2 hours. So, yeah – I do think that is a factor as well." [PSCOFG_10]

It is worth noting that the longer a PSCO takes to carry out an inspection, the more they are adding to the workload of the ship crew and limiting any rest period they may have in that particular port.

Optimization of the use of time

Additionally, thoroughly controlling a ship seems to be a challenging task considering the number of items to cover within a short period of time. Therefore, PSCOs concentrate on what are considered in their opinion as core items. They rarely have sufficient time to engage in fastidious investigations. As one participant notes:

“And as long as this is really time consuming and the scope of PSC inspection is very, very wide - in everyday practice we don’t have time, unless we have clear grounds to carry out such a verification. So, from the PSC, it will be difficult from my point of view as PSC, it will be difficult to increase our obligation to verify the [work/rest hour] records. [...] For us, the scope of our inspection is really too big at the moment to verify on an everyday basis.”
[PSCO_9]

In such a context, investing large amount of time in work/rest hour verification is an impractical process; the inspectors strive to optimize the use of their limited time. Where irrefutable evidence may be difficult to collect and the level of violations (and consequential sanctions) may be perceived to be low, investing time on work/rest hour verification seems a risky option for PSCOs. Indeed, there are many technical issues such as expiry dates of life saving equipment, which are far simpler and less questionable to check for compliance. One of the PSCOs also raised this matter during the focus group:

“And so, the fact that finding these [work/rest hour] records and finding that it’s wrong; finding some deficiency in this is very difficult, together with, in case you manage to find it, they get away quite lightly – that makes it not an attractive field to put our time. We most of the times, in our professional judgement, we can think that our time will be better invested in something else. So, I agree that in principle you just look at the working arrangements, yeah, the drills, port calls and see if it kind of makes sense. You don’t allow yourself to put more time into this, unfortunately.” [PSCOFG_21]

The diversity of technical and operational elements to verify vis-à-vis the relatively short time available influences negatively the depth of inspection which is possible. To become exhaustive in scope means losing exhaustiveness in depth.

Scope versus depth of inspection coverage

Again, the limited time allocated goes hand in hand with the large number of items to assess. The diversity of technical and operational elements to verify vis-à-vis the relatively short time available influences negatively the depth of inspection which is possible. To become exhaustive in scope means losing exhaustiveness in depth. Some inspectors clearly underlined the role of flag States as primary enforcing agencies. This argument was supported by a participant during the PSCO focus group:

“The shopping list [list of items to inspect] should be reduced, because in my opinion this is [the role of] the flag State, to make focus about many, many...; Normally, like 2nd level, PSCO should just pick some point and if we found something, we go deeper - in my opinion. But we don’t need so big shopping list. As I explained to you, the shopping list is about 98 points, for lots of kinds of vessels. And if we give it two years, it would perhaps make 100 [points to inspect/verify].” [PSCOFG_8]

The quantity of items to verify and the lack of resources available were consistently raised during the interviews and the focus group session. During the PSCO focus group one participant raised the following point:

*"I like this point about resources; additional PSCOs, because the reality is that if you are in a busy port, let's say you send out a team and everyone has three ships to inspect that day and let's say everything is smooth and they're 2 to 3 hours a piece, they're looking at; and I hate to say it, but they're going to be looking at the more low hanging fruit. And when you're done with that 1st inspection or the 1st examination, you think on the 2nd or 3rd they're going to be 'I need to dive into these logs extra deep, so I'm gonna be here till 9 o'clock at night...' So, you do have to look at it."
[PSCOFG_10]*

Training shapes priorities

Additionally, current training regimes require PSCOs to absorb a significant amount of information from diverse knowledge areas. Technical requirements seem to dominate over labour issues which may impact the agenda of inspection and inspectors' priorities. This matter was raised during the PSCO focus group:

"Well, I'm talking about your training for your PSCOs and even your domestic [flag State] inspectors, the focus; when you think about the amount of training that goes into being a good PSCO or a good domestic FSI – it's just a massive amount of information and the majority of training, at least in my experience is on the technical aspects – the machinery, the navigation equipment. And so, it's [work/rest hour compliance] almost an afterthought and so, the stress does not get put there [work/rest hour records]. So, if you're not thinking that [work/rest hour compliance] from the time you're starting and building up; it's on your checklist, you know it's there but it's not priority number one. And so, you kind of have to change the whole thought dynamic, I think." [PSCOFG_10]

6.4 Challenges to assessing accuracy of work/rest hour records

As expressed previously, the time allocated to each item does not allow extensive and in-depth verification of the accuracy of records. Consequently, the majority of stakeholder groups agree that it is difficult for a PSCO to quickly detect violations of the work/rest hours. Without lengthy cross-checking, it is virtually impossible to identify evidence of inaccuracy.

Equally difficult to ascertain practically, is the action required to find clear grounds that would allow the triggering of an expanded inspection. One of the accident investigators elaborated on the challenges:

"Now, what kind of investigation does he [PSCO] have to do in order to verify whether or not the rest hour regulation has been done correctly or not? Does he have to go to a detailed inspection for that? Does he have to have cause for that? How does he do it? Does he have the competence, the methodology, or the method of doing it? 'So, who should I interview? What kind of questions should I ask? What kind of source data do I need to have in order to be on solid ground on this?'"
[Special Government Organization_Orgz18]

PSCOs' views on detection

During the PSCO focus group a short anonymous survey was conducted among the eleven (n=11) participants to verify whether it was easy to detect violations and adjustments in work/rest hour records. Over eighty percent of participants (80%, n=9) were of the opinion that it is not easy to detect violations and malpractices. Some of the responses include:

"It is difficult to judge whether the record is correct or not due to shortage of detecting methods for false records (When is clear evidence to state the record is incorrect?)." [#2]

"It isn't mandatory on inspection to go deeper without clear grounds. Some records (record of drill, engine logbook) aren't translated in English" [#5]

For some PSCOs, time constraints and experience add to the challenge of detecting recording malpractices. A certain PSCO explained:

"Definitely not easy at first sight during an initial inspection. Even during a more detailed inspection, time constraints and lack of training or experience of the PSCO makes it difficult" [#6]

Only two of the focus group participants however reckoned recording malpractices as being easy to detect when you apply the proper detection methods. Notably, both were former senior ship officers before working in maritime administration which prompts the question of ship experience for inspectors. One of them elaborated on this as follows:

"It is very easy to board the ship. You must verify all the records of the [current] date and the past and conduct interviews with some crew members. Finally, verify with interviews is very important." [#11]

[..] inspectors are very careful in assessing work/rest hours because errors or decisions based on uncertain evidence may expose individual inspectors and their respective organizations to heavy criticism and eventually complaints.

The PSCO interviews confirm that detection for many is not a simple exercise and is a process with several nuances. As a result, explicit quantification of the ease or difficulty with which inconsistencies can be detected cannot be reached from the PSCO interviews.

Overall, however, it does not appear so challenging to find inconsistencies, but it does seem to be difficult to transform inconsistencies into irrefutable proof. PSCOs shared their experiences:

"It's very easy for the crew, [or] for the captain to change that [manipulate work/rest hour records]. It is very difficult to find it, because you cannot accuse them to do that if you don't have how to prove it." [PSCO_5]

"I think it is difficult to take action because they can alter the logbooks and because it is part of STCW that says, 'in certain circumstances that masters can deviate from the hours of rest'; under certain circumstances. And so, this makes it all much more difficult to say that this specific case, if you see an alteration, they can simply say, 'Well, in this circumstance we had to deviate to maintain the safety of the ship due to the fact of x, y, and z.' And there are stipulations in STCW that allow for that. And so, this makes it even more of a challenge." [PSCOFG_10]

Indeed, inspectors are very careful in assessing work/rest hours because errors or decisions based on uncertain evidence may expose individual inspectors and their respective organizations to heavy criticism and eventually complaints. The PSCOs elaborated on this matter:

"Because then you, as a port State you are always very careful and your approach should be in case of doubt, you have to let it go. [...] That is always the approach as a port State. You could be liable for damages; for loss of revenue - I mean you're detaining the ship. So, the principle is you don't have to interrupt the operations" [PSCO_21]

"So, we detained the vessel and then [they] went on to appeal [...] And that is why for me to form strong evidence of the case, I need to have some indicators to look into it, because otherwise... The crew should not feel that I am onboard looking for

something you know, as a port State inspector. So, you do your general inspection, general round; you get a feel for the vessel. If you find something, you start looking into it; you look into it, you find some clear grounds – yes. Then the case develops.” [PSCOFG_16]

Apparently, most of the inspectors find it difficult to identify violations or adjustments based on dubious evidence. As reported by the following PSCOs, they face the inventiveness of seafarers who possess the advantage of knowing the recording practices and software available onboard. A particular PSCO shared his experience:

“It is very difficult to find that a member of the crew has [...] exceeding working hours or have not reached the resting hours, because they have software - when you introduce some error, the software makes an alarm. So, it is very easy to modify. So, we have to believe that [which] we have checked on paper.” [PSCO_6]

Additionally, cross-checking with logbooks and other records may not be sufficient to ascertain violation or adjustment in the eyes of one of the PSCOs:

“Typical finding is that they maintain the work and rest hours “nicely” [they manipulate the records to show compliance] – there we cannot find anything, but it is there that they are not collaborating [corroborating] with the work that they are doing. When we are cross-checking, it is mentioned he is in the rest, but in the bunker log it is there that the chief engineer is there [on duty]; on the manoeuvring, captain is there [on duty] – but where it is mentioned? It means that something is there, but you can’t find it.” [PSCO_18]

Some PSCOs suggest that seafarers’ interviews complement the inconsistencies found in records and may support the collection of evidence:

“As to verifying rest hours, I check records and some documents – oil record book, bunkering, and logbook... ship’s safety manual... So, I use this to cross-check, and interview. So, I prefer cross-check method to find out some mis-[take] [barely audible] over of rest hours.” [PSCOFG_13]

They expect the ultimate evidence such as confession during face-to-face interviews. However, here too, inspectors may face the reluctance of seafarers to admit non-compliance with regulations.

“It’s not very easy [to detect work/rest hour violations], but if we cross-check with the bridge logbook to find some different; we cross-check with the shipboard working arrangement to find some difference between that; but it’s not very easy to find without... because the guys don’t really want to speak to us.” [PSCO_8]

Interestingly, during the focus group with the trade union, the ITF inspectors almost unanimously claimed that detecting records adjustments is manageable with appropriate cross-checking. It is noteworthy that, contrary to PSCOs, ITF inspectors are conversant with labour inspection and are not constrained by strict national guidance limiting their investigations.

This suggests that PSCOs with limited seafaring experience and exposure to labour inspection may feel uneasy when conducting work/rest hours in-depth verifications.

Seafarers' views on inspection

By adjusting records to protect themselves, seafarers erase the first pieces of evidence of non-compliance in the work/rest hour records. In short, they bet on the superficiality of initial inspections. Seafarers' responses include:

"And port State as I said, they cannot enforce anything else – they can only check those lists [work/rest hour records] - which we are making. So, they do what they can but it's useless". [Captain_SEA1]

"[...] through the papers [work/rest hour records] it's almost not possible to discover. Very, very, very hard to discover, because the paper – possible to adjust and nobody can find this." [C/Officer_SEA2]

On the other hand, the seafarers recognize that, on certain types of trade or ships, the professionalism of inspectors may allow them to detect inaccuracy of records. However, this would require the cross-checking of various documents. As highlighted by one of the participants:

"Yes, they, the PSCOs do their job professionally of course. They check [work/rest hour records], and they cross-check with the record book, logbook. Rest hours book, everything was done well, but I also – I was not born yesterday, I know this is kitchen and I know how to adjust everything done on the paper so to say. But paper as you know, quite different from the real life. But the trading of the vessel was also not so bad, we had big sea passage. But if the vessel working close to shore, on the coast; trading short sea passage like container vessel, it's completely impossible to follow and very, very hard to adjust the work and rest hours in that time." [C/Officer_SEA2]

Stakeholders' views on detection

PSCOs can reason that crew are fatigued based on ship's trade patterns and their own experience. However, their own subjective perception and intuition are insufficient grounds to trigger follow-up actions. One of the participants raised this matter during the focus group:

"[...] But I can see that they are fatigued after manoeuvring, after discharging cargo – I can see. But after seeing it, what the PSC inspector can do? They look fatigued; they tell you they're not fatigued. Then what grounds you've got?" [PSCOFG_18]

Rightly, stakeholders agree that objective verification of fatigue is difficult and consequently nearly impossible to base action on this alone. One of the shipowners highlighted:

"[...]then you [inspector] need really good evidence to catch you [seafarer] being too tired or if you are having severe fatigue. It is very, very difficult to prove." [Shipowner Organization_Comp1(a)]

Without medical or psychological examination with objective methods, it is impossible to ascertain fatigue. Currently, PSCOs do not possess such tools and expertise.

