11-3-2019

Exploration of implementation and reporting of hours of work and hours of rest onboard ships

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EXPLORATION OF IMPLEMENTATION AND REPORTING OF HOURS OF WORK AND HOURS OF REST ONBOARD SHIPS

By

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A dissertation submitted to the World Maritime University in partial fulfilment of the requirement for the award of the degree of

MASTER OF SCIENCE
In
MARITIME AFFAIRS

(MARITIME SAFETY AND ENVIRONMENTAL ADMINISTRATION)

2019

Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): .....

(Date): SEPTEMBER 24, 2019

Supervised by: RAPHAËL BANCHER

Supervisor's affiliation.....

Dedication

This dissertation is dedicated to my father. Thank you for your boundless love, care, support and sacrifices for making me who I am.

Acknowledgements

I take this forum to express my gratitude to WMU, my maritime alma mater for having imparted us with the maritime essential knowledge. To this affect, I would like to extend my sincerest thanks to the faculty as an instrumental node to this greater achievement. Without them it could not have been possible.

I earnestly extend my humble gratitude to my supervisor prof. Raphael Baumler for his professional guidance and support throughout my writing. With his vision and sound perspective I was able to translate my thoughts into pragmatic system.

I convey my deepest appreciation to all the seafarer respondents. Without their participation, the dissertation would not have been possible.

I deeply express my gratitude to prof. Michael Manuel (WMU), prof. Anish Hebbar (WMU), prof. Momoko Kitada (WMU), prof. Johan Bolmsten (WMU), Lect. Lt. Cdr. Peter Reneri (USCG) for their motivational advises, constructive guidance and support on this dissertation.

I express my deepest appreciation to Lect. Anne Pazaver (WMU) for the language review. Her sincere and last minute advices have been instrumental in reforming my dissertation.

My sincere thanks to all the other elements of the WMU working behind the scene to facilitate us and make our stay comfortable and worth memorable. At this note, a special thanks to the Library staff : Chris, Naomi, Christina and the World Bistro team: Nikola, Christel, Nicklas and Daniel for taking care of our needs while at the WMU.

This dissertation was not possible without the support from my WMU colleagues. My special greetings to all those for standing by my side in the collective effort to attain this feat.

In the last, I most respectfully pay my tribute to my parents, wife Dimple and son Abeer for sharing away their loving support and prayers throughout my over year journey of continual struggle. Indeed, during tiresome moments of fatigue and breakup, their adore and encouragement played pivotal to boost my moral for continuity with yet further energies and determination.

Abstract

Title of Dissertation: **Exploration of Implementation and Reporting of Hours of Work and Hours of Rest Onboard Ships**

Degree: **Master of Science**

The dissertation is an exploratory study on the implementation and reporting of fatigue-related regulations onboard ships. The literature on the topic revealed that some seafarers under-report their work and rest hours. The extent of such adjustments and their justification by seafarers are at the core of the work. The research applied a qualitative approach through interviews of active seafarers to investigate holistically their recording practices and the influences contributing to adjustment of records.

The empirical data revealed that all seafarers in the panel adjust work and rest hours records to show compliance with regulations towards third party inspections. Seafarers embrace the practice of the 'ship first'. They also underline the imbalance between workload and manning levels. The research further reiterated the incapacity of port operations and 6on/6off watch system in providing the amount of rest required by the regulations.

Employment concerns and job insecurity make seafarers submissive to the companies' interests. The companies seem to disregard any appeal from the seafarers to address a lack of manning onboard. In this context, the International Safety Management Code and its enforcement system prove ineffective. Finally, respondents report that the maritime industry lacked commitment to deal with fatigue.

The research concludes that the International Maritime Organization member States should demonstrate their commitment to seafarers' well-being and Occupational Health and Safety by enforcing regulations on manning levels and working time.

KEYWORDS: Fatigue, MLC, STCW, Work and rest hours, Under-reporting, Adjustment, Workload, 6on/6off, Manning, ISM.

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List of Abbreviations

2Off	Second Officer
3Off	Third Officer
3Eng	Third Engineer
ATSB	Australian Transport Safety Bureau
Capt	Master
CCR	Cargo Control Room
CDI	Chemical Distribution International
CIC	Concentrated Inspection Campaign
CEng	Chief Engineer
COff	Chief Officer
DMAIB	Danish Maritime Accident Investigation Board
DNV	Det Norske Veritas
DNV-GL	Det Norske Veritas Germanischer Lloyd
EU	European Union
Exp.	Experience
FAL	Convention on Facilitation of International Maritime Traffic
h/d	Hours per day
ILO	International Labour Organization
ISWG	STW Working Group
GDPR	General Data Protection Regulation
HTW	Sub-committee on Human Element, Training and Watchkeeping
ISF	International Shipping Federation
ISM	International standard for the safe operation of ships and for pollution prevention
ITF	International Transport Federation
IMO	International Maritime Organization
MAIB	Marine Accident Investigation Board
MET	Maritime Education and Training

MLC	Maritime Labour Convention
MOU	Memorandum of Understanding
MSC	Maritime Safety Committee
NGO	Non-Governmental Organisation
NI	Nautical Institute
NTSB	National Transport Safety Board
OSH	Occupational Health and Safety
P&I	Protection and Indemnity
PSC	Port State Control
PSCO	Port State Control Officer
QDA	Qualitative Data Analysis
RA	Risk Assessment
REC	Research Ethics Committee
Ro-Ro	Roll-on/Roll-off
SIRC	Seafarers International Research Centre
SIRE	Ship Inspection Report Programme
STCW	International Convention on Standards of Training Certification and Watchkeeping for Seafarers
STW	Sub-committee on Standards, Training and Watchkeeping
SMPEP	Shipboard Marine Pollution Emergency Plan
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea
UK	United Kingdom
US	United States of America
USCG	United States Coast Guard
WMU	World Maritime University
Yrs.	Years

Chapter 1: Introduction

1.1 Background

While sharing her experience of a ship voyage on TED Talks, Rose George[1] made a notable statement referring to the shipping industry (George, 2013), *"[…] the average seafarer you're going to find on a container ship is either tired or exhausted, because the pace of modern shipping is quite punishing for what the shipping calls its human element […]"*

This assertion reveals findings from considerable research works such as the United States National Transport Safety Board (NTSB) (NTSB, 1990), the United States Coast Guard (USCG) (Sanquist et al., 1996), Seafarers International Research Centre (SIRC) (Smith et al., 2006), Project HORIZON (Project Horizon Consortium, 2012) and Project MARTHA (Mike Barnett et al., 2017). These studies acknowledge that the shipping industry remains sensitive to fatigue and its impacts.

The SIRC study (Sampson et al., 2017) admitted to the influence of fatigue on seafarers' health and well-being. The study revealed a considerably higher fatigue score in 2016 than in 2011. The study further found a deterioration of mental health

[1] Rose George, a British journalist was fascinated by how the world is fundamentally dependent on shipping. She published a book titled *Ninety Percent of Everything: Inside Shipping, the Invisible Industry That Puts Clothes on Your Back, Gas in Your Car, and Food on Your Plate.*

together with an increase in psychological disorders amongst seafarers. These data raise serious concerns about the seafarers' occupational safety and long-term health.

On maritime casualty fronts, fatigue continues its impact, as displayed by the SIRC study (Acejo et al., 2018). The analysis of the causes of maritime accidents between 2002 and 2016 revealed fatigue as a contributory factor. The study of 693 accident investigation reports from many maritime casualty boards[2] revealed 71 cases (10.2%) of fatigue as a contributory cause in these casualties.

Even though the International Labour Organization (ILO) and the International Maritime Organization (IMO) adopted regulations on fatigue mitigation, the impact of fatigue remains evident in the shipping industry.

1.2 Maritime instruments governing fatigue

1.2.1 ILO Instrument

The ILO has adopted the Maritime Labour Convention (MLC) 2006 which includes fatigue-related regulations, amongst others concerning seafarer well-being. The MLC 2006 contains regulations that prescribe onboard work and rest hours limits, adequate leave, and adequate living and working conditions (MLC, 2006).

1.2.2 IMO Instruments

The IMO has adopted the following instruments concerning fatigue.

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[2] The boards include the United States (US) National Transportation Safety Board (NTSB), the United Kingdom (UK) Marine Accident Investigation Branch (MAIB), the Federal Bureau of Maritime Casualty Investigation in Germany, the Australian Transport Safety Bureau (ATSB) and the Danish Maritime Accident Investigation Board (DMAIB).

STCW Convention: The International Convention on Standards of Training Certification and Watchkeeping for Seafarers (STCW) 1978, as amended, includes the STCW 2010 Manila amendments that establish and enforce rest periods for watchkeeping seafarers including those engaged in safety, security and pollution prevention duties (IMO, 2019).

ISM Code: Chapter IX of the International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended, makes mandatory the International Management Code for the safe operation of ships and for the pollution prevention (ISM) Code. The ISM Code requires the shipping company[3] to determine risks linked to the safe operation of the ships and to develop safeguards by establishing and implementing a safety management system (SMS). The SMS contains fatigue management guidelines to ensure that the ship is adequately and appropriately manned to cover all operational requirements, and to provide the master with the support to safely perform their obligations[4]. The ISM Code also requires the implementation of all standards and instruments[5] (IMO, 2019).

IMO Resolution A.1047(27) - Principles of minimum safe manning: Besides the STCW 1978 and the ISM Code, IMO adopted principles of minimum safe manning (Resolution A.1047(27))[6] which gives recommendations to the flag State for determining manning levels on ships flying its flag. It further provides guidelines to the company for proposing such manning levels (IMO, 2011).

MSC.1/Circ.1598 - Guidelines of fatigue: Citing lack of contemporary and holistic approach to fatigue mitigation (IMO, 2014), the IMO Maritime Safety Committee

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[3] Company is defined as the owner or any other organization or person, such as the manager or bareboat charterer, who has assumed responsibility for operating the ship and who, on assuming such responsibility, has agreed to take over all duties and responsibility imposed by the Code.
[4] ISM Code under part A – 6.1.3 and 6.2.
[5] ISM Code under part A - 1.2.3.1.
[6] IMO Res A.1047(27) revoke the original guideline IMO Res A.890(21)-Principles of safe manning and A.955(23)-Amendment to principles of safe manning.

(MSC) amended[7] the guidance on fatigue management and mitigation (MSC/Circ.1014). The IMO guidelines on fatigue (MSC.1/Circ.1598) provide a contemporary and risk-based approach, recognise the role of stakeholders[8] involved in ship design, operations and regulations. It also require fatigue management to be essential part of the SMS (IMO, 2019).

1.3 Role of work and rest hours regulations

One of the important features of the MSC.1/Circ.1598 is the redefining of the term "fatigue". The guidelines defines fatigue as (IMO, 2019):

> *A state of physical and/or mental impairment resulting from factors such as inadequate sleep, extended wakefulness, work/rest requirements out of sync with circadian rhythms and physical, mental or emotional exertion that can impair alertness and the ability to safely operate a ship or perform safety-related duties.*

The definition reiterates the findings of many studies[9] that reveal that inadequate sleep and physical workload are major factors causing fatigue amongst seafarers (Exarchopoulos et al., 2018). The term inadequate sleep is often used as a synonym of fatigue, although they are different in some respects (Lützhöft et al., 2007; Narayanan, 2017).

Considering inadequate sleep and long working hours as causal factors of fatigue amongst the seafarers, compliance with working time regulations becomes imperative. The work and rest hours regulations under the MLC 2006 and the STCW 1978

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[7] On Jan 24, 2019, MSC.1/Circ.1598 circular supersede MSC.1/Circ.1014-Guidance on fatigue mitigation and management.
[8] Stakeholders includes company, seafarer, Maritime education and training (MET), Ship design, flag State and port State authority.
[9] Brown (1989); McNamara et al. (2000); Smith et al. (2006).

prescribe limit on work hours (Table 1), thus acting as an initial line of defence for fatigue mitigation.

Regulation	Work/Rest in any 24 hrs	Work/Rest in 7 days	No. and Length of Rest Periods	Schedule	Records and Exceptions
ILO 180/ MLC 2006	Max 14 hrs of work OR Min 10 hrs of rest	Max 72 hrs of work OR Min 77 hrs of rest	Not more than 2 periods of rest, one of which must be at least 6 hrs. Interval between rest periods not to exceed 14 hrs.	Specific format table for all seafarers. Actual times for at sea and in port.	Daily hours records to be maintained. Competent authority may allow exception if by collective agreement.
STCW 2010 (Manila amendments)	Min 10 hrs of rest	Min 77 hrs of rest	Not more than 2 periods of rest, one of which must be at least 6 hrs. Interval between rest periods not to exceed 14 hrs.	Specific format table as ILO, but watchkeepers and safety/pollution/ security positions only.	Daily hours records to be maintained. Parties may allow exceptions.

Table 1: Work and rest hours regulations under the MLC 2006 and the STCW 1978 Source: PARIS MOU (2013).

Under these regulations, seafarers draft and implement the work schedule, and maintain the work and rest hours record for inspection and auditing purposes. However, literature revealed that seafarers often under-report their work and rest hours records.

1.4 Literature on under-reporting

While researching the relationships between recorded working hours and fatigue, Allen et al. (2006) demonstrated that seafarers working across all maritime sectors tend to under-report their work and rest hours records.

According to the numerous research studies on fatigue such as Smith et al. (2006); Smith (2007); Allen et al. (2008); Jepsen et al. (2015); and Jepsen et al. (2017), seafarers developed a culture to under-report or under-record because of the fear of losing job and intense commercial pressure.

Anderson (2007) on the relationship between fatigue and the ISM Code, found anecdotal information on manipulation and adjustment of records. He stated that seafarers under-report their work and rest hour records for compliance with regulatory obligations.

Hjorth (2008) associated the working situation with low manning level on ships. A ship officer interviewed by Hjorth admitted to record adjustment on his ship that occur due to the pressure from the master.

An ATSB (2010) investigation report on Shen Neng 1 revealed that the chief officer's work and rest hour records did not reflect the actual worked hours. Grech (2016) relating to Shen Neng 1 findings, argued that under-reporting cases occur to satisfy the ships' demand of operational commitments.

Garb et al.'s (2011) study on the impacts of security on the workload revealed that fabricating work and rest hours records was a common occurrence amongst seafarers working long hours. The study stated that seafarers under-report to evade any findings during the PSC or third-party inspections.

Simkuva et al.'s (2016) survey study on the workload of navigational officers observed that 52% of junior officers forge the work and rest hour record due to pressure from the master and to pass various inspections.

1.5 Aims and objectives

Although many ILO and IMO instruments addressing fatigue mitigation exist, fatigue due to inadequate sleep and long working hours continue to plague the maritime industry. To control such factors, the MLC 2006 and the STCW 1978 regulations prescribe mandatory limits on working/resting hours. The compliance is without a doubt is essential for the health, wellbeing of seafarers and for the prevention of

maritime casualties. Unfortunately, seafarers often under-report their work and rest hours records as revealed through literature review.

These practices render any attempts to mitigate fatigue unproductive. Moreover, it is possible that the lack of implementation of regulations or under-reporting of work and rest hour records remains a factor for the prevalence of fatigue in international shipping. Further, inadequate reporting lacked literature to provide comprehensive and holistic views on the extent and reason of such phenomenon.

In this context, the research will focus on the current implementation and record practices of work and rest hours regulations onboard ships. Further the study aims to determine the direct and indirect factors influencing under-reporting of work and rest hours records on board ships.

1.6 Research questions

To meet the aims and objectives of the study, the researcher focuses on the following questions:

- How are work and rest hours regulations implemented onboard ships?
- What factors influence the under-reporting of work and rest hours records onboard ships?

1.7 Use of terminology for under-reporting of records

The literature highlights various terminologies to describe the under-reporting of work and rest hours records. These include: under-recording, forgery, falsification, fabrication and adjustment. For this study, the term ‘adjustment’ has been preferred to

under-reporting. The justification[10] for using such terminology is stated in Chapter 2, Research Methodology.

1.8 Overview of the research

The research is organised into five chapters.

Chapter 1 described the background on fatigue and related regulations in shipping. It provides the major causes of fatigue and the role of work and rest hours regulations to lessen such factors. It further reviews the literature on under-reporting practices. The chapter then establishes the research questions addressing the aims and objectives of the study and, finally, outlines the research.

Chapter 2 discusses the research paradigm determining the research methodology and the data collection method. It describes the participant selection principles and the negotiation method. The chapter subsequently highlights the suitability of the pilot study while discussing the data collection process and the instruments used. The analysis is followed by a section on reliability and validity of the research. Finally, the chapter discusses ethical considerations and limitations of the research.

Chapter 3 consists of the demographic details of the participants and presents the data that comprises of an assessment of the working period of the participants; subjective (respondent's) perceptions of fatigue and the company's role in fatigue mitigation; (respondent's) regulation awareness and assessment; recording practices employed by the participants and its accuracy; management (ship and company) considerations; respondents' recommendations on improving implementation and recording practices.

[10] Under Chapter 2.6: Data Collection process: Semi-structured interview.

Chapter 4 consists of the discussion aimed at responding to the research questions. The chapter provides detailed arguments on implementation and recording practices employed on ships which is followed by reasoning for the lack of implementation of regulations or under-reporting.

Chapter 5 provides conclusion, recommendations and outlines the scope for further research.

Chapter 2: Research Methodology

2.1 Introduction

This chapter opens with a discussion on the research approach. It defines the research paradigm that determines the research methodology and data collection method. This is followed by a discussion on the criteria that determined the selection of the participants. The chapter subsequently describes the negotiation process for engaging participants. It later highlights the influence of a pilot study. Further, it explains the data collection method and determination of the number of participants. The chapter then explains the data processing and analysis followed by the researcher's justification on the validity, reliability and limitation to this study. Finally, the chapter provides an ethical approach employed by the study (Figure 1).

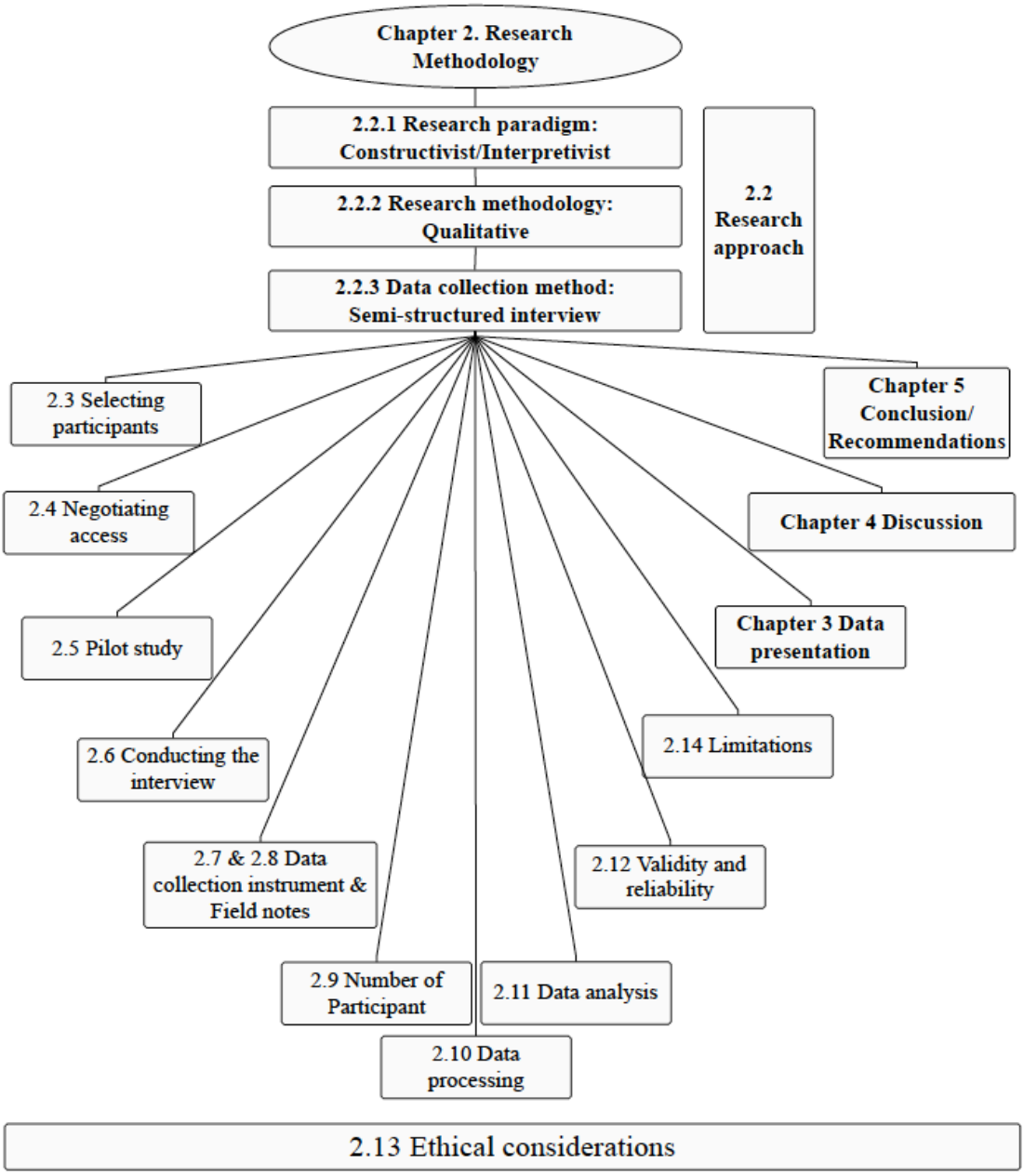

Figure 1: Research process employed for the study. Source: Various.

2.2 Research approach

The research approach constitutes a research paradigm that defines the research methodology and subsequently determines the data collection method (Figure 2).

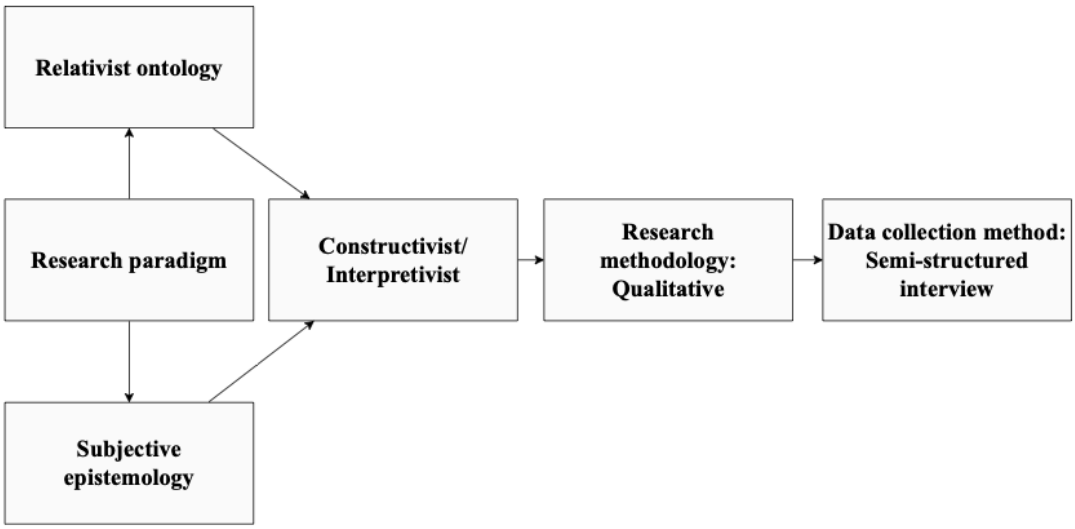

Figure 2: Research approach employed for the study. Source: Scotland (2012).

2.2.1 Research paradigm

In 1962, Thomas Kuhn coined the term 'paradigm' meaning the philosophical way of thinking. In an academic context, the paradigm is used to illustrate the researcher's 'worldview' (Orman, 2016). This worldview is the perspective or thinking or set of shared beliefs that informs the research methodology, data collection process and the interpretation of the collected data. A researcher's perspective inherently reflects how he/she perceives, interprets or acts within the world. It is a theoretical lens through which a researcher understands the world. The research paradigm is established by the ontological and epistemological orientations of the researcher (Kivunja & Kuyini, 2017). According to Grix (2004)*,"Ontology and epistemology are to research what 'footings' are to a house: they form the foundations of the whole edifice".*

Ontology is the branch of philosophy that involves a study of reality. Ontological perspective is concerned with what is or what makes up reality. Researchers are expected to take their stand on their perception of how things are or exist and work (Scotland, 2012).

Considering the researcher's ontological perspectives, the relativist ontology is the starting point for this study. This is because the phenomenon under study is subjective, and it differs with each individual (Guba & Lincoln, 1994). The implementation of work and rest hours regulations and the practise of recording vary with ships. There are various elements engaged in ship operations. These factors determine the way work and rest hours regulations are implemented and experienced by the seafarers. Because of these influencing factors, there will be many realities. Since there will be as many realities as individuals, subjective views or experiences of seafarers constitute the basis of the data from which the researcher will draw the findings and conclusions (Scotland, 2012).

Epistemology is another branch of philosophy that studies how realities, if they exist, can be known. Epistemological perspective is related to how knowledge can be created, gathered and communicated regarding the reality that exists (Scotland, 2012).

Regarding the researcher's epistemological standpoint, subjective epistemology is equally considered in which the researcher engages in an open-minded approach to evaluate realities as furnished by the seafarers. Since the realities exist in individual minds, it would require subjective interaction to access them (Guba-Egon-G, 1990). As individuals construct meaning differently on the same phenomenon, there will be different views and opinions. In such cases, there is a need to consider multiple truths and present them co-constructively (Kivunja & Kuyini, 2017).

2.2.2 Qualitative research methodology and its appropriateness

Considering relative ontological and subjective epistemological perspectives (social constructivist), qualitative research methodology proves requisite and offers a means through which exploratory study can be pursued (Gray, 2013).

As relatively little is known about the implementation and recording practices of work and rest hours regulations, the researcher adopted a qualitative methodology as it offers to explain underlying reasons and influences that prompt seafarers to adjust work and rest hours records (Gray, 2013). Unlike quantitative research, qualitative research method accepts first-hand knowledge based on the views of the participants. This allows ways to seek multiple realities and provide a holistic understanding of the implementation and recording practices used onboard ships (Hilal & Alabri, 2013).

2.2.3 Data collection method: Semi-structured interview

Under the qualitative research methodology, semi-structured interviews with guiding questions applies in this study. The semi-structured interview is suitable as it allows the question 'Why?' (Miles & Gilbert, 2005). Here, a semi-structured interview is helpful as it allows the researcher to probe the participants.

The guiding questions enjoy flexibility and can be modified to address the areas important to the participant which provides a holistic understanding of the area under study (Gray, 2013). It does not follow a specific pattern and can be adjusted to direct the natural flow of the interview. Hence it allows the researcher to "enter into a dialogue with the interviewee", leading to a better understanding of the participants' perspective (May, 2011).

2.3 Selecting the participants

According to Morse (2010), an excellent participant in qualitative research design is one with thorough experience in the phenomenon under study. Therefore, the purposive-convenience sampling method was employed to select participants in which the researcher located potential participants who have experienced the phenomenon under study and can provide the data (Qureshi, 2018). Hence the research includes seafarers having practised implementation and reporting of work and rest hours under

the current regime of the MLC 2006 and the STCW 1978 i.e., on or after 1st January 2012.

Although some participants interviewed had experience under the new regime of the STCW 1978 and/or the MLC 2016, they lacked current experience. To seek seafarers with contemporary implementation and recording practices, the researcher used snowball or nominated sampling where the researcher approached participants using his contacts (Bryant & Charmaz, 2007) (Refer Appendix 1: List of participants).

2.4 Negotiating access

Getting access to the participants is a crucial and slow process that requires persistence and care over time (Benjumea & Carmen, 2014). After identifying the background of participants required for the study, the researcher found some university colleagues as potential participants. A healthy rapport built over time helped to secure easy access. These individuals were approached, notified and briefed on the conditions for face-to-face engagement. The researcher acquired written consent prior to conducting the interviews. Finally, 11 participants from the university were engaged in the study.

The researcher's supervisor introduced 3 respondents. The researcher approached 4 Chinese participants through a contact established during a field study trip to China in mid-April 2019. A friend who was interviewed introduced the remaining 3 participants. These participants were approached via e-mail, informed about the study and terms of access. The date/time and place of all the interview were negotiated considering the participants' convenience.

Negotiating access was not an easy task. Throughout the interview stage, the researcher sought relevant participants using various means. The researcher contacted a United Kingdom (UK) based Non-Governmental Organisation (NGO). However, the European Union (EU) General Data Protection Regulation (GDPR) law restricted the

NGO from sharing contacts. Because of considerable representation in the seafaring community, the researcher desired to cover perspectives of Filipino seafarers. The researcher contacted Filipino seafarers through personal contacts, approached the administration officials and the seafarer's union. However, none of the Filipino seafarers could be convinced to take part in the study.

The researcher also intended to obtain the viewpoints of women seafarers. The researcher approached relevant NGOs, visited social networking sites, attended the International Women's Conference and looked through personal contacts. However, all the attempts were unsuccessful. A considerable number of female seafarers were contacted for the interviews, but no interviews were successfully arranged. The researcher interviewed the only woman seafarer at a very later stage of the data collection process, which resulted in a lack of time for transcribing.

Further, some participants when approached were sailing on ships. Negotiating date and time for the interview was demanding. This is because the participants could only be available for the interview when their ships were in port and had internet connectivity. Further, work/rest schedule were considered for planning interviews with these seafarers.

The researcher faced many challenges in negotiating interviews with participants. A few potential participants viewed that taking part in such a study would jeopardise their employment. It was very unfortunate to lose them even after advising them of the purpose of the study and assuring their anonymity. Some potential participants also requested for the interview questions prior interview but due to the nature of the study, the researcher could only provide them with the main themes/areas of the interview. Some participants would only partake in the research if it was unrecorded. These individuals feared that a recording might fall in the wrong hands and cause them damage. The researcher reassured these participants based on the strict data protection protocol employed by the researcher.

One of the astonishing realisations the researcher came to while negotiating was the negative perception of a few individuals of maritime governance. Once the purpose of the study was communicated, these participants expressed the view that their participation would not bring any change in shipping practices or the governing policy. In their view, maritime policies are made on a political agenda and influenced by powerful lobbies of the shipping industry. Ultimately, these individuals could not be persuaded to take part in the study.

Most of the participants from the university, some well settled ashore and other active seafarers, were energetic and excited about the interview process. The study provided them with the opportunity to use their experience to bring to light their perspective on the subject and contribute to improving the system.

During the interview stage, the researcher interviewed 22 participants out of the 63 potential participants who were approached through the means discussed.

2.5 Pilot test

The researcher conducted a pilot study with 2 participants from the university to determine the accuracy and usefulness of the semi-structured interview guide and the instruments for face-to-face interviews. The researcher found the interview guide and instruments appropriate for further study.

2.6 Data collection process - Semi-structured interview

The interview process which began in February 2019 culminated after three and a half months in May 2019, with 22 seafarers from diverse backgrounds interviewed. All meetings were single stage averaging 40 minutes with only a few going over an hour.

There were 13 face-to-face interviews. The researcher conducted most of these interviews within a university setting while the remaining participants were interviewed in their houses during a visit to Mumbai in May 2019. The researcher conducted 9 interviews using online platforms[11] with the participants who were physically inaccessible due to time and financial limitations. The interviews were conducted on one-to-one basis without the presence of any other person.