Therefore, the only way to combat fatigue is to enforce regulations and develop detection practices that enable the capturing of violations and inaccuracy. For some stakeholders, particularly those with sea-going experience, the detection is considered easy:

"It's [verification] very easy to do – port State should be doing it. You go look at the rest hours and then say, 'Show me your last bunkering time; cross-check'." [NGO_Orgz6(b)]

While some regret that insufficient time does not allow inspectors to conduct an in-depth investigation, others, such as one of the NGOs recall that it should not be the duty of PSCOs:

"Now it's [verification] very difficult, because I know a lot of PSC inspectors and other inspectors who go on, they look at the logbook and it's fine; but they look at the crew and they are tired, and what do they do about it? Do they call the blinders? The only way you could do that is if there was an accident, what would happen is you would forensically dissect that logbook, and you would say, 'Tell me exactly what you were doing' and then compare that; but that takes a lot of time to investigate beyond what they have been told in the logbook." [NGO_Orgz3]

Given that they form a key safety net (the last one), PSCOs remain indispensable to the contemporary system of enforcement. However, the system with all its influencing factors as it stands, does not make it possible for PSCOs to cover all applicable international conventions in the in-depth way that is needed. One participant stresses that the best lines of control would be upstream:

"The best position to detect are the companies and flag State. For PSC inspections it is more complicated; one needs to have a careful look if possible and cross-reference records etc." [Special Government Organization_Orgz5]

With its close and permanent contact with the ship, the company can distribute additional resources whenever necessary and possesses coercive powers over ships. In legal terms, the company has the obligation to ensure that ships and masters can correctly apply regulations and are given sufficient resources to operate safely. This view was supported by one of the shipowner organizations:

"It is the company, isn't it? In terms of who is ultimately responsible, because it is their ship, so under their SMS and Document of Compliance they should have systems in place to make sure that they are monitoring, and to make sure the safety of all persons on board." [Shipowner Organization_Orgz7(a)]

While some good companies monitor and respond to inappropriate implementation of regulations on the ships, such companies are not in the majority. One of the shipowners shared their practice:

"That is something that we do when we go onboard ships, we cross-check the records of the work/rest hours against the actual logbook and the operations. So, then you can really see that things are not the way it is, and we still find that [recording malpractices] as a major audit finding, even today; and it is a challenge." [Shipowner Organization_Comp4]

Indeed, seafarers overwhelmingly (n=18 of n=20) pointed out that most companies' management are aware of the shortage of manning and its impact on work/rest hour records, but the management neglects their complaints and implicitly incite the adjustment of records. One of the seafarers elaborated on this as follows:

"Even if you report the actual rest hours record, including actual overtime, company owner ask and come right back to you to adjust it. So, knowing that this is the case, we don't even wait for the report to go to the office. We adjust the overtime ourselves and try to compensate in some way. [...] Company always pretend they don't know, but they know the situation onboard, seeing the level of work and operations. At the end of each contract, master and other senior officer provide their feedback...and nothing seems to improve." [Captain_2]

The appropriate follow-up

When violations are detected, it seems uncertain what action to take, as it is left to an enigmatic 'professional judgement'. This matter was raised by some of the PSCOs:

"I will say it is in relation with the general overview and the general deficiencies of the ship; in the PSC seminars always, all say as '[...] under our professional judgement' – always is [like] that." [PSCO_6]

The past experience of inspectors and their own priorities influence their attitude and responses when confronted with work/rest hour deficiencies.

"[...] if I detect some mis-compliance, how can I say – it already passed, so just advise the captain, 'Your rest hours, take care not to break the rules.'" [PSCO_7]

Furthermore, it is interesting to note that a seafarer who briefly worked as PSCO demonstrated sympathy to seafarers by not issuing deficiencies when acting as a PSCO:

"I didn't have much experience doing PSC inspections at that time, but the other inspector took me because I have tanker experience. When we went on board and began to check their drills and resting hour period I found some inconsistencies immediately. But I did not give any deficiency because I know that it [work/rest hour compliance] is a practical problem. It's a general problem on ships. Ships do not care about rest hours, they were passing inspections, vettings." [Captain_3]

In short, the PSCOs seem to prefer simple and clear technical deficiencies to ambiguous labour-related non-compliance. A former PSCO summarises the issue:

"'Should it be an observation, or is it a detention, or what is this?' So, I think from port State; a former PSCO point of view, that might be a very difficult area to go into. I would rather stick with a safe area because if you want to make any mark or any deficiency on a ship, you need to be on solid ground and 'What Conventions you are talking about, and what is my observation?'" [Special Government Organization_ Orgz18]

In any case, as demonstrated by two PSCOs in the focus group, the rate of deficiency-finding and detention is nearly negligible particularly in comparison to other items:

"[...] I've done 5 years of datamining from 2015 to 2020 on all [name of a major developed country] detentions and I found three in that amount of time based on work/rest - it's specifically called out work/rest, in five years. On the other hand, looking at examples that involve MARPOL Annex I, I believe there is well over 100 examples of these." [PSCOFG_10]

"[...] like my colleague from [major developed country], I've done my homework before coming - on 2017, you have two codes, 18002 and 18001 about rest hours. You have two codes and in 2017 we conducted in [name of large European country] 1200 inspections about, and in 0.75% about these codes, is deficiency for [large European country]; and 2018, 0.92%; and 2019, 1.17% It's very low, and no detention about that [work/rest hour violations in particular]." [PSCOFG_8]

Additionally, from 2018 to 2020 (as at 04 August), of the 10,812 deficiencies recorded in their system, the United States Coast Guards reported only 2 deficiencies for PSC Code 01308 "records of seafarers' daily hours of work or rest" (2 resulted in IMO detention) and 1 deficiency for PSC Code 09235 "Fitness for Duty - Work and Rest Hours" (0 resulted in IMO detention). In contrast, over the same period, 77 deficiencies for PSC Code 01315 "Oil Record Book" (20 resulted in IMO detention) and 381 deficiencies for PSC Code 141 "MARPOL Annex I" (85 resulted in IMO detention).

The convergence of data indicates that work/rest hours attract limited effort from enforcement agencies worldwide.

Slippery area or non-priority, the PSCOs do not seem to take often actions on the issue, as confirmed by an experienced PSCO:

"I've never detained a vessel on rest hours and if I recall, I don't think I have ever given any deficiency on that also." [PSCOFG_16]

6.5 Summary

Considering the magnitude of the problem of fatigue at sea and multiplicity of indisputable research evidence, PSC action and mediation seem trivial. This may indicate that priorities in PSC inspections remain the technical parts of shipping (the hardware) and not issues relating to labour (the liveware). This is in stark contrast to the data confirming that the human element contributes to most casualties and to the findings of the concentrated inspection campaign (CIC) on STCW rest hours, for example that of the Tokyo MoU [55] which found that 62.7% of the CIC-specific deficiencies related directly to record-keeping. All this provides concrete evidence of a poor level of compliance with regards to the work/rest hour record-keeping requirements and also a poor PSC response. The only exception to the latter, relates to when CICs on rest hours are carried out.

07

Systemic failures in shipping



In their report, the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling accident attribute failures in industry and government as the root causes of the 2010 Macondo Blowout disaster. “The missteps were rooted in systemic failures²⁴ by industry management [...], and also by failures of government to provide effective regulatory oversight of offshore drilling [56].”

The continuous failure of authorities, companies and seafarers to implement work/rest hours regulations suggests systemic failures with origins in:

- the reluctance of certain flag States to address manning levels and strictly enforce work/rest hours regulations based on a desire to maintain competitive advantage;
- the inability of port State regimes to implement and develop effective monitoring systems to ensure the accuracy of records and eliminate violations;
- the disinclination of many companies to accept unpleasant feedback from ships and take appropriate measures to enhance manning levels and reduce fatigue; and,
- the unwillingness to report accurately from seafarers often due to fear or overwork but also because such record-keeping is seen as a pointless and risky exercise when properly undertaken.

Alarming, it seems that there is a growing culture of systemic acceptance of the existence of violations and recording malpractices by seafarers, companies and authorities.

These all result in systemic recording malpractices and the establishment of a “culture of adjustment”. Alarming, it seems that there is a growing culture of systemic acceptance of the existence of violations and recording malpractices by seafarers, companies and authorities.

An illustrative and insightful case study is attached in Appendix 3.

7.1 The influences of shipping culture

In various research efforts, many stakeholders have pointed out the negative impacts of the shipping culture and the prevalence of a profit motivation, sometimes to the detriment of safety and protection of the environment. One participant articulated this kind of observation as follows:

“The culture of the industry...yeah, in terms of denial and this victim status that everybody [...] seems to hide behind, ‘We’re hopeless, we can’t do anything about it’. [...] And there’s lots of stakeholders, there’s sort of lots of factions and so, it’s almost like the industry is geared up to maintain the status quo. And so, if a particular

24 Merriam-Webster Dictionary defines a system as 1) a regularly interacting or interdependent group of items forming a unified whole; 2) an organized set of doctrines, ideas, or principles usually intended to explain the arrangement or working of a systematic whole; 3) an organized or established procedure [73]

organization might want to do the right thing, it's almost like they get pushed pack into their box. It's almost like, 'Don't rock the boat, because you spoil it for everybody'; and so, there's this pressure to keep it at the lowest level, rather than aspire to the highest level. And I think that's driven by money, by profit; profit motive over performance really." [Industry Organization_Orgz11]

This culture positions the free circulation and operation of ships above anything. As expressed by Anderson, "[t]he primary role of shipping is to make profit from carrying and delivering cargo for freight"[57]. Consequently, each segment of the industry strives to facilitate seaborne trade via ships' endless motion.

This culture positions the free circulation and operation of ships above anything. [...] Even inspectors fear stopping ships, especially for work/rest hours violations [...]

In this context, seafarers, on the one hand, work to ensure smooth ship/cargo movement even when doing so compromises/negates legal requirements such as working time limits. Their obsession is to avoid any form of operational disruption. On the other hand, companies push for the continuation of operations, even with strained resources to maintain/improve their position on world markets. Even inspectors fear stopping ships, especially for work/rest hours violations as noted by some PSCOs:

"I think that there is a culture almost of fear among PSCOs to write that because it's, like I said before, it's going to be challenged." [PSCO_10]

For seafarers, whose training in many jurisdictions tends to lead to a culture of obedience [58], the pressure of the industry and the defence of ship interests is completely internalised.

"The culture of saying no or questioning the authority is not there, and sometimes for a good reason." [2/Officer_1]

Furthermore, former seafarers working in shore-based offices seem to assimilate the company agenda and always push for more with less. They try to fit in with existing practices to enhance what is purportedly work productivity and seafarer resilience. Thus, they perpetuate less-than-optimal practices. One of the seafarers responded in this regard:

"Because of fear, I don't think anyone will try to report such things. Those guys [onshore management] are hardcore seafarers. They believe that as a seafarer you have to go through that phase, that's why they always say, 'As a seafarer you need to be strong.' [...] If it means that you have to work around the clock, you will work around the clock, so they don't see anything wrong about it. Even though it ultimately results to fatigue, they believe that's how it's supposed to be. So, I don't think some of them [seafarers] will go report; I have never reported it either because that's how I was taught. That's how they teach; you learned the hard way. I wanted to become an officer and then that's when you relax and see things. Actually, the things are not supposed to be like this." [3/Officer_1]

Some participants suggested that significant cultural and structural changes are imperative to overcome the current shortcomings. One participant in particular, believes that:

"..., everything is defeat-able; you're only dealing with the symptoms and the real problems are at the culture side of things, are at the manning side of things, and the planning of work." [NGO_Orgz8]

7.2 Sleep time versus recreation/leisure time

As early as in 1919, the ILO recognized that balanced work should blend 8 hours of work, 8 hours of leisure and 8 hours of sleep [27]. The limitation to 8 hours for work would allow sufficient time for leisure/entertainment without jeopardizing sleep. Therefore, the limitations set in the MLC, 2006 and STCW regulations, which require a minimum of 6 hours continuous rest, implicitly assimilates rest to sleep.

On chronic fatigue, some organizations suggest that seafarers are unable to manage their sleep and entertainment during their rest:

"I could not make them go to bed, I could make them not work; and this is one of the things that came up in the modern day with computer games, because you know if people go to their cabins, and they are out of sight, they may be watching movies, playing computer games and not actually getting the rest." [NGO_Orgz3]

"But they might stay up watching a video or doing some hobby. So, there is a problem as well, you can get particularly; when you're on a ship where it's quite lonely, you could spend a lot of time doing a hobby or watching videos or writing home, email or whatever and suddenly actually you haven't had your sleep. And that's their fault." [Shipowner Organization_Orgz7(e)]

These comments indicate how much the rest-sleep assimilation deny the right to entertainment. Overall, this challenges the current perception of what balanced work for seafarers should be.

In addition to sleep, entertainment/leisure are essential components to human wellbeing and promote good mental health [59],[60]. The limited recreation opportunities on board have been clearly recognized in the literature as a major stressor for seafarers, along with fatigue, separation, and loneliness [61].

In conclusion, the satisfaction of basic human needs require a revision of the 14-hour workday framework, to allow time for leisure activities and sufficient sleep.

7.3 Seafarers locked in tradition and fear

The 'can-do' culture and the ways seafarers expose themselves to lawsuits when falsifying work/rest hour records indicate that their main allegiance is to the ship, its owners, and the onboard representative of such interests, the shipmaster. Therefore, as an internalised practice, seafarers may deliberately violate national and international regulations to smoothen ship operations in order to proactively avoid trouble with the company. This practice is also recognised by one of the shipowner organizations:

"[...] people are absolutely not afraid to write something absolutely different than what they have actually done in terms of rest hours, because to them it's not even a mistake. If you ask them, this is what we do in real life, but on paper, this is what we do and this is how it is done on this ship, and this is how it is done in this company. So, it comes to the culture and how they look at this and in those cultures, you can see a good correlation between the number of accidents and these sort of happenings." [Shipowner Organization_Orgz1]

The culture of adjustment indicates that seafarers place the ship interests first.