The interview guide consist of questions on the participants identification, followed by their working schedule, contract period and fatigue perceptions, and their awareness of fatigue-related regulations. These sets of questions gave broad sense to the type of question to be asked and to guide participants to discuss on implementation and recording practices employed by them. Further questions lead participants to discuss on the accuracy of record and factors leading to adjustment of records. Finally, the questions prompt the participants to provide recommendation for improving implementation practices and recordkeeping. (Refer Appendix 2: Sample of the semi-structured interview).

During the interview process, the researcher started with small talk to make sure that the environment was comfortable and built a sense of rapport and trust. The researcher reiterated the terms under the consent form and the rights of the participants for taking part in the study. The researcher informed the participants when the recording of the interviews was being started or stopped.

During the interview process, the researcher offered encouragement to the participants to approach their responses independently and carefully, and listened to their views and experiences. This helped in building trust and allowed the participants to know that their views are being valued (Seidman, 2006). It further helps the participants to

[11] Refer Chapter 2.7: Data collection instruments.

relax and reveal experiences critical for the study. Invariably, the researcher remained neutral during the interview and "sought for the particular" (Alshenqeeti, 2014).

The guiding questions encouraged the participants to display their perceptions of implementation and record-keeping practices. The researcher followed the question sequence and deviated only to maintain free-flow discussion. Follow-up questions were asked to know more about the phenomenon or make sense of the data provided. The semi-structured guide further ensured that the participants were prompted to discuss cases of adjustments of rest hours records rather than the topic being introduced or discussed by the researcher. Participants demonstrated such phenomena using words like 'adjusted', 'manipulation' and 'flog'. Since there are cross-cultural and language barriers, the researchers ensured that the phrases or sentences used by the participants correspond to their intended meaning (Patton, 2015).

According to Dempsey et al. (2016), researchers should refrain from using phrases that cause psychological stress amongst the participants. The researcher viewed that the use of the phrases such as under-record, forge, falsify, fabricate (indicated under chapter 1.4 literature review) could lead to psychological stress amongst the participants. Using such phrases might prevent participants from volunteering meaningful data or completing the interview. It may prove detrimental to the purpose of the study. To avoid such cases, the researcher used the neutral-sounding phrase 'adjustment' to question, indicate or discuss cases of inaccurate recording. Using the term 'adjustment' encouraged participants to yield rich data and ensured completion of the interview process with meaningful data.

Further, to determine cases of adjustment of records, the researcher deemed it necessary to quantify such data. Thus, the questions referred to the number of cases of adjustment provides quantitative data to generalise such cases within the data collection setting.

According to Barbour and Schostak (2005), the interview is better when the interview questions are short with long subject answers. The researcher kept the questions simple and short. The researcher used statements such as “can you elaborate on the experience?” to prompt participants to give detailed answers when responses were brief. This also reminded the participants to represent their own views and experiences and not that has been heard.

While face-to-face interviews provided continuous interaction, there were a few communication breakdowns during video online meetings with participants on the ship. In such cases, the researcher interviewed participants on audio to allow continuous communication and prompted participants to repeat their responses upon regaining internet connectivity.

At the end of the interview, the researcher re-expressed gratitude to the participants and encouraged them to comment or question (Alshenqeeti, 2014). Many participants further admitted that they were initially reluctant to answer the questions but later found the process to be engrossing. This helped a great deal in free-flowing discussion and provided rich data. The researcher discussed ways for future contact and some participants looked forward to being contacted for providing them with the final report of the study.

2.7 Data collection instrument

The researcher, a sole human instrument interacted with all participants using a semi-structured guide. Interview data is irreplaceable. Therefore, having a back-up tool such as an audio recording is essential for data management. A cell phone and a tablet were the recording devices used and one acted as a back-up for the other during the face-to-face interviews.

For online interviews, the researcher used these devices to facilitate video and audio interviews using online applications such as Skype, WhatsApp and We Chat. The researcher conducted all the interviews in English although it was neither the first language of the interviewer nor the participants. All the interviews were recorded to facilitate data processing.

2.8 Field notes

According to Burgess (1981), field notes when maintained enable the researcher to be reflective about the work. During the interview, themes were noted in a diary. The researcher used these themes to highlight the data while transcribing and also used the diary during the coding process to build-up themes. The field notes were also used to maintain a log of events and relevant details of communication with the participants.

2.9 Number of participants

Since it is difficult to determine the number of interviews for the study, the researcher ceased the data collection when data saturation was attained. During the interviewing stage, the researcher reached a juncture where further themes were no longer feasible to replicate the study (Ness, 2015). The researcher recognised when the interview data was not adding substantially to the overall framework and could make it difficult for the research to draw conclusions. Finally, the researcher interviewed 22 participants.

2.10 Data processing

Interview transcription requires a lot of patience, time and effort. This laborious work was carried out concurrently with interviewing participants and attending university lectures/studies. The audio recordings were transcribed using the paid online tool

"Transcribe Wreally"[12]. As soon as the audio data was uploaded using a laptop, the software provided automatic transcription that necessitated subsequent corrections.

Some recording took 4-6 hours to correct while a few took 8 hours. The time depended on the participants' articulation as they were non-native English speakers. Although there were options of outsourcing the transcription, the researcher did it himself to familiarise himself with the data prior to analysis. After completion, the researcher sent the interview transcripts to the participants for their reviews/corrections.

The researcher could only complete 20 transcripts out of 22 interviews. One respondent was inaudible since the participant was onboard with limited internet connectivity. The other respondent (female) was not transcribed due to lack of time[13].

2.11 Data analysis

According to Bryman (2016), an analysis is the process of reducing a large amount of collected data and making sense of them.

[12] Transcription software "Transcribe Wreally" details can be viewed at https://transcribe.wreally.com/
[13] The researcher interviewed the only woman seafarer at a very late stage of the data collection process.

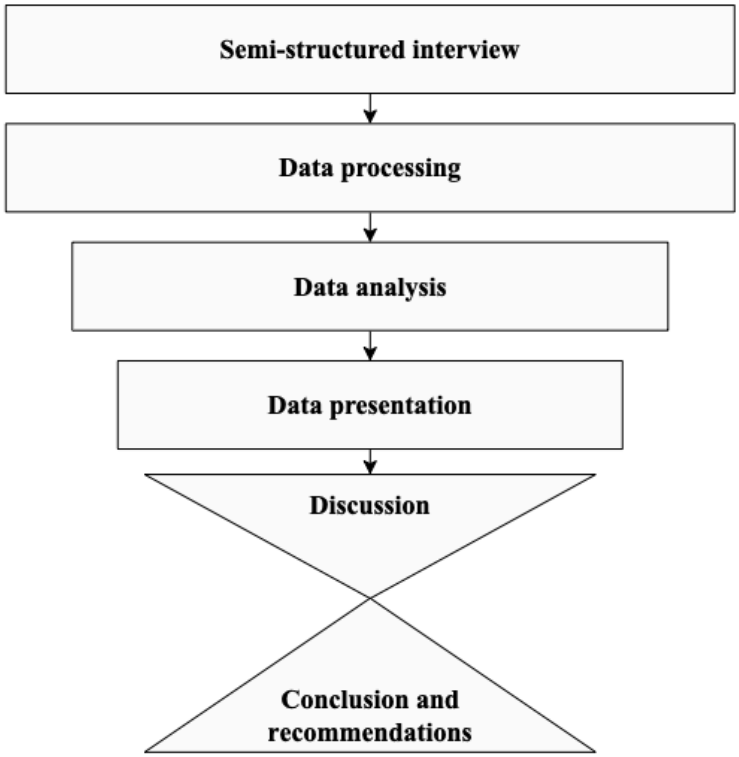

Figure 3: Data reduction process. Source: The researcher.

Once the reviewed transcripts were received, the data was analysed using "NVIVO" Qualitative Data Analysis (QDA)[14]. Although it took time to learn and operate the software, NVIVO QDA allows reduction of data by organising, coding and categorising them. The researcher used QDA over manual coding process since it saves time and keeps the data/coding organised allowing more focus on the analysis to yield more professional results. Since the interview data is text-based, the coding process involving labelling of data text, phrases, sentences and paragraphs forms a cornerstone for analysing the data (Lune & Berg, 2016).

[14] The researcher purchased the latest NVIVO Mac Version 12. Details can be viewed at https://www.qsrinternational.com/nvivo/nvivo-products/nvivo-12-mac

Name	Files	References	Created On	Created By	Modified On	Modified By	Color
1. Assessment of working period	20	100	05/08/19	BIKRAM	27/08/19	BIKRAM	
2. Fatigue Perception	20	192	05/08/19	BIKRAM	27/08/19	BIKRAM	
3. Regulation Awareness	20	152	05/08/19	BIKRAM	12/08/19	BIKRAM	
4. Recording Practices	20	146	05/08/19	BIKRAM	12/08/19	BIKRAM	
5. Accuracy Of Record	20	272	05/08/19	BIKRAM	20/08/19	BIKRAM	
6. Management Considerations	20	262	05/08/19	BIKRAM	27/08/19	BIKRAM	
7. Recommendation for Improvement	20	124	05/08/19	BIKRAM	23/08/19	BIKRAM	

Figure 4: The main coding themes[15] (nodes). Source: NVIVO QDA.

Considering the constructivist approach, the researcher used the 'Content Analysis' method. It allowed themes to be derived directly from the interview data (Lune & Berg, 2016). The main nodes were established in the same sequences as the interview question headings (Figure 4) to make meaningful sense of the coding. Each interview data was inductively broken down i.e., line by line and assigned to nodes identified during the interview and data processing stage. As the coding progressed, it developed additional nodes or child nodes. Also, double or multi coding[16] was done on the text/sentence. This principally ensured the same result if the coding was to be done by another researcher under the same settings (Hsieh & Shennon, 2005; Boréus & Bergström, 2017) (Refer Appendix 3: Detailed coding process employed for the study). The nodes and child nodes identified during the coding process are described in Chapter 4 – Data presentation under the main themes/headings as in Figure 4.

While presenting the data, the researcher used numerical/quantitative expressions to make a more precise count of things rather than using terms such as some, often or most (Maxwell, 2010). The researcher deemed this important as it provides distinctiveness and coherence to the complexity of different categories of lived experiences and for generalisation of qualitative research over the collection of individuals (Kuiken & Miall, 2001).

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[15] Here, files mean the number of interviews, references means the number of codes assigned to the nodes.

[16] Refer Appendix 3.10: Sample of interview text coding.

2.12 Reliability and Validity

Guba (1981) suggested the researcher's constructivist approach should be subjected to some criteria such as credibility, dependability, confirmability and transferability.

Credibility criterion refers to the extent to which the data and its analysis are trustworthy and authentic. The fulfilment of this criterion is based on the research paradigm of the researcher. The researcher based the study on the constructivist perspectives where the findings were socially constructed based on the experience and views of the seafarers. Moreover, Chapter 2 – attests to this criterion in greater detail.

The criterion of dependability refers to the ability to draw the same conclusion given similar circumstances. The text of data obtained were double or multi coded[17] to principally ensure that other researchers studying a similar phenomenon would draw similar findings.

The criterion of confirmability was based on Wertz (1986) who suggested that reliability is based on multi-perspective views of the participants although there may not be similarity in the context or facts. The research employed participants with diverse backgrounds in terms of rank, nationality, type of ship/company and sailing experience. All participants attest to the fact that adjustment of records exists under various influencing factors. Further, instances of adjustment were stated in the literature review section. These literatures were utilised to support the discussion on the data collected.

The idea of transferability refers to the findings of the study that could be applicable to another context. Constructivist study being contextual, the transferability of the

[17] Refer Appendix 3.10: Sample of interview text coding for sample interview text coding.

findings with this approach is not practically possible (Kivunja & Kuyini, 2017). To assess the extent of adjustment of any record on ships requires additional research such as on the ISM Code.

Further research outcomes could be influenced by the researcher's bias. Being a seafarer and having experienced the phenomenon under study, there is invariably an element of inclination or prejudice towards the area of research. Such an element possibly influences the deduction or findings of the study (Smith & Noble, 2014). Fulfilling the credibility criteria discussed above would allow such a bias.

Additionally, participants' bias could influence the data collection process. The participants' views are subjective and could be influenced by victim mentality which moved them to provide exaggerated data or data contrary to their experience (Smith, & Noble, 2014). In order to limit such bias, the finding have been validated through existing literature.

2.13 Ethical considerations

The researcher based the application for ethical approval on the careful understanding of ethical concerns that could emerge during the study (Lune & Berg, 2016). The researcher submitted the application comprising a research proposal, a WMU protocol form, a sample consent form and the semi-structured interview questionnaire to The World Maritime University (WMU) Research Ethics Committee (REC) (Refer Appendix 4: Ethical Considerations). The data collection process was initiated on approval from the WMU REC.

One of the most important ethical considerations in the study is the use of informed consent. The researcher sought the consent for online interviews through emails while the face-to-face interview respondents signed the form prior to their interviews.

Secondly, the researcher ensured the data collected from the participants was only accessible to the researcher and was protected from unauthorised use or sharing without the approval of the participants.

Confidentiality is the third ethical consideration that protects the identity of the participants involved in this study. Considering identity as the central ethical issue which could harm or damage the participant, the researcher anonymised references to any people or organisations made by the participant during the interview. Moreover, some demographic details mentioned under Appendix 1: list of participants are kept confidential.

2.14 Limitation of the study

As with other research, this study has its limitations:

- The researcher studied the phenomenon based on the perspectives of officers and engineers. The perspectives of ships' ratings could not be integrated, as these were inaccessible to the researcher.
- The participants backgrounds in terms of their nationality, origin, culture, and region and its influence on the phenomenon were not considered in this study.
- The research is only limited to the fatigue aspects. The relationship of adjustment of records to overtime or any other factors were not considered.
- Due to limited time available for the study, the researcher could not attempt to study or analyse relationships between various factors (using NVIVO QDA) depicted under the Chapter 3 data presentation.
- The study of under-reporting cannot be generalised to be applicable to any other recording onboard ships or as a general practice to deceive authorities.

Chapter 3: Data Presentation

3.1 Introduction

This chapter includes the participants' demographic details and renders the data as furnished by the participants in the following order:

3.2 Demographic of the participants;

3.3 Assessment of participants' working period on ships;

3.4 Respondents' perception of fatigue and company's role;

3.5 Respondents' awareness and assessment of regulations on fatigue;

3.6 Respondents' work and rest hours recording practice;

3.7 Respondents' on accuracy of records;

3.8 Management considerations;

3.9 Respondents' recommendations for improvement.

3.2 Demographics of participants[18]

The panel of 20 comprises male participants from 13 different nations from Asia (13), Africa (3), Europe (3) and the Pacific Islands (1). Six participants are from India, while three are from China and one each from the other nations (kept confidential).

[18] Refer Appendix 3.2: Participants Demographic details for demographic charts.

The respondents consist of masters (*Capt*) -7, chief engineers (*CEng*) -2, chief officers (*COff*) -4, second officer (*2Off*) - 4, third officers (*3Off*) -2 and a third engineer (*3Eng*). All the participants have experience of serving on tanker ships such as oil, product and chemical tankers; dry cargo ships such as containers, Ro-Ro, bulk carriers, general cargo; and offshore supply vessels.

Sailing time amongst the respondent varies from a *3Off* having sailing experience of four years to a *CEng* who has sailed for over thirty-five years. The average sailing experience amongst the participant is 12.2 years. Eight participants sailed in 2019, while four respondents last sailed in 2018 and two participants each have last sailed in 2017, 2016, 2013 and 2012.

For this research and to determine current implementation practices, seafarers having sailed in or after 2017, i.e. within three years of the time of interview, are considered active seafarers. Accordingly, 70% active seafarers are part of the study.

3.3 Assessment of the participants' working period on ships[19]

Respondents highlighted great differences between the working time at sea and in the port:

- At sea, they reported working on average between 8–11 hours per day (h/d). However, on some occasions, their working hours exceed 12h/d.
- In port, 80% of the respondents reported working between 12–15 h/d. The remaining respondents reported working about 10–12 h/d (Table 2).