The culture of adjustment indicates that seafarers place the ship interests first. They prefer putting themselves in a vulnerable position to protect the ship than risking operational disruption. In doing so, they respond to the commercial pressures relayed to the ship, as highlighted by an NGO representative:

"The problem you have is perceived commercial pressure on the ships; if guys are scared that they are going to lose their jobs, or they are culturally not able to say 'no' to something they know is wrong, that's where your problem lies." [NGO_Orgz6(b)]

One of the NGO participants elaborated on the influence oil companies and vetting regimes have on seafarers' actions:

"[...] the oil companies [...] they've got the vetting organizations, and they've got the big sticks, but again, they've got a hammer [...]. And that hammer ensures that the people onboard the ship don't want the ship to be arrested, don't want the ship not to have cargos because if they do that, then they've lost their livelihood." [NGO_Orgz8]

In short, seafarers directly associate their short-term and long-term future with the continuity of operations. Consequently, to protect the company and their employment, they accept to adjust records whenever deemed necessary. One of the participants (NGO) articulated the prevalence of adjustments made to various records:

"If you are doing this [adjusting records] within the working hours, you are going to do it [adjust records] with the maintenance logs. [...] And again, this is when you have these fantastic maintenance systems, and you haven't got the people to do it – you can't do that [maintain certain equipment] once a week." [NGO_Orgz4(c)]

This attitude of seafarers, even if misplaced per the requirements of the conventions and compromising their own fitness for duty and freedom, is understandable because their careers, retention, and wellbeing are perceived to be attached to the steadiness of operations. Any disruption or recorded deficiency after an inspection or vetting may detrimentally impact their already precarious employment, especially in a context where this is used as a premise to question their professionalism. PSCOs also recognise that seafarers will put the ship first in order to protect their livelihood:

“No, they would not [complain]. My impression from the attitude I see is that they would not; even if we found something wrong, they would be on the side of the captain and they would try to cover it. At least for us as port State officers, it’s difficult that they would come to complain... To keep their jobs.” [PSCO_21]

“I think it [fear] is a huge thing; they’re very fearful of management, they’re fearful of perhaps the senior officers onboard, and most of all they’re scared of losing their job.” [PSCO_10]

Consequently, the effects of a mixture of tradition and obedience, fear and loyalty, lead seafarers to absorb the shipowners’ interests as their own, even when these interests are initially contrary to their values. Participants shared their thoughts and experiences regarding this practice:

“[...] and seafarers comply because they invariably have a ‘can-do’ attitude and they want their companies to succeed.” [Industry Organization_Orgz11]

Any departure from the expected attitude may immediately be sanctioned as highlighted by one participant:

“People started complaining to me and to master, but master didn’t like to do anything. I just followed my instruction - do not make complaint to ITF directly, instead inform DPA. Of course, they paid money immediately, but when I came back home, I discovered that I had very bad recommendation. They [the company] would not recommend [me]; ... and from that time, I cannot find any job at all, because if the people [future employers] try to call – I don’t know what they [the company] say to them.” [C/Officer_SEA2]

Such outcomes affect seafarers’ psychological responses when it comes to violating their rest hours and adjusting the associated records. Again, for seafarers, the priority is the ship, not their rest. This attitude entails many risks because it may affect their personal safety and health and increase their criminal liability if violations and adjustments are considered criminal offences in the relevant jurisdictions.

In addition, overworked seafarers see working time records as time-consuming and pointless requirements with no impact on their real professional lives. One of them shared his opinion of the recording requirements:

“Seafarer considers that these [work/rest hour] records are only for inspection purposes. So, they are interested in filling it correctly. Most seafarers think that it is an additional paperwork over the existing ones. Company don’t want to reveal that their ships are having issue with management of rest hours.” [3/Engineer_1]

Finally, instead of attracting positive responses from companies (as required by the International Safety Management (ISM) Code) and support from national authorities, accurate records that show work/rest hours requirements not being met, are used to blame or sanction seafarers. Violations remain hidden because few organizations seem willing to acknowledge the systemic issues that perpetuate their occurrence and to take the appropriate and fundamental actions required to address these issues adequately.

7.4 Inadequate responses from companies

Companies have the duty to implement work/rest hour regulations in their fleets. To do this, they have to ensure adequate resources are provided; records are appropriately maintained; feedback from ships about operational difficulties trigger action; and verifications are maintained. However, the effectiveness of each level of implementation depends on the willingness of shipowners to comply with the international requirements and the effectiveness of verifiers (flag State inspections and surveys as well as port State control).

The influencing role of shipowners in shipping

Shipowners/managers make fleet budget allocations based on short to long-term corporate agendas and the resources to be made available to each vessel. Budget line items include crew resources in terms of quality and quantity. Four factors are particularly dominant in influencing crew selection: the safe manning levels, the flag, the sectoral specificities, and the competition in the segment. The safe manning level allows the setting of the minimum number of crewmembers on board and as mentioned previously, is a competitive factor between flags, as reiterated by one of the NGOs:

“It’s [safe manning] a commercial decision and flag will compete against flag to the lowest common denominator.” [NGO_Orgz4(c)]

Additionally, as highlighted by one of the industry organizations, by setting the norms applicable on ships, the flag determines working conditions, for example in terms of work/rest hour limits:

“I mean flag States, they won’t put more stringent requirements regarding the maximum hours of work or the minimum hours of rest, because they compete with each other. I mean there is a competition between flags, so they just put the minimum requirements.” [Industry Organization_Orgz2]

The sectoral specificities may be associated with an enhanced supervision system by private entities such as the Ship Inspection Report Programme²⁵ (SIRE). Such third-party

inspections are an additional verification layer for certain types of ships. These extra verifications are taken very seriously by companies because their outcome directly affect commercial operations. Clear instructions are therefore transmitted to the ship and additional crewmembers may be engaged, as highlighted by one participant:

“We have taken up this issue with the company. They have implemented a policy of three watchkeeping officers on navigation side and three watchkeeping engineers on engineering side. Lots of issues are already covered but there are still some cases which I think is within the permitted limit per month as per SIRE guidelines”
[Captain_1]

The remote involvement in onboard operational conduct has never been so high; this is also true of the knowledge of the operational situation on board.

The competition in shipping influences each ship management element’s²⁶ decision in terms of crew budget. The goal of the owner is to maintain maximum levels of profit and encourage competition between service providers. As previously reported by Bhattacharya and Tang [62], this results in the indirect relaying of commercial pressure down the line to ships, which encourages compliance on paper. This notion of transferring the pressure down the line is confirmed by one of the industry organizations:

“... with capitalism as we have today, and there is a huge competition everywhere, a lot of these guys are saying, ‘Ok Mr. Owner, let me think.’ And, the pressure goes down; ‘Please don’t report that because I can’t help you’; and ‘If you don’t want to help yourself, I will find somebody who will.’ So, the captain is then going on chief officer; chief officer is going on 2nd mate; 2nd mate on cook and so on and so forth. So, the rotten part comes from the top unfortunately.” [Industry Organization_Orgz12]

Additionally, the companies decide the operation profile of each vessel and with new communication technology can monitor, advise, instruct, or sanction at any moment during operations. The remote involvement in onboard operational conduct has never been so high; this is also true of the knowledge of the operational situation on board. One of the seafarers relayed his experience of how companies choose to deal with the matter:

“They [companies] know by seeing the work done report, route, etc. They know everything. They consider managing this [violations of rest hours] is the responsibility of those onboard. They know everything and keep quiet unless too many complains.” [3/Engineer_1]

In short, the shipowners possess large freedom in choosing the conditions of ship operation. They select most parameters starting from the budget allocation to operation profile, as well as verification and monitoring systems (flag, vetting, and remote monitoring). Therefore, they seem to influence the shipping sector primarily with limited counterbalance in power from other stakeholders, as viewed by one of the participants:

25 “The SIRE Programme is a unique tanker risk assessment tool of value to charterers, ship operators, terminal operators and government bodies concerned with ship safety.” OCIMF website retrieved 13 September 2020 - <https://www.ocimf.org/sire/>

26 Ship management element refers to the multiplicity of entities involved today in the operation of ships sometimes under the umbrella of one shipping company e.g. manning agents.

“They [companies] play this ‘power leader’ argument here – if you don’t do what I want, I will go somewhere else; and that applies to the class society, owners apply that to flag, and they apply the same argument to ship management. [...] So, it’s off balance at the moment.” [Industry Organization_Orgz12]

This powerful role of shipowners on ship operation led Soma to say in 2005: “The deciding factor in shipping accidents is the shipowner [63]. ”

This can be argued to give a rationale for the strict verification of the application of international standards by the flag and port State authorities.

Shipping companies’ failures related to ISM Code

One of the very influential instruments to facilitate the implementation of international regulations on ships and in shipping companies is the ISM Code. The requirements of the Code are particularly significant in relation to the implementation of work/rest hours by shipping companies. Indeed, the ISM Code through the SMS establishes mechanisms to ensure that companies²⁷:

- provide adequate resources to ship operation;
- facilitate feedback from crew;
- regularly monitor ship operation (audit); and,
- establish instructions, plans, and procedures to safely operate the ship.

However, the views and experiences of the respondents indicate failures in achieving these objectives in relation to the implementation of work/rest hour regulations.

Indicators of failure of adequate resources

The first indicator is the continuous questioning of manning level by overwhelming majority of stakeholders. Some suggest that the minimum manning certificate should encompass the diversity of ship operation and not be reduced simply to a single model voyage. According to numerous stakeholders, the operational profile of the vessel should drive the manning of the vessel, and not be seen as a competitive advantage. One of the seafarers in particular highlighted that various factors are not appropriately considered:

“They [companies] can analyse the condition under which ships are operating in and accordingly allow for more number of crew depending on the circumstances. They should consider type of ship, trading/route of ship, age of the ships and maintenance requirement when deciding the appropriate number of crew necessary for the vessel to operate safely.” [2/Officer_2]

27 The ISM Code is unambiguous. Among its responsibilities, the company has to:

- “take over all the duties and responsibility imposed by the Code” (Part A / 1.1.2);
- ensure “that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account” (Part A / 1.2.3.1);
- ensure “that the policy is implemented and maintained at all levels of the organization both ship-based as well as shore based” (Part A / 2.2);
- ensure that the master is “given the necessary support so that the Master’s duties can be safely performed” (Part A / 6.1.3);
- ensure that “procedures ensuring that non-conformities, accidents and hazardous situations are reported to the Company” (Part A / 9.1) and corrective actions initiated accordingly (Part A / 9.2);
- establish “procedures for internal audits and management reviews” (Part A / 1.4.6)

The second indicator of failure in providing adequate resources is the regular violations of regulatory limits by seafarers. As previously mentioned, seafarers reported unaddressed systematic violations, and the impact of port operations on the violation of hours is particularly high; one such example follows:

“Situation where we have multiple port entry/exits. If we do more than 2 ports in a month then that many violations were observed. If it is more than that then the records were adjusted.” [Captain_1]

In short, it is suggested that the current manning level may work in ‘normal/ideal’ navigation mode. However, as soon as port operations and special tasks such as maintenance and repair are considered, the resources available become insufficient to avoid violations.

On the positive side, a well-implemented system per the ISM Code would ensure that non-conformities such as insufficient manning levels are reported to the company for action. Unfortunately, the mistrust between ship and shore and their different agendas undermine such reporting and related actions.

Broken ship-shore communication

Open and fearless communication flows would allow feedback from the ship to be channelled to the top management for effective consideration and response. In this respect, the ISM Code requires the nomination of a Designated Person Ashore (DPA) with direct access to top management. The DPA’s critical role is to ensure “a link between the company and those on board” (Part A/4). However, the ideal picture of well-functioning communication flows seems disconnected from the practice. A participant is particularly critical about the role of DPAs:

“Running on from that, one of the corner-stands of the ISM is the DPA; now, with virtually no exception, the reports we receive from seafarers on board ships – they will not go to the DPA, because they do not trust the DPA. Now, whether this is a genuine situation or it’s just perception, whatever it is – the rank or the role of the DPA is failing miserably. And until that is addressed, we’re going to continue on a gentle downward slope.” [NGO_Orgz4(b)]

Moreover, a PSCO commenting on his experience about DPA suggests that his/her role becomes to transmit commercial demands to ships:

“They [the company] want all the records are smooth and clear and good. I encounter many incidents with this kind of problem, because the company, DPA actually, just already tell the Master whatever happen you must make sure that no report on the vessel.” [PSCO_1]

Additionally, burdensome processes and suspicion add to the bureaucratization of the ISM Code to create barriers to effective reporting and feedback. Seafarers shared their views in this regard:

"[...]everybody is encouraging you to report near-misses. But when you report the near-misses, superintendent will call you to ask, 'Did you do something like that? How can you do that?' So, it's becoming a bad reputation for you." [Captain_3]

"[...] so even if masters agree that we will send the same violation [related to rest hours]... Then, the company ask hundred paperwork, hundred questions about 'Why it happened?'; 'Why you didn't plan?'... and it actually like blaming master and the other crew members... It actually backfires [on] us..." [C/Officer_3]

When eventually feedback reaches the company, ninety-five percent (95%, n=18 out of n=20) of the seafarers' panel question the quality of the response which often dissuades them repeating such efforts. One seafarer perfectly encapsulates this view:

"As I said that initially when we join a vessel, we try to report actual violations, but we get negative response from the office.... Company ask master for clarification on rest hours violation when master reports...to know why the violations happened... Usually we don't do it [adjust records]... But once we know that nothing will happen here that from the next month or the week... We start making adjustments" [C/Officer_2]

In rare cases, the company responds positively by providing additional crew. To convince the company, the ship has to battle and demonstrate the absolute impossibility to comply otherwise. To this end, one of the seafarers highlighted a positive response from management ashore:

"So, after long communication with the office finally it was made clear by the captain to the office that there are lots of violations which cannot be handled by any other means, so we need an additional officer. So that is why we had an additional officer over there after a long talk with the company regarding the rest hours." [2/Officer_2]

Ship monitoring and internal audits

As reported by one participant, the monitoring of rest hours is part of the audit system:

"It's part of our internal audits; that's a thing [work/rest hour compliance] that we will look into." [Shipowner Organization_Comp1(b)]

So, the company monitoring of the ISM Code is based on internal audits which correspond to a document review. What is the validity of such audits when documents are cleaned-up before hand? To verify the accuracy of records, the auditors need additional data and the willingness to go beyond paperwork. Some of the possible verification methods were highlighted by one of the participants:

"[...] I think there are a lot of techniques [...] to check on whether there has been a violation or not. For example, double-checking the records: we take for example the record of the work that was carried out and then just look at the number of persons that were involved in the work and then just sample one or two guys that were involved in that work and check his rest hours at the same time." [Shipowner Organization_Orgz1]

For other stakeholders, the internal audit seems of limited effect in enforcing regulations as such audits remain self-assessments of companies' performance. One of the NGOs raised the limitations of internal audits:

“The only way to enforce it is port State or an inspection regime from that side. Because, internal audits don’t do much; they might look at it and give you an observation or non-conformance, but that’s an internal audit.” [NGO_Orgz6(b)]

Bureaucratization leading to overwork and fatigue

The ISM Code empowers companies to develop, structure, and populate the substance of the SMS as they wish. Even though highly recommended, the ISM Code does not mandate seafarers’ participation when establishing the SMS. Participants report that practices onboard can differ substantially from the procedures documented in the SMS. One such example was mentioned by an accident investigator:

“No. The thing is that when we investigate accidents, we see that there are, to use an overly used term – ‘work as done and work as imagined.’ And the difference between the proceduralisation of a ship, meaning how the safety management system is being designed from the company and how work is being carried out; the discrepancy between those two is becoming larger, and larger, and larger.” [Special Government Organization_Orgz18]

The procedures and checklists form a burdensome bureaucracy seemingly following its own aim to demonstrate compliance on paper. One participant elaborated on this point:

“[...] And the rest hour regulation schemes are just a part of that; it’s an extension of that. ‘So, this is something we fill out in order for us to get going, and when the auditors come or the PSCOs come, then we have something to show them. Make sure that the bureaucracy is in compliance and working, including all the other documents we have in the ISM system.’ But what’s going on in the ship is a completely different matter.” [Special Government Organization_Orgz18]

Finally, inflation in paperwork adds a burden to already overloaded seafarers. Participants share this sentiment:

“Apart from normal watchkeeping hours, officers are busy in additional ISM paperwork. The story does not end here. At sea, we are very much involved in keeping vessel in shape. We also keep vessel ready for PSC, annual class survey, right-ship etc.” [C/Engineer_1]

“One is culture, that’s an important driver, but the second factor is the amount of bureaucracy and paperwork has increased, so people have to do their watchkeeping time and then they have to do their paperwork. And they may be doing their paperwork when they should be getting their rest time.” [Shipowner Organization_Orgz7(e)]

This clearly impacts seafarers’ workload and affects their rest capacity. As described in previous research, they become “fatigued for safety” [62]. Finally, one respondent questions the overall efficiency of the Code:

“The thing here is, [Orgz12 (Industry Organization)] is trying to say, ‘This Emperor is naked’ But nobody wants to say that, and everybody is saying, ‘No, no, beautiful dress, really. We love this dress, it’s fabulous; it’s called ISM – everything is fine.’” [Industry Organization_Orgz12]

While the lack of seafarer participation accelerates the drifting apart of ship and shore perspectives of work practice (as identified from 2009 by Bhattacharya), the bureaucratization seems to result from shore management inflation of procedures to push any form of responsibility toward ships.