[19] Refer Appendix 3.3: Participants' working period on ships for detailed coding.

Rank	Participants	Working hours	Remarks on working hours	Other remarks
Capt	6	12-15	Not fixed, irregular	Non-watchkeeper, sea going ship
	1	> 12	>24 hrs occasionally	Non-watchkeeper, OffShore Vessel
CEng	2	10-12	>12 hrs occasionally	Non-watchkeeper, sea going ship
COff	3	12-15	>15 frequently, irregular	Non-watchkeeper, sea going ship
	1	13	Everyday	Offshore, 12on/12off watch system
2Off, 3Off, 3Eng	6	13-15	>15 occasionally	6on/6off watch system
	1	10-12		4on/8off watch system

Table 2: Respondents' work schedule in port. Source: The interviews.

- From the offshore vessel, a master (*Capt*-6) reported work periods exceeding 24 hours, whereas a chief officer (*COff*-4) works for 13 h/d for the entire contract period of 5 weeks.

It is noticeable that some senior non-watch keeping officers expressed difficulty in precisely evaluating their working periods. This challenge is because of the operational pressures that directly affect their working schedules, resulting in irregular and shifting schedules. Such comments underlined that monitoring of hours of work/rest is not a priority in ship operation. *COff*-2 shared his experience on the difficulty in describing his working hours as he states:

> *Once I had just joined a ship and within a week, I did ten different berths in the [country X]. At that time, I slept in breaks for maximum 3–4 hours and that too in CCR [Cargo Control Room][20] […]. So, the number of hours*

[20] Cargo office of a tanker ship where the cargo loading and unloading operations can be monitored by the person in charge.

per day in port, I can't tell you that. I cannot give you exactly […]. (COff-2)

The data also shows that nearly all the participants did not have any days off for the entire contract period. Most senior officers deemed the contract and vacation period to be appropriate while junior ranks required a reduction in the contract period.

3.4 Respondents' fatigue perception and company's role in fatigue mitigation[21]

All participants consider fatigue as a concern in the shipping industry.

3.4.1 Fatigue perception

Figure 5: Participants' perception of fatigue analysed by NVIVO QDA.

[21] Refer Appendix 3.4: Participants' fatigue perception and company's role in fatigue mitigation for detailed coding.

From figure 5 (QDA highlights the most coded nodes), respondents reported fatigue because of long working hours, inadequate manning, lack of sleep and commercial work pressure. The intensity of ship operation (making frequent calls at ports, conducting various operations, having short port stays, operating in coastal trade) was reported to affect the capacity to rest. *3Off*-2 lamented:

> *Sometimes, you want to stand on bridge watch after a long day but your knees are bending and your eyes are closing. You're just working to keep yourself awake, you drink coffee but that doesn't help. You're just trying not to stop because you have to work, you have to do it […]. (3Off-2)*

Many officers believed that physical exhaustion because of these activities denied opportunity for shore leave and instead they opted to rest. *COff*-2 regretfully expressed:

> *It is very very seldom […]. People are busy with 6on/6off [...]. Most of them [crew] after their duties have a rare chance to go ashore and have some off time to refresh themselves [..]. I don't remember when I've been ashore, I don't remember actually when I went to ashore last time […]. (COff-2)*

Compact living spaces with limited or no recreational facilities; harsh living and working conditions due to vibrations, noises and rough weather; lack of quality crew and work plan were further factors that resulted in fatigue amongst seafarers. *COff*-4 put across the harsh reality of living onboard ships:

> *There is very less amount of recreation things. There was not even a carrom board. You can see, there is a lot of pressure and you don't have anything to divert your mind. Accommodations with a small cabin, these also contribute a lot to fatigue […]. (COff-4)*

3.4.2 Company's role

Respondents expressed that companies should monitor fatigue and provide adequate manning based on ship operational profile. Finally, participants believe that companies are reluctant to provide additional resources since they may have immediate financial impacts. The problem is summarised by one of the masters, *Capt*-3:

> *Well, the simplest way is to employ more ratings. But companies are trying to cut their operating costs and actually that's the easiest ways to cut operating costs by reducing crew. (Capt-3)*

3.5 Respondents' awareness and assessment of regulations on fatigue[22]

3.5.1 Awareness of regulations

Active seafarers[23] considered working time regulations under the MLC 2006 and the STCW 1978 as the main fatigue mitigation tools. They reported being aware of the content of the regulations concerning work and rest hours.

Interestingly, Fifteen percent of respondents are aware of the IMO guidelines on fatigue.

3.5.2 Assessment of regulations

Seventy-five percent of respondents reported that the regulations lacked effective implementation. These respondents believed that regulations are impractical to cover the complexities of ship operation. *Capt*-7 dejectedly expressed:

> *Practically compliance with rest hours requirements has become the seafarer's worst nightmare. You not only need to comply with the*

[22] Refer Appendix 3.5: Respondents' awareness and assessment of regulations on fatigue for detailed coding.

[23] Seafarers having sailed on or after 2017 i.e. within three years are considered as active seafarers while others having sailed before 2017 are non-active seafarers.

requirements but are also expected to perform multiple tasks with the same set of crews. (Capt-7)

Sixty percent of respondents questioned the practicality of safe manning principals in certifying the number of crew members to be employed on ships. *2Off*-3 and *3Off*-2 assert:

There were less people required [referring to the safe manning certificate] and we had more people on the vessel. But even in that case, we got very fatigued. I mean this logic tells you that there is something wrong and something should be done here. (3Off-2)

I don't know from where the company gets a minimum manning level that mentions 15 or 16 crew. I don't know how to manage with 15 or 16 crew onboard for tanker. (2Off-3)

Thirty percent of respondents believe the current regime is adequate as long as these regulations are complied with. *2Off*-4 viewed:

So far, I have found that they are good. Especially, the introduction of the MLC 2006 […]. When I started sailing as cadet in 2010, I suffered more fatigue as compared to now. So, I can say that regulations are good but they are only good as long as the seafarers are complying. (2Off-4)

Twenty percent of respondents doubted the suitability of work and rest hours regulations in addressing fatigue in real operational settings as *COff*-2 expressed:

So, six hours sleep at a single stretch. In the first place, it is wrongly said because for a human to have an effective sleep, you should be sleeping for about seven hours and that is minimum[24]*. With six hours of doing 6on/6Off*

[24] The comment is in line with the recommendations provided for daily rest (7-9 hours) by the National Sleep Foundation: how much sleep do we really need?. Data can be viewed at https://www.sleepfoundation.org/articles/how-much-sleep-do-we-really-need

port watches, normally you don't sleep for all six hours effectively, you only sleep for 4 hours. (COff-2)

Ten percent of the participants expressed the view that the PSC lacked enforcement of these regulations. Respondents believed that inspectors never investigated their records during third-party inspections even after having violations. *COff*-4 working on an offshore vessel emphasises, *"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"*.

3.6 Respondent's work and rest hours recording practice[25]

3.6.1 Who's recording?

Seventy-five percent of respondents maintain their own records. However, it seems that cases exist when one person is appointed to complete the records for other crew members or eventually for the entire crew. As *COff*-2 and *COff*-3 relates,

We all don't get time to do all this and we know that these things [regulations] are not really effective and not of any use […] So, cadet[26] is the one who is doing the record-keeping for all the ratings and myself and then I check it at the end of the week before we sent the records to the office. (COff-2)

Basically, our cadet is doing for me and for the rest of the crew. It's actually an extra workload and extra paperwork. It's [regulations] not useful. (COff-3)

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[25] Refer Appendix 3.6: Respondent's work and rest hours recording practice for detailed coding.

[26] Trainee Navigational Deck Officer or nautical apprentice who is employed to learn the basic duties of a deck officer onboard a ship.

A few respondents stated that an officer assists the computer illiterate crew to update the records.

3.6.2 Frequency of recording

Sixty percent of respondents were inconsistent in recording daily[27] primarily due to the workload. As *Capt*-7 and *2Off*-3 expressed,

> *Work/rest hours are to be recorded daily. However, practically it's not always possible to record the same on a daily basis as you don't expect the crew members after 6 hours of cargo watches to sit in front of the computer and fill work/rest hours. (Capt-7)*
>
> *Every day. It is the company requirement. To tell you the truth […], companies say that we should record every day but there are some crew when overworked and very tired will not record this every day. (2Off-3)*

Nevertheless, respondents ensured that their entries in logs were being recorded and verified by the head of the department before sending the data[28] to the office.

3.6.3 System of recording

Eighty-five percent of respondents reported that the company equips ships with a computer-based recording system[29] with features that shows/highlights violations while updating the record. A few participants also believed that the recording software facilitates the adjustment of records. As *3Off*-2 and *3Off*-1 illustrate,

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[27] Respondents stated that the company set standards procedures for daily recordkeeping.
[28] Respondents stated that the requirement for data exchange is company specific.
[29] Participants reported using software available on the ship which is provided by the company. The software is either a common software such as ISF watchkeeper; and DNV-GL Navigator work and rest or company-developed software. For details on ISF Watchkeeper software, visit http://isfwatchkeeper.com/. For details on DNV-GL recording software, visit https://www.dnvgl.com/services/work-and-rest-hours-software-mlc-2006-and-stcw-2010-rest-hours-navigator-port-work-rest-1462.

It [software] tells you if you exceeded your working hours. I mean if it's red that means that you have exceeded the time that you can work. (3Off-2)

It [violation] wouldn't show right. Because, when it's computerised they [crew] putting exactly the hours that are supposed to show compliance. (3Off-1)

Such software is also used as a work and rest hours planning tool and eventually to record overtime.

Three participants based their record only on the paper while 8 respondents underlined that they manage both paper and computer-based recordings, *"Paper sheet is given to the crew and I tell the crew to fill up the record as per the actual working hours. Then, later these hours would be done on the computer"(COff-2).*

3.7 Respondent's on accuracy of work and rest hour records[30]

All participants have adjusted or witnessed occurrences of adjustment of work and rest hours onboard ships.

3.7.1 Are there any adjustment of records?

- 80% of the respondents reported having adjusted their own records.
- 50% of the respondents have adjusted the records of the other staff including the six who adjusted the records of all crew under their control.
- 60% of the respondents reported that their records have been adjusted by someone else onboard. Recalling the responses of these participants:

[30] Refer Appendix 3.7: Participant's on accuracy of work and rest hour records for detailed coding.

I normally fill 8 watchkeeping hours and 2 overtime hours irrespective of any additional work done or not. Even if I do more hours, I still record normal working hours. (3Eng-1)

Well, as a master, if the record is not consistent with the rules, I was telling the chief officer and then to amend it [record] accordingly. (Capt-3)

Yes, I've been doing adjustment of record to avoid violations and not only for me but also for junior officers, deck ratings. (COff-2)

It is actually me and the master who is adjusting it for all crew. (COff-3)

I have been told to adjust my own records and I have been told to adjust others records. However, I have never adjusted my own or somebody else's records without being told to do so by the master or the company. (2Off-1)

When I was deck cadet, I used to do it [adjustment] with Chief officer or bosun. (3Off-1)

3.7.2 Frequency of adjustment of records

In order to have a consistent approach amongst participant reporting on the frequency of adjustments[31], the intervals were grouped as never, rarely (2/month), sometimes (1/week), often (more than 2/week), or always.

- 3 respondents update their records only to show compliance (always).
- 7 respondents often adjust their records.
- 4 respondents adjust the records sometimes or rarely.
- 1 respondent never adjusted records but witnessed an occurrence of having his records adjusted by someone else.
- 1 respondent is not sure of the frequency as his records are adjusted by others onboard.

[31] The frequency of adjustment does not necessarily suggest the number of days of violations.

The officer's comment on the frequency of adjustments:

> *Every day people are doing adjustments. It is difficult to estimate as it is different for different ships. But as per my worst experience I have adjusted to 10-12 days in a month or sometimes more than that. (Capt-2)*
> *In recent months, I have 5 days non-compliance that in 12-day period […] we try to adjust for all these days and as much as we can. (2Off-2)*

3.7.3 Circumstances leading to the adjustment of records

Eighty-five percent of participants have reported adjustment of records in relation to port operations. They mentioned activities such as pilotages, 6on/6off watch system in port, third-party inspections, mooring operations as work-related factors are causing maximum adjustments. *CEng-1* states:

> *Master and Chief Engineers are not able to take a rest after a long manoeuvring, berthing operation. As soon as the vessel is berthed, they have to carry out port formalities, attend to third-party inspection, reply to numerous emails, attend and oversee cargo operation, deal with port authorities etc. You just cannot ignore them. (CEng-1)*

Multiple port operations, short distance between consecutive ports and port stay have resulted in adjustment for 70% of respondents. *Capt*-4 expressed:

> *Small ship, doing taxi service [many ports], we need to attend as many mooring stations. At the mooring station, I have even slept on the mooring ropes. Because after departure, in 2 hours you will arrive at the next port. (Capt-4)*

The junior officers working on a 6on/6off watch system in port reported adjustment of the records as they work during their resting period to draw passage plans and complete port administrative works. *2Off*-2 and *3Off*-2 commented:

As we do 6on/6off during the port stay, in addition to those hours, I have to attend mooring station and make various passage plans during my off watch. (2Off-2)

As a 3rd Officer, I additionally have to do arrival documents and departure documents [Port administrative work]. So, apart from 6on/6off watch system, I have to do these additional jobs during my off watch. So basically, I am not getting sufficient rest by working 16 hours per day. (3Off-2)

Forty percent of the respondents reported voluminous and time-consuming ISM paperwork has resulted in adjustment. The officers commented:

There is plenty of paperwork that is required by the company to be filled up by us. On top of it, there is duplication where one particular thing you are logging in five different documents. I mean the drill – I have to record in Deck logbook, if Oil spill drills then in SMPEP, in [X flag-name removed] Official Log, in company checklist. This was one example and there are many examples of it. (3Off-2)

So, when you start a job you have the initial set of paperwork which includes an RA, toolbox meeting, and the closure paperwork […] and I guess the amount of paperwork that we do for a job takes more time to actually do the job. (Capt-7)

Maximum of our work is on papers and it takes a lot of our time […] during oil major inspections such as SIRE or CDI. Inspectors emphasis only on the paperwork and to complete those will drains you out. We just keep on working with very little rest or no rest. (COff-2)

Thirty-five percent of respondents reported that tank/hold cleaning operations commonly leads to adjustments as stated by *3Off*-2,

We received an order [from charterers] that tanks have to be washed [for next cargo loading]. The chief officer again got busy and we continued

with 6on/6off and then we received the information that we are going back to the same port. So again, the canal transit and port operations. So, it was like almost two weeks of 6on/6off. (3Off-2)

Twenty-five percent of respondents reported the adjustment of regulatory records for overtime. Respondents reported that sometimes crew would over-report work. On the contrary, senior officers would reduce actual working time to fit overtime within the company limit.

Fifteen percent of respondents also viewed that emergency situation resulted in the adjustment of records.

3.7.4 Unrecorded work

Forty-five percent of respondents reported that there are tasks onboard that are never recorded in any log books or under specific procedures. Such working periods cannot be verified. Interview quotes from *2Off*-3 and *CEng*-1 support this observation:

Sometimes I can see the masters, he's working all the time but he cannot record that. Especially dealing with the officials [port]. After long pilotage inside the river then after coming alongside and if the officials come one after another then the master has to be there. He cannot take rest but he also cannot show that he's working all the time. (2 Off-3)

It is very common that the master gets a call at 03:00 in the morning or message from the charterers at 04:00 in the morning to fix cargo. This is followed by long pilotage at 06:00 am. But he never specifies or includes those scenarios [Messages or Calls] in his rest hours sheet. So, in a similar manner, we just try to fill the sheet in a normal way. (CEng-1)

3.8 Management considerations (company and ship)[32]

3.8.1 Reporting violations to the company

Nearly all respondents experienced reporting violations to their companies' management. They used various communication channels either onboard (by email, phone or meeting company's representatives) or when ashore (during seminars or meetings).