Limited consideration for rest hours

Because employers correlate hours of work with productivity, competitiveness, and profits, there is an incentive to augment working time to reduce operational expenses. Therefore, the question of manning levels or fatigue collides with tight financial margins in some segments of the industry, as raised by one of the participants:

"So, for me I think it [fatigue at sea] is a big issue and [...] that it has got to do with manning because you're more incentivised to put fewer and fewer people on the ships, because the margins are tighter and tighter from their operations." [Industry Organization_Orgz9(b)]

Despite criticism related to the 14-hour workday in the literature, this reference system remains unchallenged. Indeed, it satisfies the industry to legally maintain dangerous practices such as the 6 hours on /6 hours off system and to control crew expenses. However, some still believe that the current regulatory and administrative framework is adequate and that there are other issues that have to be addressed. This is indicated in the response of one of the respondents from a shipowner organization:

"[...] we leave the current provisions of STCW and MLC as they are. We believe they are sufficient and as I mentioned with the guidelines on fatigue, we believe that there is more to fatigue than just rest-hour compliance. [...] There are many other things that we need to tackle and work on with other stakeholders, administrations and port State authorities with regards to inspections and reporting; we can work with our seafarers' representatives and work on certain aspects." [Shipowner Organization_Orgz7(c)]

The above comment is particularly interesting. It shows how shipowners may be perceived as diverting attention towards other stakeholders. For them, fatigue at sea does not seem primarily driven by inadequate manning levels but by overwork related to administrations' demands and port State inspection regimes, factors which are claimed to be independent of shipowners' decisions. While it is undeniable that administrative

While it is undeniable that administrative requirements and continuous inspections increase workload, it remains the duty of shipowners to ensure that manning levels are adequate to compensate and balance for such external verifications and requirements (expected or non-expected).

requirements and continuous inspections increase workload, it remains the duty of shipowners to ensure that manning levels are adequate to compensate and balance for such external verifications and requirements (expected or non-expected). On shore, companies respond to new regulatory developments by increasing recruitment as exemplified by the broad company response to the ISM Code²⁸. When the Code was established, shipping companies established ISM Code teams and departments to integrate DPA(s) and supporting staff. The increased workload was compensated for by new staff ashore. This did not happen on ships, generally speaking. The increased workload resulting from compliance with both the letter and the spirit of the new

regulatory requirements were just passed on to existing crew. Optimally, instead of blaming administrations and inspections, the maritime industry will be better served if shipowners balance the extra workload required for regulatory compliance and verification with additional seafarers on ships and not have the same crew do all.

The general perception evident from this research is that shipowners do not wish to investigate and assess the compliance issues related to work/rest regulations, as articulated by some of the participants:

"And what shocked me was that nobody really investigated this from a company perspective; I mean nobody really tried to understand." [Industry Organization_Orgz9(a)]

"[...] it's probably the owners that present the biggest challenge, probably; and I suppose also denial. 'We don't have a problem with fatigue' – you know that sort of attitude. But they don't actually ask the right questions. So, they don't know whether they've got; and they don't want to know, because then they will have to do something about it." [Industry Organization_Orgz11]

As long as the violations are purportedly kept hidden from companies and the adjustments performed onboard are not linked to explicit instructions from the company, the responsibility (and blame) for violation and adjustment remains on ships – victims at the sharp end. Companies cannot be considered liable for something they are not aware of. Additionally, some shipowners' trade organizations consider violations and adjustments as anecdotal:

"I wouldn't say it's widespread in any way. I think the vast, vast majority of our owners and managers want to comply with it [work/rest hour regulations]... It's an easy one to bend about, but as [colleague Orgz7(c)] said, 'It tends to be anecdotal rather than firm evidence for doing it.'" [Shipowner Organization_Orgz7(b)]

"Maybe they [seafarers] report it [violations] to companies, but I don't know. You're not the first one asking me, and it's mentioned from time to time, but always I can say, 'I don't know.'" [Shipowner Organization_Orgz16]

However, certain individual companies want to know and address the specific issue. In this respect, a company in the panel developed a specific tool to encourage feedback. The software has been constructed to ensure confidentiality:

"So, we have something called [software solution name] which sort of is a confidential, whistleblowing; and we used to have a lot of work/rest hour complaints actually. Initially when we started it, it took a lot of messaging and convincing at crew conferences to say that this [recording malpractice] is really not acceptable. And I still feel that it [adjusting records] is still going on in the fleet [...] Because they are really concerned that you can have a SIRE observation or a PSC, or the next audit you will have a problem. So, rather than explaining or trying... So, it's easier to just adjust the work/rest hours. " [Shipowner Organization_Comp4]

In short, the problem is known but the challenge remains as the protection of the ship interests seems deeply rooted in numerous seafarers' mindset.

7.5 Challenges in compliance monitoring for authorities

As indicated previously, the authorities face significant challenges in verifying records. First, seafarers ‘clean’ records knowing that the scope of the initial inspection remains limited. Second, inspectors’ resources and time are limited. A captain emphasized this view:

“What they [port State] are doing in view of rest hours, is useless. What they do is check the paperwork, and as I said, we make the paperwork in such a way that we are complying with the law. But they don’t have the means to look for the wrong; for man it’s just plain impossible to be correct – logical thinking... So, they can only check the work/resting hours as we record them.” [Captain_SEA1]

Not seeing advantages to and any change resulting from reporting violations on work/rest hours, the crew seem reluctant to cooperate further with inspectors. Seafarers are generally neither rewarded nor protected²⁹ for reporting violations. On the contrary, reporting usually brings them trouble. At best, the consequence of such reporting will precipitate unpleasant emails or calls and additional workload. At worst, it leads to reprimands, sanctions, and blacklisting. Finally, seafarers witnessed that reporting violations does not better their working environment nor trigger any effective action by inspectors. One of the participants clearly stated this:

“Because I have been inspected by PSC and my vessel has never been detained or we never receive any warning regarding the fact that we are working on a daily basis 13 hours a day.” [C/Officer_4]

Consequently, any form of co-operation between enforcement agencies and seafarers seems improbable. Not supported by seafarers, PSCOs never or rarely receive complaints about their (seafarers’) situation:

“So, it is very difficult, to also have a complaint of the member of the crew. A written complaint by the member of the crew is a great help for us [...]” [PSCO_6]

Consequently, any attempt to question the quality of record-keeping requires the inspectors to confront records, crew silence, and their own (un)willingness to leave their comfort zone.

Despite being spread in various documents, the collection of inconsistencies remains feasible for experienced inspectors, though it involves significant time and effort

²⁹ Except in some rare occasion when the seafarer is protected as a whistle-blower such as United State vs. Princess cruise line

in cross-checking. Furthermore, in the eyes of numerous inspectors, minor/basic inconsistencies may not constitute sufficient pieces of evidence to trigger effective enforcement measures. Interviews with seafarers seem the preferred option to complement initial findings.

Mistrust and lack of cooperation

The purpose of the inspection and its consequences are not the same for each of the respective parties. For seafarers, non-conformity may question their level of professionalism and serve as evidence to initiate reprimands and reprisal. For flag surveyors, PSCOs, and other private verifiers, the inspection regime secures some specific interests such as coastal or charterers' protection. Therefore, the main agenda of inspectors cannot be the same as for seafarers. Additionally, they usually do not demonstrate compassion for seafarers, particularly when the latter hinder the collection of information. The seafarers do not see advantages in facilitating their work. On the contrary, in some rare cases, the authorities report seafarers to shipowners who threaten or sanction them. One example was given by a particular NGO:

"So, the chief officer documented accurately that he had gone beyond the work hours; the PSC inspector came down, saw that, said nothing, reported nothing, went back ashore, called the shipping company – which was registered in that country, and said 'You need to sort this out, because your guys are reporting overtime.' So, the shipping owner went back to the ship and said, 'What the hell are you doing?' They said, 'That is accurate, that is what we do.' He said, 'You do that again, you will be fired.'" [NGO_Orgz3]

Additionally, inspectors hardly ever consider the impact of their work on seafarers' workload. They and other representatives of national authorities tend to impose their own schedule and inspection agenda. Seafarers have no choice but to submissively comply with their demands even when they clearly require resting or recreational periods. Participants share their personal experience and observations in this regard:

"In one instance, in [name of major developed country], we completed tiresome bunkering operation and crew were told to rest. After few minutes, [name of PSC regime] came on board for inspection. I told the [name of PSC regime] that the crew is having rest after busy bunkering operation and requested if it is possible for them to consider this. [name of PSC regime] replied that that is not possible as he has to cover 6 other vessels. [name of PSC regime] requirement to conduct boat or fire drill during inspection. So, we had no option but to agree to their demands. So, the rest hour requirement doesn't work in these cases." [C/Engineer_1]

"...they've got to channel on the river which is not so easy – he [master] is awake until sometimes 5am in the morning. Because the agents, the customs or the police, they come in the middle of the night and disturb the sleep of the captain or the crew or the officers. And a lot of captains have complained to me, 'Why does the customs officer come at 2am in the morning; why can he not come at 9am?' So, it's sometimes; or even the food supply – it's delivered at 12pm – lunch break; so, the seafarers have no lunch. No company thinks about the seafarers, it's crazy." [NGO_Orgz17]

In short, seafarers do not see authorities as supportive and compassionate about their working conditions. They are seen as opponents who, eventually, bring them problems and additional workload. However, the compassion may exist when it relates to employment, as one PSCO commented:

“So, I have to think like a seafarer myself at one stage, because if I have to call this guy out from my job and say, ‘Hey look, I’m thinking of putting you up’, he will plead, ‘Please no; let me work because my family needs me to be on the ship.’ So, that is basically why I say, what is the remedy?” [PSCO_18]

Indeed, PSCOs are aware that violations affect ship operations and expose seafarers to shipowners’ spotlights. One seafarer’s response supports this argument:

“Probably pressure from the office not to have violations, because the PSC they are checking this since MLC is in force. So, companies don’t want any deficiency. Also, if top 2 don’t want to have a headache then, the crew are also afraid to lose [their] job, they keep shut. Company know about this and try to take advantage of it.” [C/Engineer_2]

In short, for seafarers, the least risky option remains to adjust records and hide everything to untrustworthy inspectors.

Regulation gaps

Participants often consider certain flag States as the villains for abusing power during negotiations and the role they play in setting excessive working hours and permitting insufficient manning levels as the ‘norm.’ The feedback from a participant to the Manila conference provides food for thought. The participant is of the view that hours of rest regulations were developed to satisfy some private interests defended by a few States but certainly not to safeguard ships and crews:

“Hours of rest regulations should have changed and in 2010 in Manila we were very close to changing that from 90 hours to 45 hours or 50 hours; but believe it or not – [a country in Scandinavia], [a European country] and [another European country] were absolutely against that, and they had it their way. [A country in Scandinavia] was leading on it; [a country in Scandinavia] was the country that would not allow reduction of hours, and I will remember that vividly – we lost, unfortunately they had silent support from [a European country] and [another European country]. [...] I remember we were all sent back because we could not work out common work, common ground, and IMO at that time said, ‘Guys go back, you have two hours to work out something.’ And what did we work out? 90-hours a week; this is absolutely ridiculous.” [Industry Organization_Orgz12]

Another participant highlights the need for balanced governance to allow decent working time standards to gain increased traction in the maritime world:

“Current regulations are favouring shipping companies and required to be amended in favour of international labour standards for factory workers.” [Captain_1]

ISM Code: A missed opportunity for flag States and seafarers

Among its expanded monitoring activities, the flag State continuously monitors the implementation of the ISM Code on both ships and companies.

In this respect, the flag State has powers that are well beyond those of port States. The flag State can access the shipping company through the issuance and annual verification of the Document of Compliance (DOC). The DOC is an imperative requirement of the ISM Code (Part A /1.1.5 and chapter 13). Without a valid DOC obtained after an audit, the company cannot operate ships. This requirement permits the flag State that is running the survey (or the RO acting on its behalf) to examine the internal functioning of the shipping company. This provides very high leverage to the flag State because the withdrawal of the DOC for major non-conformity prohibits the company from operating, and multiple non-conformities may affect its reputation. It could be an opportunity for flag State auditors to assess the effective relationships and effectiveness of feedback between ship and shore as well as initiate direct contacts with seafarers.

Alternative inspection regimes

Bhattacharya and Tang [62] highlight the impact third-party inspections like vetting regimes by Oil Majors, can have on improving ship safety and indirectly (through the pressure on shipping companies) pressurising seafarers to comply with the higher standards set by Oil Majors. The pressure for success impacts the recording practices and sees the involvement of the company in how records are kept on the ship. One of the seafarers shared his/her personal experience in this regard:

“You [the companies] are telling us indirectly not to get any non-conformities. So that everybody is happy, and no one sees that ‘RED’ [indicating violation] highlighted in the records. If it [violations] comes once in the month, it's fine. It should not be more than two. If it becomes more than two then it is pointed as observation during third-party audits, SIRE/vetting inspection on tankers and PSC. So, you have to play in those parameters not more than two [violations] in a month. There have been incidents where I have noticed that one duty officer gets about three violations and the other gets one. They [the company] tell you to make two violations for each so that you don't get an observation during the inspections. People have been doing that also and that's a very interesting fact...how to play around within the parameters.” [Captain_7]

Notably, having to work excessive hours leading up to a third-party inspection, often has negative consequences on seafarers' occupational health.

Some views on penalties for adjusting records

It is worth recalling that the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I violations often lead to severe penalties for infringers particularly when they forge records. It seems that the penalties associated with MARPOL violations contribute to compliance and reduce (without elimination) malpractices particularly in terms of record-keeping. A similar approach, in terms of severity of sanctions for counterfeiting work/rest hour records (seen generally as

an attempt to deceive public authorities) may, as in the case of MARPOL, lead to a reduction in malpractices.

The discussion of penalties raises major questions such as who to penalise - the crew, the ship, the DPA, the company, all levels, etc.

Thirty-one (n=31 of n=61) non-seafarer participants had clear answers regarding who to penalise; the remaining participants avoided giving a direct response. The results of who the various stakeholder groups believe should be penalised are summarised in Table 3.

Table 3: Stakeholder response: Who should be penalised?

	Penalise seafarer	Penalise company	Penalise both
Shipowner Organizations’ view	1	3	
Industry Organizations’ view		3	1
NGOs’ view		4	1
Special Government Organizations’ view	2		
PSCOs’ view	1	9	6

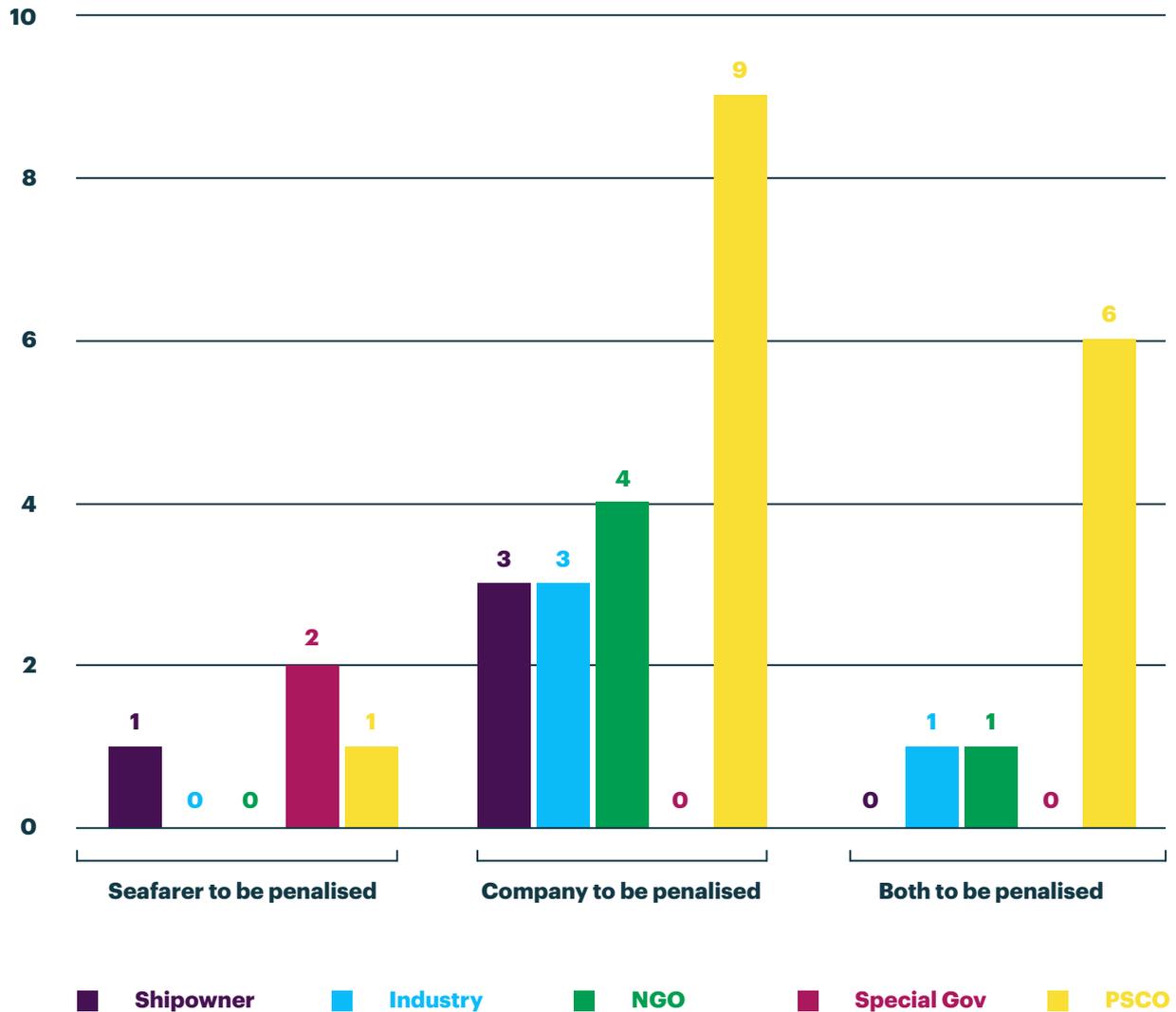
One example of a clearly articulated response comes from a participant in the focus group with PSCOs:

“And last thing – penalty system; penalty system should be embedded to the company, not the seafarers. To the company because everything comes from the top.” [PSCOFG_18]

Three respondents (a shipowner organization and two PSCOs) were of opinion that penalties should be extended to flag States in addition to the companies.

Figure 2 provides an illustration of the results of who the various stakeholder groups believe should be penalised for the adjustment of reports on rest hours.

Figure 2: Summary – Who should be penalised?



When thinking about the consequences of fatigue on seafarers, PSCOs indicate, in addition to enforcing penalties, the responsibility of the master and the need to train inspectors:

“Sometimes that is the first thing for the company, that they provide the shipboard working arrangement according to the MLC requirement; the penalising system is one of the ways to implement all the requirements. But in any case, our job we try to explain to the captain that he must; that he is responsible for the rest hours onboard – he must create the situation onboard that everything; according the working hours and rest hours.” [PSCO_17]

“First of all, should be like the penalties, like really high penalties, not only monetary, it could be like cancelation of the license of captains. Something like, things like that, because even these kinds of things, talking about fatigue could lead to an accident and loss of life. Could be also jail, right? But uhm, it is really difficult you know? You need to train the PSCO too.” [PSCO_5]

Despite having differentiated responsibilities, several participants consider that any penalty system should consider both levels; one example of such response comes from a PSCO:

“Then penalise the company and the crew, because both of them are responsible.”
[PSCO_4]

This recognises the imperative need that the shipping company should provide ‘adequate resources’ as required by the ISM Code. One of the PSCOs made a particularly interesting comment regarding penalties:

“Penalising the seafarer is an easy way out; penalising the company has a long-term effect - and that long-term effect will be negative. The long-term effect will more or less be captured somewhere in the company procedures to restrict the seafarers from doing the same.” [PSCO_19]

Others suggest to also penalise the flag State because the ranking of flags in white/grey/blacklists may not be enough:

“Sanction on company and flag State on that [work/rest hours] issue can be important things for achieving this international rule” [PSCO_7]

Some seafarers also support the penalisation of violations and adjustments. It seems a way for seafarers to force companies to comply with regulations and avoid them having to bear the consequences of decisions made at higher levels. One particular participant made an interesting observation as to what could drive companies to comply:

“For the companies, the stick needs to be bigger [...] if you want the rest hours to be respected...” [C/Officer_4]

However, this penalisation of violations is also deemed to be insufficient to address the problem and may even be ineffective. One NGO had a particular view on ‘forcing’ compliance:

“The solution of just using a stick and trying to get compliance just doesn’t work.”
[NGO_Orgz4(d)]

In short, there is a vast variety of propositions for penalties and most of them seem to include the company. Any discussion related to the penalisation of adjustments of work/rest hour records needs to incorporate the responsibility and powers of each stakeholder in order to best address the issue.

08

Conclusions

Accurate recording of seafarers’ work/rest hours is not only a legal requirement under both the MLC, 2006 and the STCW, 1978, but also a compliance monitoring tool. When records are regularly or systematically adjusted, there is no feedback on the work as it is. Therefore, the management of the company as well as regulators do not have accurate input of work processes. It affects the understanding of the effectiveness of fatigue-mitigating strategies, thereby limiting improvement attempts. It also undermines regulatory enforcement actions.

The empirical data collected from seafarers, PSCOs, ITF inspectors and other industry stakeholders, through in-depth interviews, onboard inspections and focus group discussions converge with and address the various arguments put forward by literature. Furthermore, the collected data suggests that recording malpractices are widespread, known by all stakeholders but differently perceived, interpreted and acted upon.

While responding seafarers and former seafarers from various organizations are unambiguous about the frequent adjustment of records, other stakeholders without sea-going experience do not appear to recognize the magnitude of the problem. Some stakeholders from the private sector tend to consider the issue as anecdotal or unknown.

[..] recording malpractices are widespread, known by all stakeholders but differently perceived, interpreted and acted upon.

The precise quantification of the adjustment of records would require another type of research methodology. However, the data provided in this research and the literature review related to the topic clearly illustrate that the problem of inaccurate record-keeping is significant and systemic. Additionally, the wide geographical diversity of the respondents supports the notion that the issue of adjustment affects all regions.

On the appropriateness of the current international regulatory framework to effectively prevent fatigue and mitigate its effects, the research participants are of the opinion that there is no scientific basis to ensure the effectiveness thereof. The legally permissible number of hours seafarers are allowed, and often obliged to work is in direct contrast to ILO’s eight-hour workday. In addition, the 14-hour workday goes against the findings of research on fatigue and sleep as to what is appropriate for workers in a context such as seafaring.

Nevertheless, the 14-hour workday has patently become the reference standard in the maritime industry, contrary to the apparent intentions of the MLC, 2006 as amended, which refers to the 8-hour workday as the normal working hours standard³⁰. The primary

The root cause of violations and adjustments has been identified mainly in the insufficient safe manning levels approved by flag States.

reference to an 8-hour workday in the MLC, 2006 has support in working time research/literature which show that working beyond an 8-hour workday and 50-hour workweek has detrimental impacts on occupational safety and health. Consequently, it is not surprising that the 14-hour threshold receives stark criticism across the entire range of stakeholders interviewed except from one shipowners’ organization.

The root cause of violations and adjustments has been identified mainly in the insufficient safe manning levels approved by flag States. It is suggested that the commercially driven competition among flag States to keep their ship-owning clients

satisfied has serious impacts on manning levels. The research found that the detailed principles for establishing minimum safe manning are not adhered to in most instances. The lack of focused incorporation of operational elements results in an imbalance between workload and the number of personnel available to complete the numerous and diverse range of tasks required in ship operation. This oftentimes leads to violations of work/rest hour requirements and the situation is exacerbated during peak workload conditions such as those related to port operations.

The research found a “culture of adjustment” among seafarers; work hours are either under-reported or work/rest hour records are manipulated for compliance purposes. This is confirmed by each of the seafarers interviewed; either they themselves do the adjustments, or it is done on their behalf.

The effectiveness of recording one’s hours as a tool to demonstrate compliance to regulations that are designed to mitigate fatigue is widely questioned by research participants and viewed as purely a paper exercise for compliance purposes.

It is worth highlighting that recording malpractices are found to extend beyond work/rest hour records as also highlighted in previous research. Although participants are of the opinion that any record has the potential to be adjusted, certain ones are raised in particular: planned maintenance records, drills, oil record book, risk assessments and the official logbook.

Various factors are identified as contributing to seafarers adjusting their records. Eighty-five percent (85%, n=17) of seafarers interviewed attribute it to the workload during port operations, especially during multiple port operations (short sea shipping) when working 6 hours on/6 hours off due to insufficient manning levels. Other factors that encourage recording malpractices primarily include fear of the company, especially considering employment insecurities and consequences of failing third-party inspections. Bonuses linked to KPIs and the nature of recording software are also mentioned. Many of the programmes are ‘gamed for success’ to ensure compliance with the regulations and incentivise crew to adjust their records.

The underlying culture of shipping companies and the culture onboard the vessel also severely impact effective implementation of the international regulatory framework. Additionally, national inspection regimes seem unsuccessful in implementing and enforcing existing measures to effectively prevent fatigue and mitigate its consequences.

[..] the normalization of deviance is also present in other stakeholders because they accept seafarers’ deviance and deviate themselves by not prompting any modification.

Although PSC activities seem to be carried out according to the established guidelines in the vast majority of instances, only two items (the watch schedule and the records of work/rest) have been found as consistently checked for compliance monitoring and enforcement. While numerous PSCOs reported that other documents are relevant in detecting inconsistencies, this awareness alone may not (apparently has not) result in further cross-checking leading potentially to the initiation of stringent enforcement measures.

Flag State supervision and PSC seem to fail at the implementation and enforcement of work/rest hour regulations. Limited commitment, inconsistent interpretation, and (mis) application of international provisions by both flag and port States receive criticism from most stakeholders. The inadequacies and effects of the much researched “6 hours on/6 hours off watchkeeping schedule” that a lot of flag States still allow, are reiterated by all stakeholders interviewed.