> *When I was a master, from time to time the issue comes up. When the superintendent visits the vessel, I talk to them. (Capt-3)*
> *These issues have been raised by many senior officers including masters during the company's seminars. There has not been any movement from the office. I don't know the reason, but yes, the office seems not interested in these issues until and unless we have a big incident. (COff-2)*

A few of these participants have also recommended companies to provide additional manpower, *"So, we have been reporting this [violation] to the office but nothing has been done on this like we always ask for more manpower but nothing has been done" (COff-2)*.

A few participants believed that reporting to the company was not productive. As *Capt*-7 and *CEng*-1 quoted,

> *I believe there's nothing much you can do about it. If your vessel schedule demands that amount of work. You have to go ahead and finish off that work. (Capt-7)*
> *These issues are addressed but it keeps on happening regularly even after sending various messages from the vessel. (CEng-1)*

[32] Refer Appendix 3.8: Management considerations for detailed coding.

They address such violations by providing compensatory rest to crew members. However, they also admit the limits to such an isolated approach particularly in highly demanding operations such as in ports. *CEng*-1 vividly describes that

> *In the [country X], we completed tiresome bunkering operation and crew were told to rest. After few minutes, [X PSCO] came on board for inspection. I told the PSCO that the crew [required for boat or fire drill] is having rest after busy bunkering operation and requested if it possible for them to consider this. PSCO replied that it is not possible as he has to cover 6 other vessels. So, we had no option but to agree to their demands. (CEng-1)*

3.8.2 Response from company to reported violations

Ninety percent of respondents (18) considered that the feedback from the company was inadequate to address the seriousness of the issue.

Amongst these, 13 participants highlighted that companies wanted onboard staff to somehow manage the situation by themselves. *Capt*-6 expressed that, *"They know this situation, they just want us to hold on and don't give up"*.

9 respondents reported that the company blames and/or questions the shipboard management's capacity to run the ship and crew; and,

> *The company ask hundred paperwork, a hundred questions about why it happened, why you didn't plan and it actually blaming master and the other crew members. It actually backfires us. (COff-3)*
>
> *Usually, the company blames saying you can't manage. If you put exactly how much you work, then they should not argue. (CEng-2)*

8 respondents reported having directly instructed by the company to adjust the records. *2Off*-1 and *Capt*-7 believed that,

Well, actually adjustment would very seldom come from the master onboard, it usually comes from the company and usually via telephone. Company request masters "not to leave any traces" or any of the deck officers to adjust the rest hours or edit the sheet before resending them. (2Off-1)

The actual response will never come back to you in 'black and white' [officially]. It will always be a phone call that, "Captain, please try to manage it between the requirements and not to get any observations during third-party inspections". (Capt-7)

In rare cases, it was reported that companies provided additional crew after being persuaded by the ship. *2Off*-2 said that,

"After long communication with the office, finally, it was made clear by the captain to the office that violation cannot be handled by any other means and we need additional officer. So, we had an additional officer later on that ship" (2Off-2).

3.8.3 Instructions provided to adjust records

About 40% of participants estimated that companies' requirements for compliance, directly or indirectly, start such adjustments. *Capt*-7 quotes,

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. (Capt-7)

A further twenty-five percent of respondents considered that the master or head of department influenced the adjustment. These participants expressed saying,

I don't flog the book, I don't cook books. I let other people cook the book for me […] somebody on behalf of the master (COff-4)

I've been doing myself as well because I've been told by the captain to adjust the records. (2Off-2)

At the end of the month, he [master] changed so there was no violation. I do not know if he has done that for other crew members. Later, I had a talk with him and afterwards he didn't do it anymore. (CEng-2)

Thirty percent respondents adjusted the records themselves without external and identifiable pressure.

It came to me like it's the way you do it, you adjust. It's not the request of the captain or chief officer. (3Off-2)

3.8.4 Awareness of management about the record adjustments

Nineteen respondents highlighted that masters are aware, while seventeen respondents stated that companies fully know of the adjustments on rest hours records performed on ships. *Capt*-4 and *Capt*-2 recalled on being asked:

Yes, as a master I have also filled like this. Come on! as a master I have worked 18 hours and I log 10 hrs. So, (laughs) […] why I am saying about others?. As a master, I have done the same thing (Laughs). What to do? (Capt-4)

Company is very much aware, 100% for this happening. The company always pretend they don't know. But they know the situation on board 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. (Capt-2)

3.8.5 Reasons for adjustment of records

Eighty percent of the participants believed that the fear of losing employment is an important factor that leads to adjustments. *Capt*-1 stated,

> *You don't want to be in the limelight of the company that you're working extreme hours. Otherwise again, it will be a question of your employment. They will say you are working too long. Probably there would be a question that company may not take me next time. So, after this I have to keep doing that. (Capt-1)*

Sixty percent of respondents adjusted their records to comply with third-party inspection. A few believed that negative outcome of third-party inspection might impact vessel business and it also raises questions on their capability of managing ships. *COff*-2 and *CEng*-1 expressed that:

> *We have PSC, SIRE, CDI inspections. So, when they see these violations and plenty of them. We may not pass the inspection and the possibility of not getting any cargo raises. So, it's like a big big issue for the ship owner. (COff-2)*
>
> *[...] purpose was not to get into trouble during third-party inspection. If there is any observation, then there will be questions on our capability in managing the vessel. (CEng-1)*

Sixty percent of respondents believed that the company was unwilling to provide additional crew since that has cost implications. They believed that the easier way out is to comply with regulations on record. Participants viewed,

> *[…] manning levels are a cost issue. Hence, the easier and cheaper way to deal with it is the way that I have seen it being dealt with, simply cheat. (2Off-1)*
>
> *I think it is really important but hard to provide more number of crew on board ships because they [company] think economically. (Capt-2)*
>
> *Companies are primarily driven by profit and so they will not want to shoot themselves in the foot. (COff-1)*

A further fifty-five percent of respondents also believed that adjusting records has become a 'culture' in the shipping industry. *COff*-3 made an astonishing comment on shipping culture:

> *When I was a junior officer, then my chief used to do it. It is actually becoming a culture onboard. When I was a cadet, I used to do for other crew members. Now, I am a chief officer and I instruct my cadet to do for everybody and I know once my cadet will become chief officer, he will also do the same. (COff-3)*
>
> *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. (3Off-2)*

Finally, thirty-five percent respondents highlighted that any non-compliant record triggers paperwork/additional workload and has the potential to generate conflicts with shore and/or onboard management. Therefore, they are reluctant to provide accurate records containing violations to avoid problems. The following participants quoted,

> *Sometimes you want to avoid extra, extra procedures, there are so many procedures on board, so many checklists, so many reports to make every day. So, you just prefer not to raise any issues sometimes. (2Off-4)*
>
> *You will have that extra amount of paperwork from the office which will require another number of hours for working (laughs). Just to avoid that extra paperwork since you already have because of ISM. (Capt-7)*
>
> *According to our company's procedure, we have to report to the office. We have to raise the report of non-conformity and some certain follow-up procedures will be followed and like investigation, preventive actions and all those. (2Off-4)*
>
> *In order not to get such messages [blames or questions] from the company, the adjustments being made on the ship to the rest hours record of all the crew. From next time onwards, we don't show any non-compliance and they won't be coming back with the mail asking for explanations. (2Off-2)*

If you don't do it [adjustment] then there will be some argument with company. So, even if you managed to get additional hand on this ship, probably you're not going to get the ship next time. (Capt-4)

3.9 Respondents' recommendations for improvement[33]

3.9.1 Work and rest hour recordkeeping

Forty percent of the respondents believe that seafarers should accurately record work and rest hours and report violations. Respondents called on masters to exercise their authority with caution and demand companies for providing adequate solutions to implement regulations.

Further, twenty-five percent of the respondents believe that companies should encourage reporting violations, *"Company should encourage reporting of violations and adjustment. Onboard staff should not be criticised" (3Eng-1).*

Thirty percent of the respondents suggested stricter PSC and oil major inspections. *COff*-4 suggested, *"PSC need to search for the right place. The stick needs to be bigger if you want the rest hours to be respected"*.

Moreover, a few participants suggested using software that prevents onboard and onshore adjustments of records. *Capt*-1 stated, *"To reduce this and adjustments probably some standard software which can track the system and then other third parties can manage and they can observe it"*.

3.9.2 Manning levels

[33] Refer Appendix 3.9: Recommendations for improvement for detailed coding.

All respondents raised concerns about insufficient manning onboard. *Capt*-2 expressed the view that, *"There will always be tasks which are never reducing. The only way to cope with the situation is to increase the number of crew working on board"*.

Seventy-five percent of the participants are of the opinion that companies should provide adequate manning levels. *2Off* stated that, *"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"*.

Fifty-five percent of the respondents questioned the safe manning principles and highlighted the responsibility of regulators to redefine them. *Capt*-1 vigorously expressed,

> *International Maritime organization must revise their regulation on safe manning because it does not provide any specific numbers. They should probably consider type, size of ship, age and route of ship to standardise sufficient manning level. (Capt-1)*

Three participants suggested that the company should reduce the ISM paperwork by simplifying procedures, eliminating unnecessary documentation/reports and duplication of records.

> *[…] reduce the amount of paperwork by making simplifying checklist or can make it digital, eliminate unnecessary daily work done reports which includes photograph. System should be such to avoid duplication […]. (CEng-1)*

A few respondents suggested reducing onboard workload in ports through better coordination with third-parties involved in the vessel operation.

3.9.3 Other improvement measures

Thirty-five percent of respondents seriously questioned the commitment of the maritime industry to address fatigue. *Capt*-7 and *Capt*-2 grimly expressed,

> *We talk a lot about fatigue. You can just sit and you can talk about fatigue, man management but do we actually see that they are implemented on board with the amount of people. (Capt-7)*
>
> *We need to be sure that what we want with these regulations. So, I think much improvement can be done. (Capt-2)*

Twenty-five percent of respondents highlighted the inability to assess the extent of fatigue of seafarers when records are inaccurate. They believed that without such an assessment, the overall validity of the regulatory framework is difficult to evaluate. *2Off*-1 offered, *"The regulations we have today cannot be revised properly and effectively if the data it is based on is not accurate"*.

Chapter 4: Discussion

4.1 Introduction

This chapter includes the discussion of the data presented by the participants. The discussion supported by various literature is aimed at responding to the research questions.

4.2 Regulation reporting as a 'paper exercise'

Respondents reported compliance with work and rest hours regulations prescribed in the MLC 2006 and the STCW 1978. They explained that the required documents and records are available and completed to show compliance during the inspections. Posting work schedules, maintaining and acknowledging/signing records and preserving them in vessel archives are achieved.

Despite this apparent compliance, all respondents highlighted that the content of work and rest hour records are regularly adjusted to demonstrate compliance with the requirements of flag State, PSC's, classification societies, oil majors, and seafarer unions.

This implies that the records are maintained to comply with rules but does not reflect the reality of working hours onboard ships. It seems that seafarers merely consider recordkeeping as a 'paper exercise' directed towards inspection regimes.

Seafarers are adjusting the records for a 'paper compliance' or to appear 'nice'. The adjustments are mainly accomplished after verification with work logs. Consequently, recording practices were inconsistent and inappropriately controlled. Despite double-booking or dual recording practices, seafarers sign the records before archiving them. The recording to satisfy third-party inspections is demonstrated by *COff*-4:

> *I have to fill up on spreadsheet than it is transferred to the software called "DNV NAVIGATOR" by one of the mates. The hard copy of the spreadsheet is kept on board to be presented to the PSC. Sometimes, these Spreadsheet are modified to have a clean sheet to present in case of a PSC visit. (COff-4)*

An EU commissioned study conducted by Garb et al. (2011) witnessed similar recording issues where it states:

> *I personally feel that STCW rest hour norms are being followed only on paper to satisfy oil major, ism, portstate inspectors. I have talked about this issue to lot of seafarers serving on different ranks, in different companies. The general scenario on most of the ships is that usually it's a nominated officer who is in charge of filling up the rest hour reports of all personnel working onboard and it is thereby the duty of this officer to "fabricate" a report which satisfies the STCW/ILO norms... [sic].*

4.3 Software induced adjustments

It seems that software has an influence on recording practised. The violations appear in "red" or in a distinguished background incites seafarers to adjust records. *Capt*-7 reveals adjustment of record assisted by a software as he states*, "We use ISF Watchkeeper for recording work/rest hours [...] any work/rest hour violations are automatically indicated by the software by highlighting the same in RED colour [...]".*

Simkuva et al.'s (2016) study reverberates related finding that *"records of work hours on board by Watchkeeper system allow adjustment of working hours"*. This feature seems to function contrary to the claim, *"[...] this program will continue to assist ships to accurately plan and correctly record their work hours [...]"*, made by the International Shipping Federation (ISF) on document submission (STW/ISWG 2/8) to IMO in 2009 (IMO, 2009).

4.4 Culture of 'ship first'

Adjustment of records seems to integrate the seafarers' culture of 'ship first'. In this respect, some respondents avoid recording certain tasks in any forms/logs to render them invisible. *3Off*-2 relates his recordkeeping experience to the shipping culture where he states, *"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" (3Off-2).*

The notion of a seafarer 'culture' submissive to ships' rhythm and demands is echoed in various literature as:

> *We've always had a culture, if you like, in the whole maritime world of the ship coming first. (4:24 Michael Grey - Maritime Journalist)*
> *(Centre for Occupational Health and Psychology, 2011)*
> *[...]seafarers are willing to work whilst highly fatigued because it is seen as "professional" to do so. The widely held belief that fatigue "comes with the job. (Grech, 2016)*

By adjusting records and protecting the interests of the ship owners, seafarers denote an established "Normalisation of Deviance[34]" (Price & Williams, 2018) which may have direct impacts on their health, safety, security and liability.

[34] Sociologist Diane Vaughan coined this term which means people within the organisation are so much accustomed to the deviant behaviour that they do not consider it deviant despite the fact that they far exceed their own rules for the elementary safety.

4.5 Imbalance between workload and manning levels

This study and other research[35] efforts provides evidence proving the reality of structural imbalance between workload and manning level which affects working time regulations and their recording. Reduced manning results in long working hours and excessive workloads as revealed by Exarchopoulos et al. (2018) but they are hidden behind adjusted recordings.

One interviewee from the Garb et al. (2011) study expressed the impact of workload on implementation of regulations, *"You're asking me about workloads: do you want the rules or the truth?" (Garb et al., 2011).* It mirrors the finding of *COff*-1 who says, *"Overworking is normally the main reason [...] another problem because you come from long hours of work with a little rest and another long hour of work" (COff-1).*

Moreover, participants deemed that the 6on/6off watch system is inadequate to provide sufficient rest. The issue of 6on/6off watch system has been highlighted in numerous works such as Folkard et al. (2005), Maurier et al. (2011), as well as in IMO submissions such as HTW 3/INF.8 (IMO, 2015b) by France, and HTW 3/7 (IMO, 2015a) by the Nautical Institute and the InterManager.

The current study further highlights that the diversity of tasks related to navigation, cargo, maintenance, operation or administration require officers to multitask during watchkeeping periods and beyond as highlighted by Simkuva et al. (2016). It is not only affecting fatigue of watchkeepers but also their vigilance at work.

Similarly, Hjorth (2008) emphasised the burden of multitasking on vessel safety, where a master on a 6on/6off watch stated,

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[35] Branch et al. (2004); ATSB (2010) and Xhelilaj & Lapa (2010) revealed similar findings.