Limited enforcement by flag and port States create an environment for the normalization of deviance in seafarers recording practice. Additionally, the normalization of deviance is also present in other stakeholders because they accept seafarers' deviance and deviate themselves by not prompting any modification.

Consequently, this results in widespread recording malpractices and systemic failure by all stakeholders – seafarers, companies, flag and port States – to address the issue. The inability to enforce existing rules may seriously affect seafarers' health, safety and cognitive performance. Consequently, decision making impaired by fatigue may lead to serious accidents and large-scale environmental damage.

Flag States' strategies and actions seem to be defective in fulfilling some of their responsibilities in terms of ensuring sufficiently and efficiently manned vessels, monitoring work/rest hours, and verifying the implementation of the ISM Code beyond paperwork. The bureaucratization of safety created by the ISM Code and its detrimental outcomes on ship work systems seem inadequately appreciated and addressed by regulators.

In spite of being aware of work/rest hour malpractices, most companies seem unable or unwilling to tackle the issue. Additionally, companies continue operating with deficient SMSs that appear to be for compliance purposes only. In such contexts, the SMS represents a paper exercise disconnecting the sharp and blunt ends of the operation. While a clear intention of the ISM Code was to channel feedback from the ship to the top management, the participants report that the current approach to SMS is inadequate in its ability to collect relevant and accurate data from ships, which jeopardises any attempt to enhance ship operation.

Finally, seafarers seem unable to prioritise their allegiance and are locked in cognitive dissonance.

Finally, seafarers seem unable to prioritise their allegiance and are locked in cognitive dissonance. On the one hand, they have to complete multiple records to ascertain compliance. On the other hand, the adjustment of records is necessary to avoid disruption to operations. In such a context, the accuracy of records is secondary at best, and at worst,

completely pointless. All forms of accurate record-keeping with respect to rest hours is thereby discredited.

The inability to address violations and recording malpractices indicates systemic failures, which in the absence of significant reform in both industry and administrative practices, may continue unabated together with all its negative outcomes.

The incentives not to comply

The research reveals that stakeholders do not have incentive or any advantage to comply. Therefore, at present there is limited possibility to promote implementation and enforcement if the barriers are not suppressed and compliance incentivised.

Each stakeholder has a different motivation not to implement and enforce the regulations:

For seafarers, the adjustment of records is the default option because violations may question their professionalism and affect performance evaluations. In the current non-appearance of action by authorities and companies, there is no incentive to maintain accurate records. Adjustments are incentivised by the need to minimise unpleasantities (blame, fear of losing employment) and additional workload associated with accurate reporting of work/rest hours. Therefore, seafarers position company interests before their own.

For shipowners, the incentive is to enhance individual seafarer's productivity per day. The aim is to reduce overall crew expenses, increase profit margins and competitiveness without being perceived as violators by third parties.

For flag States, the determination of manning is a competitive item. Therefore, there is a permanent incentive to allow very low manning levels to attract shipowners and increase economic benefits derived from additional tonnage.

For port State control officers, the incentive is to balance workload considering the multiplicity of elements to verify in a short period. Therefore, the verification of the accuracy of the records is not a priority, because it is time-consuming, difficult to find clear grounds to take further action, and offer a low return on investment with regards to eventual enforcement action taken.

In summary, without disrupting the current incentive regime, there will be a continuous failure in the implementation and enforcement work/rest hour regulations.

09

Recommendations

Noting that further research will be essential to expand on the findings, the following recommendations, nevertheless, should be considered to support stronger implementation and enforcement of the working time regulations.

The way forward : three core directions

The study reveals three significant shortcomings.

First, the study confirms previous research that insufficient manning levels facilitate non-compliance with rest hours requirements. Subsequently, the adequacy of the current legal framework and associated practices may need to be reviewed to balance workload with manning, safe operations and safety culture on board, including accurate record-keeping. Therefore, it is suggested that:

- Maritime administrations should seek to collaborate on developing a stringent, objective, and research-based model for determining safe manning, allowing full compliance at all times and in all operational conditions.
- The safe manning level for each ship should integrate the diversity of ship operation and be thoroughly justified and documented to establish sufficient manning.
- ILO and IMO should start considering how manning provisions for the safe operation of ships could be developed in order to make them binding in nature.
- ILO and IMO should review the current work/rest hours regulations to align them with the evidence-based research on fatigue.

Second, fully in line with previous research, the study suggests that the ISM Code faces challenges to achieve some fundamental objectives, such as full compliance with regulations and effective feedback mechanisms. Therefore, it is advocated that maritime administrations should engage in assessing the effectiveness of, and considering amending, the ISM Code accordingly, as appropriate.

Third, also confirming previous research on ship/shore relationships, the study considers the negative impact of chronic mistrust between shore and ships combined with the job insecurity characteristic of numerous seafarers' working contracts, as triggers of a culture of adjustments to, in particular, records of work/rest hours. Maritime administrations should prevent such a culture by putting in place protection mechanisms that secure seafarers' employment and to promote the concept of just culture.

To a certain extent, all maritime stakeholders seem aware of the existence of a culture of adjustment. This de facto connivance needs to be unlocked to avoid the culture of adjustment becoming uncontrollable and irreversible. Therefore, in the context of work/rest hours, maritime stakeholders should engage in high-level discussions to review comprehensively the existing safety culture and applicable legal framework and identify potential gaps and areas for improvement.

Aware of the obstacles and time necessary to achieve such a significant revision of major IMO and ILO instruments, the report proposes a number of short-term and follow-up recommendations to pave the way forward and set the stage for the necessary paradigmatic shifts.

Short-term recommendations for national regulators and regional organizations³¹

1. Flag States and port State control (PSC) regimes should recognize the importance of the human element and the detrimental impacts of insufficient rest on ship safety, work performance, and occupational safety and health. Therefore, flag State surveyors and PSCOs should be trained accordingly. Furthermore, inspections should target work/rest hour and ensure records' accuracy.
2. Flag States should review the guidance given to their surveyors and those authorized to act on their behalf, as appropriate, to include systematic verification of work/rest hours records' accuracy. In addition, flag States should ascertain that all relevant personnel are fully cognizant of the appropriate guidance and strictly apply it. Furthermore, national PSC organizations and PSC regimes should amend their guidance and instructions to include systematic verification of the accuracy of records during the initial inspection. The Procedures for PSC (Resolution A.1138(31)) should be amended accordingly.
3. Tailor-made tools to facilitate detection of violations and malpractices in recording work/rest hours are recommended for flag State and port State inspectors. Such tools should be supported by training such as those developed in association with MARPOL Annex I inspections.
4. National PSC organizations and PSC regimes should initiate Concentrated Inspection Campaigns (CICs) focusing on work/rest hour regulations with emphasis on assessing records' accuracy. Before launching such CICs, the PSCOs should be instructed on cross-checking methods.
5. General PSC inspections should be complemented with focused inspections outside CICs. Such focused inspections allowing cross-checking should be randomly launched or determined via targeting using risk assessment frameworks. For example, PSC regimes should modify their targeting system to enhance inspection of work/rest hours on ships operating a two-watch system.
6. Relaying the concerns expressed in Annex 3 of the Resolution A.1047(27) on Principles of Minimum Safe Manning, flag State authorities, national PSC organizations and PSC regimes should amend their guidance to include the presence of a two-watch system as clear grounds immediately prompting detailed inspections, since this watch system is, in practice, incompatible with the provisions on hours of rest set out in the STCW Convention, 1978, as amended, and the MLC, 2006.
7. Flag State surveyors and PSCOs should register adjustments of records as a major non-compliance to specific instruments and evidence of ISM Code non-conformity.

31 It is important to recall some practical differences between flag State inspection and port State control.

Flag State or Recognized Organization acting on their behalf, carry out surveys and audit ships to certify them. Their inspectors are mandated to thoroughly monitor ships' compliance levels with respect to every instrument ratified/enacted by the flag State. Therefore, flag State inspectors are positioned to conduct multiple and in-depth inspections.

On the other hand, port State control regimes emerged to protect national waters from substandard ships and to compensate for the failures of certain flag States as well as to organize the conduct of inspections regionally. In this context, the PSCO does not certify the ship but verifies its compliance with the international conventions. Usually, a PSCO verifies at once all conventions but do not have time for in-depth verification during the initial inspections. Therefore, in principle, the flag State inspector/surveyor is expected to complete the bulk of inspection tasks with port States simply carrying out verifications of compliance.

8. At present, PSC inspections' outcomes consider, inter alia: no deficiency, deficiency(ies), requiring inspection in the following port, detention in port, or inspection suspended. In the context of violations of work/rest hours or adjustment of records, PSC regimes should develop innovative responses such as delaying the ship to allow the crew to rest without recording it as a detention. Additionally, PSC regimes should strengthen co-operation with the flag States of ships with related deficiencies, for them to take relevant actions on the safety management system. The relevant flag State could be invited to expand the current reporting mechanism regarding "flag comments" following detention for all deficiencies related to adjustments of records.
9. When conducting ISM external audits, flag State surveyors should not exclusively rely on paperwork. Other forms of data collection, such as confidential interviews with seafarers, should be promoted.
10. During the renewal of the Document of Compliance (in respect of the ISM Code), surveyors should cross-check the information provided in ISM records and investigate the effectiveness of feedback mechanisms.

Short-term recommendations for companies

1. Companies should acknowledge and address any feedback from ships which may be of concern and respond to violations of working time standards or any justified request for additional crew. Besides, companies should regularly assess their ships' manning levels with the crew's input. Finally, non-routine events or situations such as canal/channel crossing or heavy maintenance should immediately trigger pro-active company's response with a manning level increment.
2. Companies should train their shore managers and decision-makers to recognize the importance of human factors and the detrimental effects of fatigue on ship safety and occupational safety and health and show evidence of such training (such as the shore-based training records required by the IMDG Code).
3. Companies should initiate fatigue management programmes incorporating work/rest hours data verification.
4. Companies should establish a genuine link with their crews and strive to incorporate stable employment conditions in seafarer contracts.
5. Companies should promote the concept of a just culture to strengthen their reporting systems.
6. Companies should empower DPAs to, inter alia, initiate substantial change enabling trustful feedback and initiate/support research on the bureaucratization of ship operation and its impacts on safety and working conditions. Internal audit guidance should be adjusted to become an opportunity to assess safety beyond mere paper exercises.
7. Companies should test and implement innovative methods for record-keeping as long as they are ethically acceptable. Good practice in record-keeping should be reported to international trade organizations and other industry stakeholders.

Short-term recommendations for seafarers

1. Campaigns targeting seafarers should urge accurate record-keeping and the reporting of violations of the work/rest hours to companies.
2. Seafarers should be encouraged to use existing reporting procedures such as per ISM Code and the MLC, 2006 complaint procedures to report any violations and malpractices. Where there is a fear of victimization, seafarers should report to any framework allowing sufficient confidentiality and protection such as CHIRP maritime.

Short-term recommendations for international organizations on implementation and enforcement

1. ILO and IMO should initiate discussions on the implementation and enforcement of work/rest hours regulations and related instruments.
2. Considering the concerns about the two-watch system expressed in Annex 3 of the IMO Resolution A.1047(27) and the research on fatigue, IMO member States should consider amending the provision 6.3.2 of Appendix 11 to resolution A.1138(31) on Procedures for Port State Control, 2019 to include the two-watch system as clear grounds prompting detailed inspections.
3. IMO should amend Appendix 11 chapter 6.2 of Resolution A.1138(31) to expand the scope of the initial inspection and allow systematic cross-checking of records.
4. The ILO Guidelines for Flag State Inspections and Port State Control Officers should be revised to include systematic verification of records' accuracy during initial inspections.
5. Resolutions MSC.255(84) and A.1075(28) related to the Casualty Investigation Code should require the systematic assessment of manning levels and report the adjustments of records and particularly those related to work/rest hours. Furthermore, the resolutions should require the evaluation of the effectiveness of the ISM Code beyond its paperwork.
6. ILO and IMO should review tamper-proof monitoring technologies limiting manual input and forging attempts. Ethically acceptable technology guaranteeing seafarers' dignity, and data confidentiality should be identified.

Other short-term recommendations for international organizations

1. Considering that the current 14-hour workday and 10-hour rest (split into two periods) in maritime employment do not align with fatigue research, ILO social partners and IMO member States should re-examine the thresholds included in MLC, 2006 Regulation A2.3 and STCW Section A-VIII/1. Additionally, ILO social partners and IMO member States should discontinue the two-watch system as an acceptable arrangement.

2. The MLC, 2006 Guideline B2.3 should include an explanation of “compensatory rest” as used in Standard 2.3 paragraph 8, and STCW Section A-VIII/1.4 should establish limits to “overriding operational conditions”.
3. The requirements of ILO and IMO instruments related to working time should be strictly aligned.

Further recommendations

1. Regulators, maritime education and training institutions, professional organizations, trade unions, and shipping industry organizations (including P&I Clubs and insurance entities) should initiate and strengthen programmes on human factors for seafarers and shore managers (including DPAs). Among other things, such programmes should create substantive awareness of the importance of maintaining accurate work/rest hour records and seeking, ascertaining and using feedback.
2. The maritime and labour communities should debate using ethical, fair and efficient sanctions or other measures as a last resort to address systematic violations and recording malpractices. Any form of sanctions should additionally focus on those who hold power to determine manning quantity and quality.
3. Further research to assess and identify options to overcome the detrimental impacts of adverse working conditions and victimisation for accurate recording and feedback should be initiated. The mechanisms and practices that engender fear and hinder trustworthy recording as well as impact seafarers’ mental health should be researched and counter-measures proposed and implemented.
4. Long-term contractual agreements and protection of seafarers should become a primary objective and norm in shipping. Mutual engagement is a necessary condition for implementing a just culture and building confidence between seafarers and their companies. Flag States should promote social security measures enabling confidence.
5. Legal practitioners should be encouraged to research the impact of work/rest hour violations and adjustment of records on the concept of seaworthiness.

10

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Appendices



Appendix 1: Methodology

Previous studies, which predominantly made use of seafarer surveys to assess fatigue, were found to have some limitations in terms of assessing motivations for work/rest hour recording malpractices and reflecting the views/voices of other stakeholders.

The researchers in this study therefore deployed a qualitative approach to evaluate the implementation of the current maritime regulatory framework on rest and work hours by gaining deeper insight into the onboard reporting, compliance monitoring, and enforcement practices from the perspectives of different stakeholders.

Moreover, it was considered more appropriate to have a seafarer conduct semi-structured interviews where research respondents were seafarers using neutral vocabulary that do not cause psychological stress to seafarers and that facilitate open discussion. Possible ethical and bias implications were acknowledged and addressed through a comprehensive and objective research design process and review mechanisms engaging stakeholders from the industry and administrations.

The participation of a broader range of stakeholders was also established through the use of semi-structured interviews and focus group discussions. This brought further objectivity to the findings from interactions with seafarers. The inclusion of a much wider group of stakeholders is a significant step beyond the usual and exclusive collection of data from surveys to seafarers.

Research Aims

The associated research activities broadly aimed to achieve the following:

1. Investigate stakeholder perceptions of the capacity of the current international regulatory framework to effectively prevent fatigue and to mitigate the consequences relating to ship safety and security, as well as seafarers' health;
2. To assess the barriers to effective implementation onboard ships; and
3. To evaluate the level of compliance with the current regulatory regime.

Appropriateness of methodology and selection of research participants

A multi-step qualitative approach informed the research work. The most appropriate research methods should be employed in attempting to answer the research questions [64].

Semi-structured interviews and focus group discussions were deemed most suited for undertaking this particular exploratory research. These methods enabled the researchers to obtain a holistic understanding of implementation, recording and enforcement practices, taking into consideration the multiple realities of various stakeholders.

Qureshi [65] and Morse [66] advocate the inclusion of thoroughly experienced participants in qualitative research design. This is the ideal technique to obtain particular information pertaining to the phenomenon under study.

Participants were selected following the purposive nonprobability and snowball sampling methods. Seafarers that have practiced implementation and reporting of work and rest hours on or after 1 January 2012 were targeted to participate. Likewise, a broad range of industry stakeholders with a thorough understanding of the relevant regulatory issues and with policy engagement at the international level were targeted; these include shipping companies, trade-, industry-, governmental-, and non-governmental organizations, and port State control officers. It is noteworthy that numerous organizations involved in the data collection, by virtue of their consultative status with IMO are actively engaged in IMO discussions.

WMU research ethic protocols were observed throughout the research project.

Choice of vocabulary

Researchers use different words to describe malpractices relating to work/rest hour records, including under-record, forge, falsify, fabricate, and adjust. It was acknowledged that ideally researchers should avoid using vocabulary that may induce psychological stress among participants [67]. The researchers in this study used the word 'adjust' during interviews and focus group discussions as under-record, forge, falsify, and fabricate were considered as having the potential to cause psychological stress.

Data collection

Data collection methods, specifically, consisted of seventy-one semi-structured interviews and two focus group discussions.

Most of the interviews were conducted one-on-one, whether in person or via other telecommunication media. In some instances, however, more than one participant took part in the interview. Although these can be considered as working group discussions - having emerged organically, they were not expressly intended as focus group discussions by the researchers, and therefore, for purposes of the discussion in this report, they are deemed as interviews.

In total eighty-six (n=86) individuals participated in the study. Table 1 presents descriptive statistics related to the stakeholders and includes a breakdown of the stakeholder groups, number of entities, and number of individuals that participated in the study. In addition, the number of quotations per stakeholder group that have been included in this report, is also indicated.

Table 1: Descriptive Statistics of research participants

Stakeholder group	Number (n) of interviews conducted	Number (n) of entities participated	Number (n) of individual participants	Number of quotations per stakeholder group; Ratio: quotations/individual
Seafarers	n=20	N/A	n=20 consisting of: seven (n=7) masters, two (n=2) chief engineers, four (n=4) chief officers, four (n=4) second officers, two (n=2) third officers and one (n=1) third engineer.	n=61 Ratio 1:3
Shipowner organizations	n=8	n=2 shipowners n=2 ship management companies n=3 Trade organizations n=1 shipowner association	n=3 individuals n=3 individuals n=6 individuals n=1 individual	n=33 Ratio 1:2.5
Industry organizations	n=7	n=7 entities	n=8 individuals	n=30 Ratio 1:4
NGOs	n=10	n=8 entities	n=14 individuals	n=37 Ratio 1:2.6
Special government organizations	n=5	n=1 International organization n=4 Accident Investigation Boards	n=1 individual n=4 individuals	n=25 Ratio 1:5
PSCOs	n=21	n=16 countries n=9 inspection regimes	n=21 individuals	n=32 Ratio 1:1.5
PSCO Focus Group	n=1	n=10 countries n=6 inspection regimes	n=11 individuals	n=23 Ratio 1:2.1
ITF Inspectors	n=2		n=5 individuals and follow up n=4 individuals	N/A

Interviews

A phenomenological interview approach dominated as it places emphasis on participants' lived experience. Van Manen [68] defines phenomenology as the way of access as we experience it pre-reflectively; meaning the ordinary experiences of our day-to-day existence. As viewed by Adams and Van Manen [69]

"The interview evokes 'descriptions of lived-through moments, experiential anecdotal accounts, remembered stories of particular experiences, narrative fragments, and fictional experiences.' By capturing a personal description of a lived experience, the researcher aims to describe a phenomenon as much as possible in concrete and lived-through terms. In other words, the focus is on the direct description of a particular situation or event as it is lived through without offering causal explanations or interpretive generalizations."

Semi-structured interviews enabled the researchers to probe participants in order to better understand their individual perspectives. Four separate semi-structured interview instruments were used accordingly for each of these groups of stakeholders: 1) seafarers; 2) shipping companies; 3) government, trade and industry organizations; 4) port State control officers.

Seafarers were the first group of stakeholders to be interviewed, the remaining interviews and focus group discussions followed concurrently thereafter.

Focus Groups

Separate focus group discussions were held with two groups of stakeholders, a select number of ITF inspectors³² and PSCOs³³.

The first entailed a two-step approach involving five (n=5) ITF inspectors. The intent of the first meeting was to discuss the involvement of ITF inspectors in documenting information collected during interviews and discussions with seafarers, complaints, identification of recording systems used onboard, and assessment of objective evidence relating to recording malpractices. A draft inspection checklist was created to facilitate the assessment of work/rest hour records and gather objective evidence of work/rest hour violations and recording malpractices. The follow-up ITF inspectors focus group discussion with four (n=4) individuals entailed the modification of the draft checklist after incorporating feedback regarding the inspectors' experience of using the checklist. The updated checklist is being tested by some ITF inspectors with the aim of ultimately developing a suitable compliance monitoring tool for both ITF inspectors and PSCOs. Unfortunately, due to the impact of COVID-19, only a limited number (n=11) of responses has been received to date. Additional information about the checklist and case study regarding the evidence collected are available in Appendix 2.

Following PSCO interviews, eleven (n=11) officers took part in a follow-up focus group discussion. The intent of the session was to gain deeper insight into the inspection practices under various PSC regimes and the ease with which violations and adjustments of work/rest hour records can be detected.

32 ITF inspectors focus group discussions in London, UK on 6 August 2019 (n=5 participants) and follow-up meeting on 4 February 2020 (n=4 participants)

33 PSCO focus group discussion in Malmö, Sweden on 6 March 2020 (n=11 participants)

Data analysis

The interviews and focus group discussions were manually transcribed in Microsoft Word³⁴ from Apple Voice Memos³⁵ and qualitatively coded and analysed using the ATLAS.ti Qualitative Data Analysis³⁶ software programme. A hundred and four (n=104) codes were created, and documents (transcripts) manually coded thereafter. The documents were grouped according to particular stakeholder groups³⁷, and the data was analysed using the Code Cooccurrence Table and Code Document Table features of the ATLAS.ti programme.

Limitations of the research

The research had some limitations, which include:

- Focus on deck and engine officers' experiences, ratings were not included;
- Nationality, origin, culture, and regional representation of participants were not taken into consideration; the data could therefore not be inferred as representing the global seafarer community, or particular fleets;
- The research focus is on the implementation of fatigue-related instruments, and as such the relationship between various other factors such as the adjustments of records to overtime is not considered;
- The response rate from shipowner/manager companies is low compared to the other stakeholder groups and as such views and opinions cannot be generalised to particular fleets;
- Despite their relevance when addressing fatigue, the impact of stressors such as vibration or motion has not been included in the research.

34 Microsoft Word for Mac (version 16.36)

35 Apple Voice Memos (version 2.1)

36 ATLAS.ti Qualitative Data Analysis (version 8.4.4)

37 Twenty seafarers (n=20) consisting of seven (n=7) masters, two (n=2) chief engineers, four (n=4) chief officers, four (n=4) second officers, two (n=2) third officers and one (n=1) third engineer. Sixty-one (61) individuals representing eight (n=8) shipowner organizations; seven (n=7) industry organizations; ten (n=10) non-governmental organizations [NGO]; five (n=5) special government organizations and twenty-one (n=21) port State control officers representing sixteen (16) countries and nine (n=9) inspection regimes.

Appendix 2: Background discussions with ITF inspectors and checklist preparation

From subjective to objective evidence of non-compliance

The researchers aimed to expand data sources and obtain objective evidence of work/rest hour violations and recording malpractices. To this end a small number of ITF inspectors participated in a pilot study, in which two separate focus groups were held. The purpose of the focus group discussions was to gather information from ITF inspectors and have them participate in collecting objective evidence regarding work/rest hour violations and recording malpractices during routine inspections.

The first was held on 6 August 2019 following individual interviews with five (n=5) ITF inspectors from the European region, and Canada. The interviews were aimed at assessing each participant's subjective experience on the topic and identifying key investigation areas.

Key points raised during the interviews include:

- 6 hours on/6 hours off watchkeeping schedules are a major concern;
- Quick, and multiple port rotations increase fatigue levels;
- Rest hour issues are particularly severe for feeder vessels;
- Overtime is a major factor contributing to rest hour violations;
- The use of certain software programmes enable manipulation and incentivise adjustments;
- Culture of fear among seafarers prevent them from freely offering information during inspections, or formally submitting any complaints to authorities;
- Discrepancies in work/rest hour records are easily detected when cross-checking various records and logs, especially overtime records.

The group discussion focused on rest hour regulations and its recording with the aim to develop a strategy to support verifying the accuracy of records and data collection.

The importance of using neutral vocabulary, i.e. 'adjustment' during interviews and discussions with seafarers was emphasized to enable data collection and not cause psychological stress to seafarers during the process.

In order to facilitate data gathering and the assessment of work/rest hour records, an initial four-page draft 'rest hours inspection' checklist was prepared.

Particular information deemed necessary to ensure consistency in data provided relate to the inspection and include ship name, flag, location, date, crew list, and the nature of the inspection – complaint, routine etc. Seafarers' employment- and overtime agreements, when available were also considered useful to include. All the data was processed with confidentiality.

The proposed method to ascertain the accuracy of work/rest hour records, was set as follows:

- Collect objective evidence by cross-checking the records of rest hours using port of call list, shipboard working arrangement, bell book, deck/engine/cargo logs, engine room alarm records, etc.;
- Conduct interviews and discussions with seafarers;
- Assess time and number of crew necessary to perform some operations (e.g. average manoeuvring time to enter/leave the port);
- Collect information on recording practice: (1) how rest hours are recorded (details on software or any other solutions); (2) who is recording (and for who); (3) how often records are completed (daily, weekly, monthly, other).

The first checklist was tested by the selected inspectors during a 4-month period. A follow-up focus group with four (n=4) inspectors from the European region, was held on 4 February 2020. The purpose of the second focus group was to discuss the inspectors' experience using the draft checklist as a means to assess the accuracy of work/rest hour records. Most inspectors reported that the exhaustiveness of the initial checklist was not necessary.

The checklist was simplified after incorporating the feedback received. Following the meeting, the attending inspectors and some additional ones committed to pilot test the shorter version. The ultimate aim is to provide a simple assessment tool to assess the accuracy of work/rest hour records and detect violations whenever possible. The compliance monitoring tool would be used by ITF inspectors and, eventually, proposed to port State control officers.

The initial timeframe for data gathering was set for end-March 2020 with the aim of obtaining one hundred (n=100) cases indicating adjustments to records. Unfortunately, the COVID-19 global pandemic impacted data collection and prevented inspectors from carrying out verification of records. Limited data had been received during this period. Eleven (n=11) cases were received during this initial period. Without being able to be conclusive about the effectiveness of the checklist, the first feedback is positive and have merit to enhance focus on work/rest hour records.

Checklist: Recording of rest hours inspection

The simplified checklist includes the following fields to enable quick assessment of violations and the accuracy of rest records, whilst providing objective evidence:

- vessel particulars;
- inspection elements;
- methods employed to acquire objective evidence;
- and, onboard recording methods in use.

The checklist also provides for elaboration and other observations. Example of the checklist is indicated in Figure 1.

Data collected from inspectors:

Limitations

It is worth highlighting some limitations encountered during this pilot study:

- ITF inspectors do not have full access to ships and the required data may not be available;
- A small number of European ITF inspectors participated in this pilot (an inspector from Latin America has not been able to provide additional information);
- Each inspector has a large number of tasks to complete and have to respond to emergencies in priority which may impact the number or routine inspections (the target);
- Limited data has been received as result of the COVID-19 pandemic, which prevent the continuation of routine inspections.

Contribution

Objective evidence received, although limited in number of cases (n=11), indicate inconsistencies suggesting violations of work/rest hours and recording malpractices. The following points exemplify the data collected:

- Wrong reporting of work hours. In the logbook, a master is having 8-hour bridge watch whilst vessel is under pilotage while the records indicate rest periods;
- Post-adjustment of records. Rest hour records indicate master and bosun resting whilst logbook indicates pilot on the bridge and master certainly with him while bosun in stand-by at anchor station;
- Under-reporting work hours. Mooring arrangements requiring the engagement of all crew, yet rest hour records for AB welder and cook do not reflect their engagement in such operations;

- Perfect records (?). Work/rest hour records in perfect alignment with the shipboard working arrangement, apart from additional safety drills indicated. However, the logbook indicates pilotage, cargo operations etc. taking place;
- Under-reporting work hours. Logs indicate vessel is preparing for sailing, yet engineers' records indicated as rest hours;
- Adjustment of records during special operations. Engineers resting whilst deck and engine logs indicate bunkering operations.