> *I do my paperwork during watchkeeping on the bridge. I know that this does not fulfil the regulations but what am I to do? Otherwise, I would be sitting with administrative matters both before and after my watch. Something I can't do if I want to be fit for duty when I take over the next coming watch.* (Hjorth, 2008)

This comment is corroborated in our study by *3Off*-2:

> *As a 3rd Officer, I additionally have to do arrival documents and departure documents [Port administrative work]. So, apart from 6on/6off watch system, I have to do these additional jobs during my off watch. So basically, I am not getting sufficient rest by working 16 hours per day. (3Off-2)*

Additionally, multitasking at sea and in port affects seafarers' opportunities for shore leave and their wellbeing. As a result, the seafarers' happiness index is on a decline which questions the foundation[36] of the MLC 2006 (Thiruvasagam & Rengamani, 2015; Nadkarni, 2019)[37]. This further puts into question the capacity of IMO instruments to simplify seafarers' working environment and facilitate maritime traffic[38].

Manning levels are deemed inadequate to implement working time regulations, leading to questions about the validity of the manning determination process. Despite the consideration of ship operation, the resolution on safe manning remains

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[36] Under the regulation 2.4.2 - Entitlement of leave.

[37] Nadkarni (2019) highlighted that crew happiness Index declined from 6.54 to 6.16. The report also noted extended gaps of 4-6 months between shore leaves. Similarly, one of the respondents *(COff-2, under Chapter 3.4.1:* Fatigue perception*)* claimed of not remembering an instance where he had gone for a shore leave.

[38] Also, 3Off-2 claimed, "We have a FAL convention but it is basically not been implemented properly. [...] you go to countries like [Continent X] and [Country Y] and [Continent Z], they try to have different forms and then you have to start writing all over again".

insufficient to connect manning levels with real operational demands[39]. Responders believe that the IMO principles governing safe manning (IMO Resolution A.1047(27)) are not appropriate, particularly, *"[...] to meet peak workload situations and conditions"* as exemplified by *3Off-2*:

> *There were less people required [referring to the safe manning certificate] and we had more people on the vessel. But even in that case, we got very fatigued. I mean this logic tells you that there is something wrong and something should be done here. (3Off-2)*

This echoes the findings of the casualty investigations such as "Nedlloyd Genoa", *"[...] should check not only that their instructions are understood, but also that they are achievable with the manpower available in the turn round times allotted" (Marine Accident Investigation Branch, 2006).*

Further Garb et al. (2011) believes that the competitive environment of shipping creates an incentive for the ship owner to reduce operating costs, particularly crew expenses. Moreover, MacDonald (2006) states competition amongst the flag State for tonnage influence the manning levels. Flag-hopping being the norm in shipping, shipowners select flags allowing maximum flexibility on manning.

4.6 Company influence

Respondents adjust the records, directly or indirectly under the company instructions/influences in order not to jeopardise their employment as stated by *2Off-1*:

> *Well, actually adjustment would very seldom come from the master onboard, it usually comes from the company and usually via telephone.*

[39] Exxon Valdez marine accident report by NTSB (1990) stated excessive workload and reduced crew as a probable cause.

Company request master "not to leave any traces". Master or any of the deck officers adjust the rest hours or edit the sheet before resending them. (2Off-1)

The company influence has also been highlighted in a film[40] on seafarers' fatigue by Cardiff University where a deep-sea pilot stated, *"Any master that's brave enough to go and anchor his ship because his crew is fatigued will very soon find himself on the next flight home" (24:55 Voice of a deep-sea pilot) (Centre for Occupational Health and Psychology, 2011)*

Further, company influence on the seafarers for adjusting records is also captured by CHIRP (2019) in a report that states:

This is entirely due to commercial pressure from the company - the master is constantly under pressure from the company over the telephone because they never make their demands in writing. He only wants to do his best and to keep his job as do all of us.

4.7 Failure of the ISM Code

Despite supposedly having the overriding authority[41] (IMO, 2018), respondents consider that ship masters are submissive to companies' demands and surrender to commercial and company pressures which leads to violations of rest hours (Hughes, 2019). As the current research and Xue et al. (2017) underline, the authority of the master is not absolute. It seems the company accepts the master's authority when not in conflict with its interests.

[40] Film can be viewed at https://www.youtube.com/watch?v=ua-ppReV684

[41] ISM Code Part A 5.2: Company should establish in the safety management system that the master has the overriding authority and the responsibility to make decisions with respect to safety and pollution prevention and to request the Company's assistance if necessary.

These instances prompt the researcher to question "who is the master?" when the master's actions are subject to shore-based management decisions. Moreover, these occurrences validate the studies conducted by Bhattacharya (2009) and Strkersen (2018) and raises further questions on the functionality of the ISM code mandated under the Chapter IX of SOLAS 1974 for the safe operation of ships.

Despite facing blatant rest hours violations on their fleets[42], shipping companies do not provide additional resources contrary to ISM Code requirements. Indeed, the ISM code requires the company to provide necessary support to the master and to ensure that each vessel "*is […] appropriately manned in order to encompass all aspects of maintaining safe operations on board[43][...]"* (IMO, 2018).

Moreover, by not responding to the MLC 2006 and the STCW 1978 violations, companies contravene their responsibilities under the ISM Code and do not achieve the objective "*to ensure compliance with other mandatory rules and regulations[44]"* (IMO, 2018).

4.8 Seafarers submissiveness

Further, masters continue to hold power over the crew who usually adjust records as per their explicit or implicit instructions. Seafarers are reluctant to complain since they believe that going against something established would ruin their career. Similarly, Hjorth (2008) reported a situation where a master never accepted inaccurately-filled records which led the officer to adjust the records.

> *I once tried to fill in my real working hours and when I had done that, when presenting my hours of work journal to the master, he responded:*

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[42] In Chapter 3.8.4: Data presentation. It was highlighted that companies are aware of continuous violations of rest hours.
[43] ISM Code under part A - 6.2.2: Section also make reference to the Principles of minimum safe manning, adopted by the IMO by resolution A.1047(27).
[44] ISM Code under part A - 1.2.3.1.

> *"My God! You can't fill it in like that, then we will never fulfil the regulations, I will never sign that journal." So, after that I only filled in my hours of work according to the template and according to the regulations. [sic] (Hjorth, 2008)*

Master's direct involvement with the adjustment of records is visible in another case as revealed by a *CEng*-2:

> *At the end of the month, he [master] changed so there was no violation. I do not know if he has done that for other crew members. Later, I had a talk with him and afterwards he didn't do it anymore. (CEng-2)*

Adjusting records seems the easier way for the seafarers to secure their jobs. By complying with every regulation even when it is impossible, seafarers intend to meet companies' injunctions to avoid any risk of detention or deficiency. Indeed, if a ship has deficiencies or is detained (after PSC or third-party inspection), seafarers may be reprimanded as viewed by Exarchopoulos et al. (2018). Consequently, ship would be declared as unseaworthy and the company could not limit its liability in cases of violations of these regulations (Tracy, 1997; Aladwani, 2011)[45].

Further, masters are in particularly delicate positions between the hammer and the anvil, as stated by Hughes (2019), because:

> *If the crew were to log their real hours in excess of regulation, the master would find himself criminally liable and held accountable while at the same time the company would denounce their master for not complying with their safety management system procedure.*

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[45] Aladwani (2011) stated that fatigue has been reported to be sufficient to render a seaman incompetent. Although there has been no case law on this matter, it has been argued that it is possible that a court may find that lack of adequate rest had rendered the vessel unseaworthy because of an incompetent or a temporarily incompetent crew.
Tracy (1997) stated a case law of 1974 of Motorship Buko Maru. The court found that the vessel was unseaworthy because of insufficient crew and the requirement of crewmembers to work more than eight hours, which was a violation of the work hour limitation statute.

4.9 Enforcement challenges

Lack of stringent enforcement of working time regulations does not facilitate accuracy of recording and true compliance. According to PARIS MOU (2014), PSC inspectors check the records of rest hours and normally verify them with other work records/logs/forms[46]. When irregularities are noted, PSCOs identify them as "not accurately recorded" but irregularities can be mistakes without any intention to deceive. It is, therefore, difficult for any third-party inspector to differentiate between "not correctly recorded" and "records willingly adjusted". Additionally, tasks which remain unrecorded pose a major challenge for an effective enforcement. Hence, existing paper/software recording systems facilitate adjustment of records which affects effective enforcement.

In hindsight, the researcher believes that the PSC statistics on hours of rest violations would present a different picture if accuracy of records were systematically questioned and thoroughly investigated.

Further, respondents observed that PSCOs' capacities of assessing the accuracy of work records may be insufficient and they seem satisfied with any record,

> *Port State Control [...] should check the emails of a captain and you will realise that he is working for hours [...] to find them [accurate working hours] is to look at the right relevant place". (COff-4)*
>
> *"[…] the PSC, they will not be able to catch the vessel that we have done the manipulation [...] It's very easy to manipulate. (COff-2)*

[46] Paris MOU CIC report provide instruction on how to verify rest hour records with other logs.

Moreover, one respondent having worked as a PSC inspector reported unwillingness to tackle the issue and accepted adjustment of records to be a common problem without any practical solution:

> *I also work very short time as a PSC inspector [...] when we went on board and began to check their drills and resting hour period and I found some inconsistencies immediately. But I did not give any deficiency because I know that it is a practical problem. (Capt-3)*

Hjorth (2008) study reflects PSCO's unwillingness to tackle the issue where it stated:

> *There is no new information on how much we work; I tried once to convince a Port State inspector to put a note in his protocol how much we actually do work. But he refused, he didn't "dare do it" and "not deemed it meaningful" as he stated. [sic]*

Similarly, Garb et al. (2011) extracted one of the participants' field notes on PSC enforcement where it stated*, "I pointed this out to [PSCO] on the way home. He agreed that the hours of rest were clearly falsified but had no solution to suggest"*.

4.10 Cultural incapacity to safeguard workers

The culture of accommodating operational demands by all means seem completely assimilated by seafarers (at least in the panel). From the study, seafarers' culture of "ship coming first" is obvious even when it affects their life. In this context, seafarers consider working and rest hours regulations as merely a 'paper exercise' aimed at satisfying third-party compliance.

In addition, the current regulatory framework enabling fatigue management seems inappropriate:

- For 90 years, since the SOLAS 1929 requirement to *"sufficiently and efficiently man"* (SOLAS, 1929), principles of safe manning have been unable to address the issue of workload on ships.
- Seafarers seems unaware of IMO guidance on fatigue (15% of our panel)[47] which shows the limited interest of the Maritime Education and Training (MET) and the industry to spread such information.
- The enforcement of working periods does not seem to be prioritised by flag State inspectors and PSCO because verification of accuracy of records remains scarce.

In short, the long-standing issue of fatigue as well as the current research tend to demonstrate the inability of the shipping industry to commit adequate resources to solve the issue and safeguard seafarers' health, safety and wellbeing.

[47] Under chapter 3.5.1: Awareness of regulations.

Chapter 5: Conclusion and Recommendations

5.1 Conclusion

Work and rest hours regulations are vital for effective fatigue mitigation on ships. Seafarers are required to maintain records of such regulations. As literature reported, seafarers' under-report these records. Therefore, the current study employed a qualitative approach and interviewed seafarers to explore the implementation practices of work and rest hour regulations and its recording.

The empirical data revealed that seafarers consider the recording of work and rest hours requirements as a 'paper exercise'[48]. Consequently, the records do not reflect the actual working periods. Seafarers embrace the culture of the ship coming first[49] by priority and adjust records to show compliance towards third-party inspections. By doing so, they protect shipowners' interests without recognising the detrimental consequences on their health and wellbeing. Inadequate tools are used to record hours facilitate such adjustment[50].

The study further established the imbalance[51] between the workload and the manning levels which has resulted in adjustment of records (particularly for ships operating on

[48] Discussed under Chapter 4.2: Regulation reporting as a 'paper exercise'.
[49] Discussed under Chapter 4.4: Culture of 'ship first'.
[50] Discussed under Chapter 4.3: Software induced adjustments.
[51] Discussed under Chapter 4.5: Imbalance between workload and manning levels.

6on/6off watch system). Excessive working hours and multitasking cause violation of minimum rest periods which are hidden by forged records.

Fear of losing and incapacity to swim against the stream impacts the behaviour of seafarers when recording their hours. Moreover, the masters and crew[52] seemed to have integrated the company's agenda and become submissive to company authority[53].

Locked in the cost reduction mindset, shipping companies do not listen and respond to manning level inquiries. The ISM Code[54] supposedly developed to address human error remains unable to address the most basic sources of human error: fatigue. Contrary, the administrative work demanded increases in the seafarers' workload.

Finally, flag inspectors, PSCO and other third-party verifiers have been unable to deter[55] the adjustment of work and rest hours regulations. Accurate recording, if achieved, would ensure relevant data collection for a practical assessment of fatigue-related regulations and other associated research efforts.

Is the recording of rest hours the only area of adjustment of official records on board ships? If not, it would provide a bleak picture of an industry inside which adjustment and fraud has been institutionalised.

5.2 Recommendations

This exploratory study reveals several loopholes. A realistic, comprehensive and robust approach to fatigue management demands that the maritime industry accept and act upon these shortcomings, *viz*:

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[52]Discussed under Chapter 4.8 and 4.9: Seafarers submissiveness and Enforcement challenges.
[53] Discussed under Chapter 4.6: Company Influence.
[54] Discussed under Chapter 4.7: Failure of the ISM Code.
[55] Discussed under Chapter 4.10: Cultural incapacity to safeguard workers.

- The IMO member States should demonstrate their commitment to seafarers' safety, wellbeing, and Occupational Health and Safety (OSH) by imposing manning levels in proportion to actual workload and operation demands.
- The shipping culture of placing human beings in secondary position should be reconsidered.
- Companies should consider fatigue not only as a paper exercise for compliance but as having direct impacts on seafarers and the safety of the vessel.
- The inability of current SMS and audits to reveal the extent of fatigue and of fraudulent recording practices should be considered.
- METs and shipping companies should inform seafarers about fatigue and its impacts on ship safety and individual health and well-being.
- Recording systems for rest hours should be rethought to ensure that real working hours are recorded. Non-intrusive automatic systems could be purposely developed.
- Strict flag and PSC inspections through adequately trained officers would ensure effective enforcement of these regulations. Cross-checking rest hours records with other logs onboard would unveil the adjustments.
- Verification of records accuracy and compliance should be supported by dissuasive penalties for seafarers and shipping companies.

5.3 Scope for future research

In context of the last argument under the conclusion, additional research work to assess if other records, as required by the ISM Code, are regularly adjusted is needed. It would be interesting to conduct research within the same area including views of various stakeholders such as seafarers, companies, flag States and the port States to provide a holistic view of the phenomenon in the maritime industry and its impact on various elements. Further participants also expressed inadequacy[56] of the work and rest hours

[56] Under chapter 3.5.2: Assessment of regulations.

regulations in providing sufficient ‘sleep’. Hence further research efforts could be aimed at assessing the practicality of work and rest hours regulations onboard ships in a real operational setting to provide adequate rest.

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Appendices

Appendix 1: List of participants

No.	Pseudonym*	Region*	Age (Yrs.)	Rank	Sailing Exp. (Yrs.)	Last Sailed	Source of Finding*	Type of interview*	Place of Interview*
1	CEng-1	Southern Asia	35	Chief Engineer	14	2018	Confidential	Individual Face-to-face	Confidential
2	Capt-1	Southern Asia	35	Master	15	2017		Individual Face-to-face	
3	Capt-2	Western Africa	40	Master	10	2013		Individual Face-to-face	
4	Capt-3	Western Asia	35	Master	8	2013		Individual Face-to-face	
5	3Off-1	Southern Africa	32	Third Officer	5	2012		Individual Face-to-face	
6	COff-1	Eastern Africa	38	Chief Officer	5	2016		Individual Face-to-face	
7	Capt-4	Southern Asia	34	Master	9	2012		Individual Face-to-face	
8	Capt-5	Micronesia	41	Master	15	2018		Individual Face-to-face	
9	2Off-1	Northern Europe	30	Second Officer	7	2016		Online (Video and Audio)	
10	2Off-2	Southern Asia	28	Second Officer	8	2019		Online (Audio (from ship in port)	
11*	----	Eastern Asia	33	Chief Officer	8	2018		Online (Audio from ship in port)	
12	3Eng-1	South Eastern Asia	28	Third Engineer	4	2017		Individual Face-to-face	
13	3Off-2	Western Asia	24	Third Officer	4	2018		Individual Face-to-face	
14	Capt-6	Eastern Asia	39	Master	15	2019		Online Audio (from ship in port)	
15	2Off-3	Eastern Asia	32	Second Officer	11	2019		Online Audio	

16	CEng-2	Eastern Europe	57	Chief Engineer	35	2019	Confidential	Online Audio	Confidential
17	COff-3	Southern Asia	33	Chief Officer	14	2019		Individual Face-to-face	
18	COff-4	Southern Asia	36	Chief Officer	17	2019		Individual Face to face	
19	Capt-7	Southern Asia	33	Master	14	2019		Online Video and Audio	
20	2Off-4	Eastern Asia	32	Second Officer	9	2019		Online Audio	
21*	----	South Eastern Asia	30	Chief Engineer	9	2017		Individual Face-to-face	
22	COff-4	Western Europe	45	Chief Officer	25	2019		Online Audio	

* Pseudonym used to maintain anonymity.
* Not included in the study due to reasons mentioned under Chapter 2.10: Data processing.
* Instead of country, geographical sub-region of participant mentioned for anonymity.
* Source of finding participant and place of interview kept confidential.
* Type of online messenger services used such as WhatsApp, WeChat or Skype kept confidential.

Appendix 2: Sample of semi-structured interview with guiding questions

Semi-structured Interview - Guiding questions

Identification

1. Name/nationality/age/COC/experience in years or months?
2. Last positions and when?
3. What is your sailing background? (company/manning - Type of ships / Flag / crew nationality)

Working time and overtime

4. How many hours do you work per day?
5. How many days off do you have per week?
6. Are your overtime periods fixed or do they change according to your work?
7. If you are on hourly paid overtime, please explain how you record overtime ? is it with the same system or independently as hours of rest?

Contract and fatigue

8. How long are your contracts at sea? How long are your vacation period?
9. What would be an ideal tour?
10. Do you think fatigue is an issue in shipping?
11. Have you ever experienced fatigue yourself or/and other crew members?
12. Why do you think people are fatigued?
13. What do you think your company can do about this?
14. What do you think you can do about this?

Regulations

15. Are you aware of the international work (regulations, actions, interventions etc.) to address fatigue?
16. Do you know the basic legal requirements for hours of rest and hours of work?
17. What do you think of the present regulations?

Recording practice

18. Do you record hours of rest yourself or someone records for you? Crewmember or/and officers?
19. Do you record hours of work or hours of rest or both?
20. Do you record your hours every day or once a week/month?
21. How do you record hours of rest or hours of work? (computer/paper/other)

22. If you are recording on dedicated software, what is the software? Does it indicate violations of hours or not?

Quality of record - adjustments

23. Do you know if some people adjust the records to avoid violation?
24. Have you ever adjusted records for you or someone else?
25. Has someone else adjusted records for you?
26. How often the adjustment referred to (first in #24 and then in #25) were done? never/rarely (2/month)/sometimes (1/week)/often (more than 2/week)/always
27. What were the circumstances during which rest hour records were adjusted?
28. What actions were taken by onboard management to deal with violation (if any)?

Company support/influence/consideration for reporting

29. Have you ever reported hours of rest violation to your company? What has been the response?
30. Do you initiate the adjustment (if any) yourself or after a senior officer or company request?
31. Is the Master/company aware of rest hours recording adjustments?
32. Any suggestions from your side on this topic or for improvement?

Justification

33. Why are seafarers adjusting their records on hours of rest?

Manning level and workload/recommendations

34. Do you have any recommendations to improve the situation?
35. What do you think about manning levels on your ships?
36. Were vessel manned adequately onboard your ship, do you ever felt that your ship should be provided with more no. of the crew?

Appendix 3: Detailed NVIVO Coding process

3.1 Basic definition and concepts

- Node is defined as a collection of reference about a specific theme. In figure 1, assessment of working period is a node.
- Coding is the process of selection of text/sentence/paragraph to assign it to the node.
- Files represents number of participants (interview data) assigned to the node
- References represents number of text/sentence/paragraph assigned to the node from that many participants (files).
- For example: Node '1. Assessment of working period', represents 20 participants with 100 text/sentence/paragraph assigned to the nodes. Similarly, node '2. fatigue Perception' represents 20 participants with 192 text/sentences/paragraph assigned to the node.

Name	Files	References	Created On	Created By
1. Assessment of working period	20	100	05/08/19, 5:29 PM	BIKRAM
2. Fatigue Perception	20	192	05/08/19, 5:30 PM	BIKRAM
3. Regulation Awareness	20	152	05/08/19, 5:31 PM	BIKRAM
4. Recording Practices	20	146	05/08/19, 5:32 PM	BIKRAM
5. Accuracy Of Record	20	272	05/08/19, 5:34 PM	BIKRAM
6. Management Considerations	20	262	05/08/19, 5:34 PM	BIKRAM
7. Recommendation for Improvement	20	124	05/08/19, 5:35 PM	BIKRAM

Figure 1: Main nodes of the study

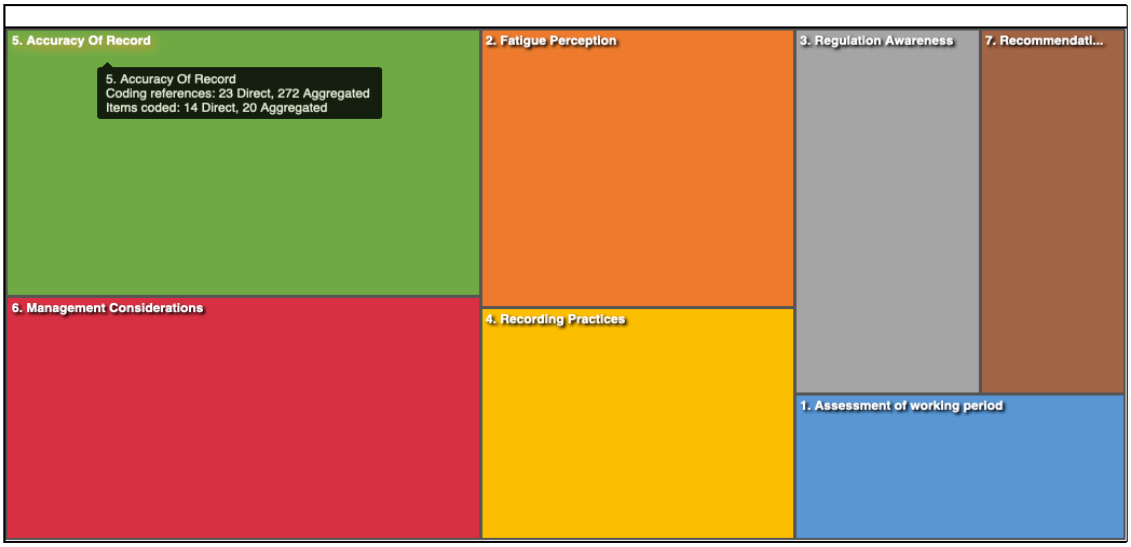


Figure 2: Hierarchy chart of main nodes

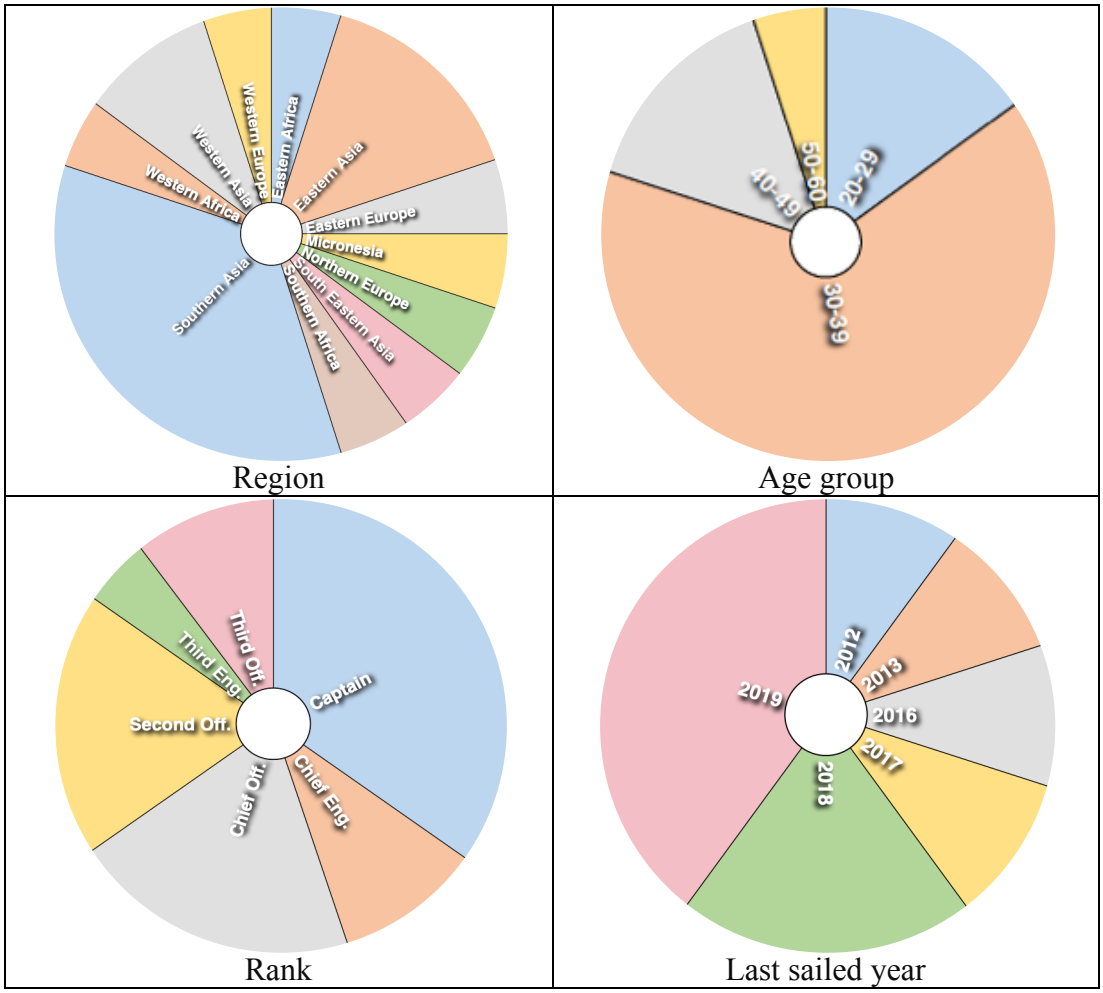
- Hierarchy chart is used to visualize data most coded node. One of use of hierarchy chart that it is used to identify most coded node. For example: Node '5. Accuracy of records' is coded the most with 272 references from the data of 20 participants.

Figure 3: Sunburst of main nodes

- Sunburst is pie representation of hierarchy chart.
- When many nodes are to be displayed, the sunburst indicates only the most coded ones.

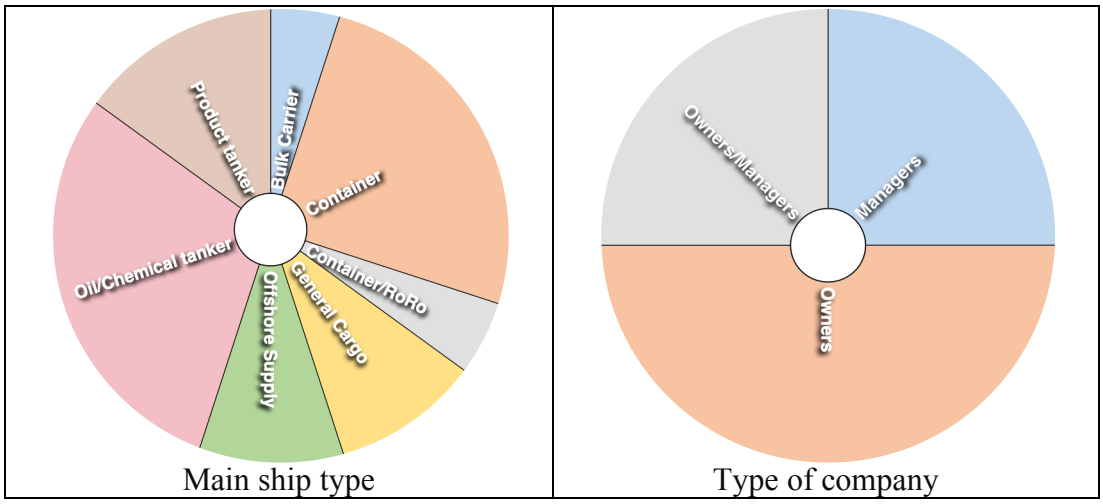
Below sections present the coding process employed by the research from which the data was presented under Chapter 3: Data presentation. The listing and sequence of below is same ,as in the main text, for easy reference.

3.2 Participants Demographic details



Region | Age group

Rank | Last sailed year



Main ship type Type of company

Figure 4: Demographic details of participants

3.3 Participants' working period on ships

3.3.1 Node and child nodes

Name	Files	References
1. Assessment of working period	20	100
1. Work routine	20	72
1. At Sea	18	20
1. Non watchkeeper-Capt and CEng	8	9
8-10 hrs	8	9
2. Watchkeepers	10	11
COff	3	3
JOfficer & Engineers	7	8
2. In Port	20	31
1. Non watchkeeper	12	20
1. Capt	7	14
Main Fleet	6	7
Off Shore	1	7
2. CEng	2	2
3. COff	3	4
2. Watchkeeper	8	11
12on 12off	1	2
4on 8off	1	1
6on 6off	6	8
3. Day Off	19	21
1. Non-Watchkeepers	8	10
2. Watchkeepers	11	11
2. Contract and vacation periods	18	28
Capt and CEng	8	12
COff	3	3
JOff and Eng	7	13

Figure 5: Node and child nodes – Assessment of working period

3.4 Participants' fatigue perception and company's role in fatigue mitigation

3.4.1 Node and child nodes

Name	Files	References
1. Assessment of working period	20	100
2. Fatigue Perception	20	192
1. Fatigue perception	20	133
Inadequate living and working cond.	5	6
Lack of awareness	2	2
Lack of crew welfare	4	4
Lack of manning	13	19
Lack of Sleep	10	14
Lack of work plan	4	4
Loneliness, Isolation and depression	1	1
Long contracts	3	3
Long working hours	18	48
No shore leave	5	6
Physcological factors	3	3
Quality of crew	4	6
Work pressure	12	17
2. Company role	18	37
Comittment	1	1
Employ quality crew	4	4
Increase Manning	12	14
Monitor Work routine	1	1
Office fatigue management	1	1
Others	3	4
Perception	2	2
Provide decent living and working condi...	5	6
Random sampling	1	1
Reduce workload	1	1
Training crew	1	1
Use quality software	1	1

Figure 6: Node and child nodes- Fatigue perception and company role

3.4.2 Sunburst: Fatigue perception

Figure 7: Sunburst- Fatigue perception of respondents (QDA displayed only most coded nodes)

3.5 Participants' awareness and assessment of fatigue regulations

3.5.1 Node and child nodes

Name	Files	References
1. Assessment of working period	20	100
2. Fatigue Perception	20	192
3. Regulation Awareness	20	152
1.Awareness level	20	75
Fatigue regulations	20	23
Work and rest Hours regulations	20	23
2. Subjective assessment of adequenc...	20	77
Adequete	6	8
Lack of appropraiteness	4	6
Lack of enforcement	2	4
Lack of Implementation	15	28
Practicality of SMP	12	31