The following general observations were mentioned regarding inspections on ships:

- Cooks' work/rest hours seem more difficult to check;
- Neutral vocabulary, i.e. 'adjusting' the records do facilitate better crew engagement;
- Some seafarers admit to adjusting rest hour records to comply, by shifting work hours to following days;
- Some seafarers confirm that malpractices can be detected when comparing work/rest hour records to logbooks, bell book etc.;
- The researchers would welcome a wider campaign focused on gathering objective evidence in support of enhancing compliance monitoring and enforcement of work/rest hour regulations.

Practical application

The 'Recording of rest hours inspection' checklist demonstrates its effectiveness in easily detecting certain work/rest hour violations and recording malpractices when cross-checking the rest hour records against various other logs and records.

The following examples present a non-exhaustive view of possibilities by departments. They are subject to variability associated with ship organization and profile.

Galley crew

The Maritime Labour Convention, 2006, requires that vessels having ten (10) or more seafarers onboard, shall employ a dedicated ship's cook. It is normal practice for vessels to carry a second cook or steward when the vessel complement is more than fifteen (15).

In reality, the working hours will start an hour before breakfast for preparation and include cleaning the galley for at least an hour after dinner.

Tips for assessing records:

- Check when the meals are being served
- The galley staff would start activities around 6:00 (preparation of breakfast)
- For example, it is unrealistic for the rest hour records to show for example 8:00 as a start
- After a dinner at 18:00, the galley staff would normally stop activities around 19:00. It is unrealistic for the rest hour records to show that the galley staff stops daily at 17:00

Deck Officers

The STCW Code Section A-VII/2 Part 4-1 [16] lists the lookout and helmsman [woman] duties to be observed in keeping a navigational watch. The standard is to have a lookout and officer on the bridge at night on any ship. During daytime, the officer might be sole lookout only when certain criteria are met. If the helmsman [woman] is used to work on deck, he/she should not be used as lookout at the same time.

Rule of thumb is that the officer is alone during sunlight hours. Severely reduced visibility, fog or heavy rain/seas usually requires an extra lookout on bridge and, eventually, the presence of the master on the bridge. Such situations should be recorded in the deck logbook.

During hours of darkness, the situation varies:

- On properly operated ships, lookout stays on the bridge. Only exceptional reason(s) might justify his/her momentary absence. After duty, the extra lookout may conduct a safety round on the vessel which should be added to his/her work after watchkeeping.
- On vessels with only two or three deckhands, lookout is usually carrying a handheld radio and attending to other duties. It is not permissible and should be investigated.

Tips for assessing records:

- On larger ships, the deck officers are composed of one captain, one chief mate and one or two mates.
- If more than one port in a day and many during a week, violations are going to occur, especially if berth to berth is very short (e.g. 8 hours) or if navigation area is intense.
- The chief mate is tasked with the cargo operations in port. So, he/she is always at start and completion of cargo operations. Check start and completion times of cargo operations compared to chief mate's rest hours
- The delicate operations or transits always involve the ship master. Particularly check the rest hours of master during port long transits and locks, in heavy weather, restricted visibility, intense navigation. Such periods may indicate if records are be adjusted.

Engineer Officers

During particular operations, such as bunkering, the engineers are required to be present.

Tips for assessing records:

- Compare the rest hour records of the chief engineer as well as the engineer and engine rating appointed for bunkering, with the time of commencement and completion of bunkering operations.

- On UMS ships, the engine team usually works from 08:00 to 17:00. However, one engineer is on call per day. So, after dinner he/she usually conducts a safety inspection of the engine before the night. In case of night alarm, the engineer on duty proceeds to engine room to assess and respond accordingly.
- Check the hours of work of duty engineer and verify days on call. Use the alarm recorder, to assess type and date/time of each alarm. Cross-check with records.

Pilotage

The captain's presence is required in certain situations on board such as:

1. Mooring/departure
2. Passage in the lock and canals
3. Pilotage arrival/departure

The International Maritime Pilots Association (IMPA) set the following requirements:

1. Safe boarding arrangement rigged
2. Officer on deck, in contact with bridge and escorting the pilot to the bridge
3. Captain on the bridge

The rigging arrangement normally requires two (deckhands) to set up (it can be prepared in advance) and for the safe removal after boarding/disembarkation. Preparation and removal each take 30 minutes to an hour and usually requires a minimum of two ratings.

At night-time, the master should not be alone on the bridge during such preparation.

Tips for assessing records:

- Compare the master's rest hour records with the time of commencement and completion of the activities requiring his presence on the bridge
- Compare the rest hours of the deckhands involved in rigging and removing the pilot ladder with the time of pilotage

Mooring and port operations

Mooring normally consist of the following arrangements:

1. Forward: minimum two/three crew members. On larger vessels: officer and two ratings
2. Aft: minimum two/three crew members. On larger vessels: officer and two ratings
3. Bridge: captain, chief mate and pilot. On larger vessels: one additional rating

During port stays, as required by the ISPS and STCW Codes, the watch arrangements are as follows:

1. Gangway and moorings: deck rating
2. Deck office and cargo control: usually watch officer in charge of cargo operations

Tips for assessing records:

- Compare the rest hour records of the master and chief mate and crew with the standby time for mooring operations
- Compare the rest hour records of the ratings with the gangway watch times

Conclusion

Inspectors with past ship experience may be advantaged in assessing the accuracy of records. However, practice and simple math may facilitate the detection of inaccurate records. Discussion with crew members may provide additional clues or evidence of rare or recurrent violations.

To collect information from crew may not be an easy exercise. Therefore, it necessitates to establish confidence.

Appendix 3: Case study

The following case study presents an insightful account of recording violations, deficiencies, blame and ‘expected’ behaviour change. In the context of the study some ITF inspectors provided the research team with data extracted during ship inspections.

The following case study presents some elements of a selected ship ‘DM’ operating in North-West European waters during spring-summer 2019. The ship, crew, and company names have been anonymised.

This example gives an insight into current practices and their consequences on reporting.

First step, the shipmaster and other officers accurately recorded hours of rest including violations (see Document 1).

Document 1: Extract of record of working and rest hours for the Captain A on ship DM

Date	Working and Resting hours																								Hours of rest in a 24hrs period	comments	Min. hours of rest in any 24hrs period	Min. hours of rest in any 7day period	
	0	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					24
1						1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	10		10.0	154.0
2									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		10.0	144.0
3									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0									16		12.0	136.0
4									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		15.0	126.0
5		1.0	1.0	1.0					1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	1.0	12		11.0	114.0
6									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		12.0	104.0
7									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		14.0	94.0
8						1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0					10		6.0	94.0
9									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		10.0	94.0
10									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0									16		12.0	94.0
11									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		15.0	94.0
12		1.0	1.0	1.0					1.0	1.0	1.0	1.0	1.0	1.0	1.0							1.0	1.0	1.0	1.0	12		11.0	94.0
13									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		12.0	94.0
14									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		14.0	94.0
15						1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0					10		6.0	94.0
16									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		10.0	94.0
17									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0									16		12.0	94.0
18									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		15.0	94.0
19		1.0	1.0	1.0					1.0	1.0	1.0	1.0	1.0	1.0	1.0							1.0	1.0	1.0	1.0	12		11.0	94.0
20									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		12.0	94.0
21									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		14.0	94.0
22						1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0					10		6.0	94.0
23									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		10.0	94.0
24									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0									16		12.0	94.0
25									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		15.0	94.0
26		1.0	1.0	1.0					1.0	1.0	1.0	1.0	1.0	1.0	1.0							1.0	1.0	1.0	1.0	12		11.0	94.0
27									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		12.0	94.0
28									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		14.0	94.0
29									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		14.0	98.0
30									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0						1.0	1.0	1.0	1.0	14		14.0	98.0

Second step, a scrupulous PSCO issued a deficiency for work/rest hours violations (see Document 2).

Document 2: Extract of report of inspection in accordance with Paris Memorandum of Understanding on Port State Control (related to previous record)

DEFICIENCIES FOUND AND FOLLOW UP ACTIONS ***)										
No.	Code	Defective Item	Nature of Defect	Convention Ref	Ground for Detention	Action Taken Code	Additional Comments <small>(record rectification dates for codes 47, 48 and 99. If using AT codes 21 and 19 please see reverse of this page for text.)</small>	ISM related Y/N	RO Resp Y/N	Accidental Damage Y/N
1	1820	FITNESS FOR DUTY WORK & REST HOURS	NOT AS REQUIRED	MLC 2006		17	MASTER C/O 3 E & OS HAVE NUMEROUS BRIEFINGS OF HOURS SO REST IN APRIL.			

The requested action to take is code 17 “to be rectified before departure,” which is surprising in the context of the violations evident in the previous month. Remarkably, the PSCO did not associate the violation code 18202 (Fitness for duty – work and rest hours) with the ISM Code.

Third step, it was the company which immediately initiated an ISM response via a standard follow-up form (see Document 3).

Document 3: Extract of Follow-up for Port State Control, Flag State Inspection and class survey (related to previous case)

Deficiency	Root Cause	Corrective and preventive Action	Corrective Action implemented
Fitness for duty, Work & rest hours Record	Negligence of the officer incharged to follow work & rest hour as per contract.	Fill in daily work & rest hour to monitor crews work load as per contract, STCW and MLC requirements.	Yes, next safety meeting to be disc

Document 5: Extract of the Bell book with details of the ship activity

DEPARTURE		FRMTX	23.08.2019
1400	P.O.B	4 ACFT ON BOARD	Dr 4.2m Da 6.5m
1424	ALL LINES ON DECK	/ CRST OFF	
1549	PILOT OFF	AGENT DISMBAK	φ 17° 07' 0" N
1548	B.O.S.P	GPS POS	λ 003° 23.9' W d. 162'
ARRIVAL		FRBES	24.08.2019
0230	E.O.S.P	GPS	φ 46° 17.1' N λ 004° 46.5' W d. 162'
0400	P.O.B		
0510	F.L.A		
0524	ALL FAST	SLIDE 2+1 FWD & DEFT	
0630	PILOT OFF	/ F.W.E	
0606	Cargo ops started.		
1300	2 PASSENGERS ON BOARD		
1336	COMPLETED CARGO OPS.		
DEPARTURE		FRBEC	24.08.2019
1406	2 P.O.B		Dr 4.4m Da 6.2m
1424	ALL LINES ON DECK	/ CRST OFF	
1506	2 PILOT OFF		
1530	B.O.S.P	GPS	φ 28° 17.1' N λ 004° 41.9' W d. 46'
ARRIVAL		NLRM	26.08.2019
0230	E.O.S.P	GPS	Dr 4.8m Da 6.2m φ 51° 57.1' N λ 003° 39.9' E d. 47'
0354	P.O.B		
0450	↘ PASSING NW/3 BUOY		
0654	FLA		
0700	AV fast 2+1	FWD & AFT /	
0706	F.W.E / P.	lot off.	
2200	POB.		
2212	Cast off		
2242	FLA		
2248	All fast 2+1	F&A / F.W.E / Pilot off	
DEPARTURE		FRMTX	27.08.2019
0218	COMPLETED CARGO OPS		
	SHIFTING RST		Dr 6.2m Da 6.2m
0330	P.O.B		
0342	CRST OFF		
0542	FIRST LINE		
0548	ALL FAST AT DOLPHIN #2	DISIDE 2+1 F&A	
0554	F.W.E / PILOT OFF		
DEPARTURE		FRMTX	27.08.2019
0800	POB		
0818	Cast off	Δ 2.	
0906	FLA		
0912	All fast 2+1	/ F.W.E / Pilot off	
0924	Cargo ops started.		
1506	COMPLETED CARGO OPS.		
1530	2 P.O.B		Dr 6.1m Da 6.2m
1548	CAST OFF		
1634	FIRST LINE		
1730	ALL FAST AT DDE	SLIDE 2+1 F&A	
1736	PILOT OFF	/ F.W.E	
1748	COMM. CARGO OPS		
1748	BUNKER BARRE	ALONGSIDE	
2224	Cargo ops completed		
2230	POB		
2242	Cast off		
DEPARTURE		FRMTX	28.08.19
0000	All fast 2+1	/ Dolphin No 4.	
0006	Pilot off.	/ F.W.E.	
1000	POB		
1030	Cast off.		
1118	All fast 2+1	APM / F.W.E / Pilot off	
1148	Cargo ops started.		
2200	POB.		
2230	Cargo operations completed		
2248	Cast off / Departure.		
2254	Pilot off.		
0006	BOSP	$\varphi = 52° 03.1' N$	
	DTG	$= 039' N_{M} \lambda = 003° 51.3' E$	
ARRIVAL		FRMTX	31.08.2019
0242	E.O.S.P	GPS	φ 47° 04.1' N λ 002° 26.7' W d. 47'
0245	LET GO STBD	GPS	φ 47° 07.3' N λ 002° 25.6' W
0330	F.W.E		
1654	START HEAVING UP	STBD GPS	φ 47° 07.3' N λ 002° 25.6' W
1712	ANCHOR UP		

Comments:

On 26 August, the ship proceeded from 0354 to 0700 with the Pilot to the berth apparently without the master working. Indeed, according to work/rest records, the master started his day of work at 0800 (one hour after ship arrival).

On 27 August, from 1506 to 1748, the same ship apparently completed cargo operation in one berth and sailed to another berth without the chief officer and master supervising cargo operation and participating in manoeuvring operation.

Remarks:

Contrary to hours of rest records, navigation practice and undoubtedly the ship SMS require the master to conduct the ship during pilotage/manoeuvring and the chief officer to monitor cargo operations and participate in manoeuvring.

In the final analysis, all the above converged to ensure that the crew understood 'good' (in reality deviant) reporting attitude without modifying ship operation to optimise safety.