Figure 8: Node and Child nodes- regulation awareness and its assessment

3.5.2 Sunburst: Subjective assessment of regulation

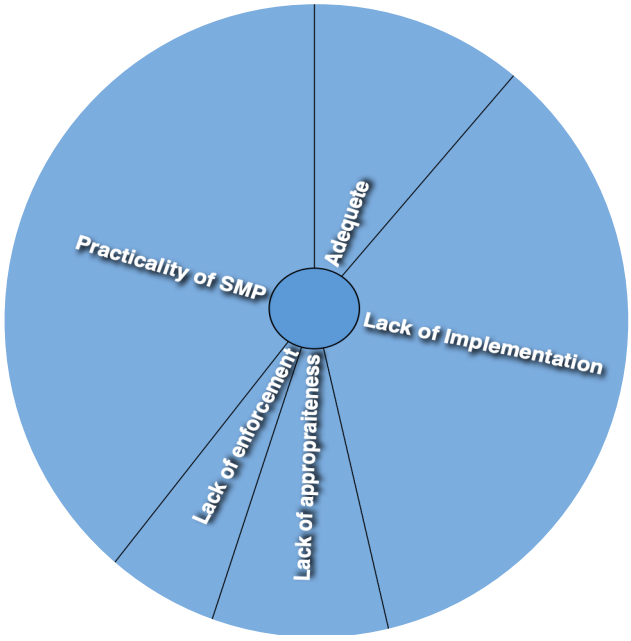


Figure 9: Sunburst- Respondents views of fatigue-related regulations

3.6 Respondents' practised work and rest hours recording practice

3.6.1 Node and child nodes

Name	Files	References
1. Assessment of working period	20	100
2. Fatigue Perception	20	192
3. Regulation Awareness	20	152
4. Recording Practices	20	146
1. Who does the recording	20	28
Assisted	3	3
Others	5	8
Self	15	17
2. Frequency of recording	20	33
2 times in a week	6	7
Daily	8	8
Inspected	9	9
Weekly or More	6	9
3. What is being recorded - Rest, work or...	20	20
Both	5	5
Hours of rest	2	2
Hours of work	13	13
4. System for Recording	20	65
Dual recording	8	15
Crew	4	7
Officers	4	8
Paper	3	4
Same system for overtime and RH	14	14
Software	17	32
Company specific	9	14
Market driven	8	18

Figure 10: Node and child node- work and rest hour recording practice

3.7 Participant's on accuracy of work and rest hour records

3.7.1 Node and child nodes

Name	Files	References
1. Assessment of working period	20	100
2. Fatigue Perception	20	192
3. Regulation Awareness	20	152
4. Recording Practices	20	146
5. Accuracy Of Record	20	272
1. Who is adjusting	20	44
1. Self	16	19
2. Others	10	11
3. Someone else for you	12	14
2. Frequency of adjustments	20	31
1 Never-0	1	1
2. rarely	4	4
3. Sometimes	4	7
4. Often	7	13
5. Always	3	5
Do not know	1	1
3. Circumstance leading to adjustme...	19	140
4. Number of violations	20	20
1. Never	0	0
2. rarely (2 per month)	3	3
3. Sometimes 1week	3	3
4. Often (More than 2week)	9	9
5. Always	3	3
Not Sure	2	2
5. Jobs not recorded	9	14

Figure 11: Node and child node of accuracy of work and rest hour records

3.7.2 Node: Circumstance leading to adjustments (extracted due to limited space in 3.7.1)

Name	Files	References
3. Circumstance leading to adjustme...	19	140
Emergency	3	3
ISM	8	11
Overtime	5	11
Less OT than actual	1	4
To get more overtime	2	3
Port Operation	17	70
3rd party inspection	9	11
6on6off	9	14
Bunkering	3	4
Cargo operation	3	3
Emails, phone calls	3	5
Moorings	8	12
Off Shore operation	1	1
Pilotage	10	11
Port official visits	4	6
Port services	3	3
Port Rotation	14	32
Paperwork	5	7
Passage plan	2	4
Tank cleaning	7	13
4. Number of violations	20	20
1. Never	0	0
2. rarely (2 per month)	3	3
3. Sometimes 1week	3	3
4. Often (More than 2week)	9	9
5. Always	3	3
Not Sure	2	2
5. Jobs not recorded	9	14

Figure 12: Node and child nodes- Circumstances leading to adjustment of records

3.7.3 Sunburst: Who is adjusting?, frequency of adjustment, circumstances leading to adjustment and port operation leading to adjustment.

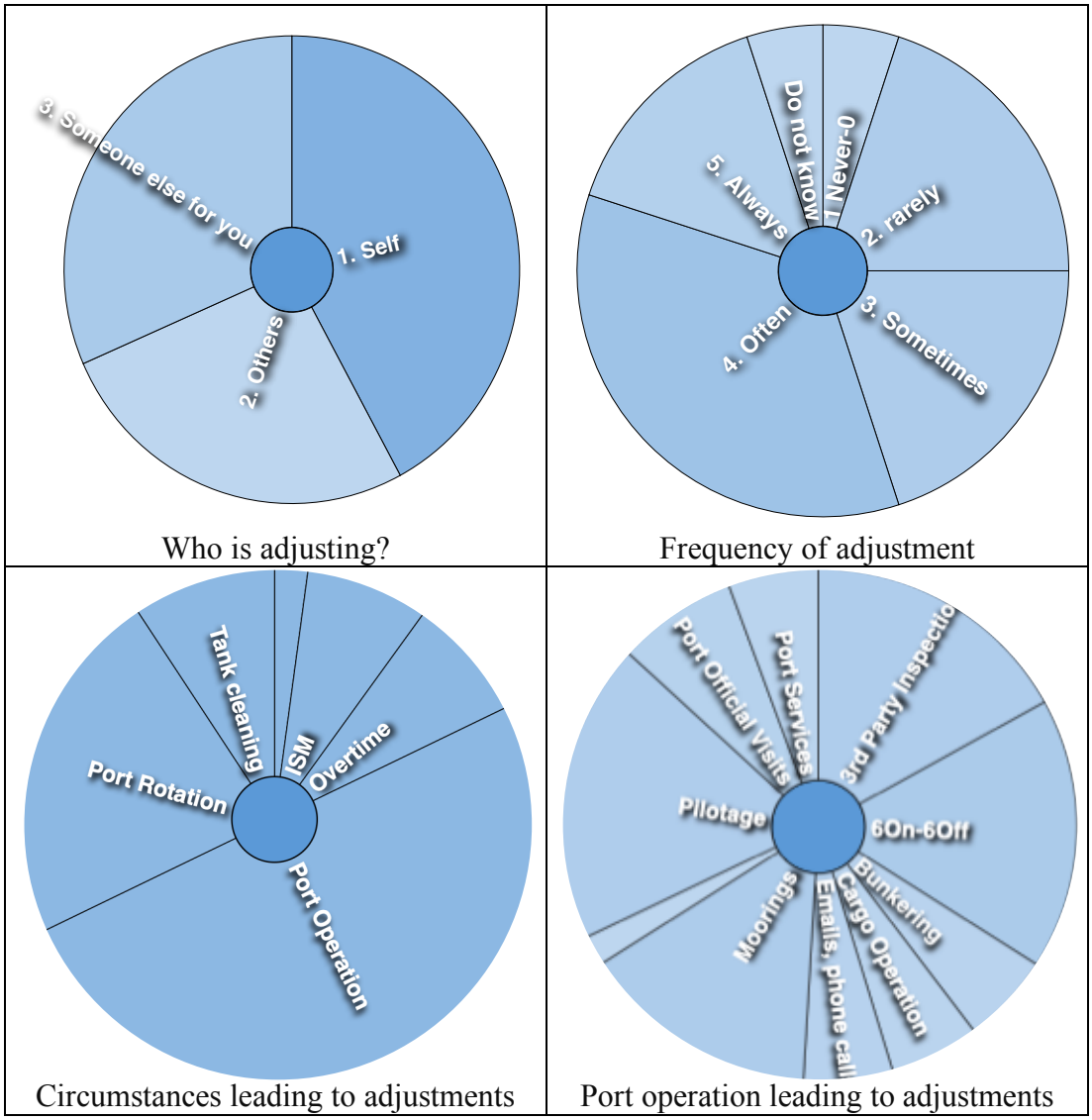
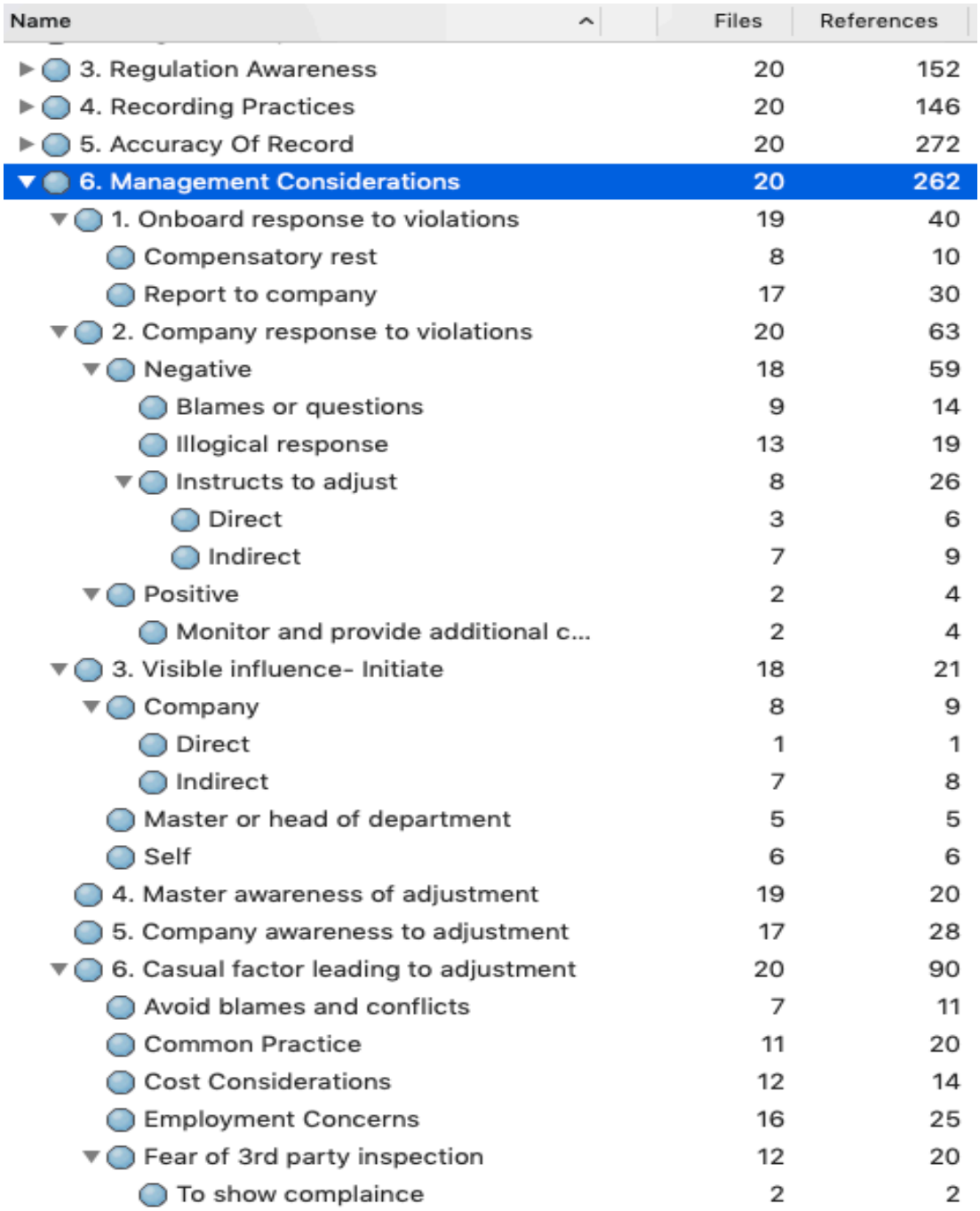


Figure 13: Sunburst- Who is adjusting?, frequency of adjustment, circumstances leading to adjustment and port operation leading to adjustment

3.8 Management considerations

3.8.1 Node and child nodes



Name	Files	References
3. Regulation Awareness	20	152
4. Recording Practices	20	146
5. Accuracy Of Record	20	272
6. Management Considerations	20	262
1. Onboard response to violations	19	40
Compensatory rest	8	10
Report to company	17	30
2. Company response to violations	20	63
Negative	18	59
Blames or questions	9	14
Illogical response	13	19
Instructs to adjust	8	26
Direct	3	6
Indirect	7	9
Positive	2	4
Monitor and provide additional c...	2	4
3. Visible influence- Initiate	18	21
Company	8	9
Direct	1	1
Indirect	7	8
Master or head of department	5	5
Self	6	6
4. Master awareness of adjustment	19	20
5. Company awareness to adjustment	17	28
6. Casual factor leading to adjustment	20	90
Avoid blames and conflicts	7	11
Common Practice	11	20
Cost Considerations	12	14
Employment Concerns	16	25
Fear of 3rd party inspection	12	20
To show complaince	2	2

Figure 14: Node and child nodes- Management consideration

3.8.2 Company negative response

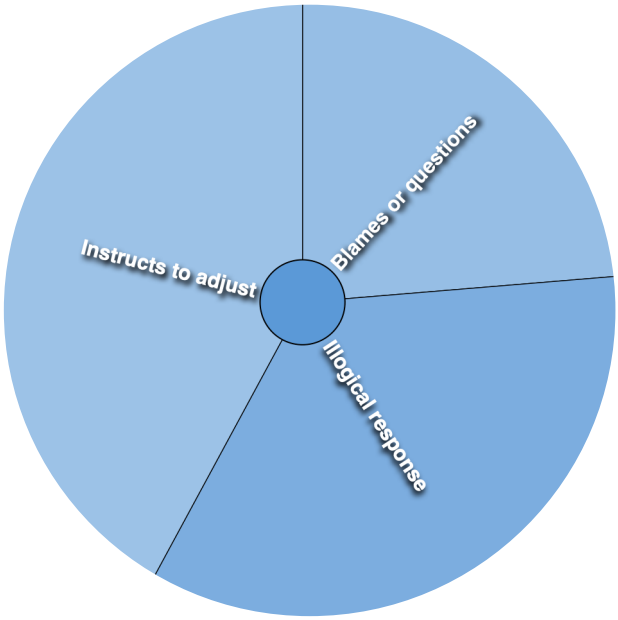


Figure 15: Sunburst- Negative response of company

3.8.2 Casual factor leading to adjustments

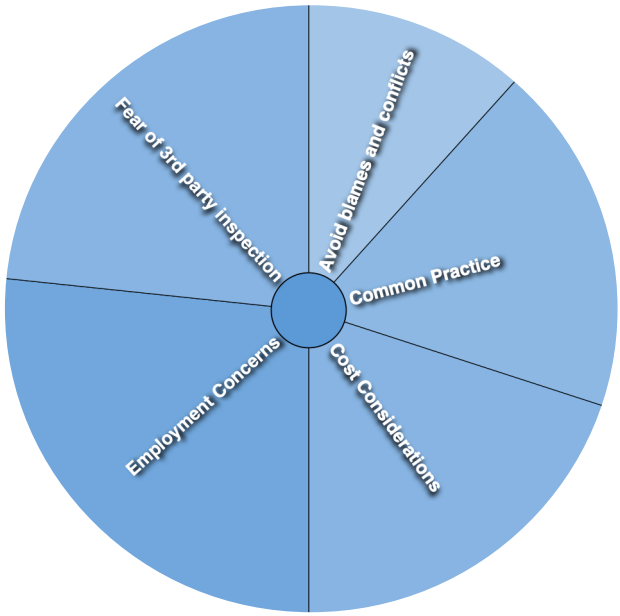


Figure 16: Sunburst- Casual factor leading to adjustments

3.9 Recommendations for improvement

3.9.1 Node

Name	Files	References
7. Recommendation for Improvement	20	124
7a. Recordkeeping	15	39
Indepth inspection	6	10
Oil majors	2	2
PSC	5	8
Recording Software	2	5
Reporting	11	24
Company	5	9
Encourage reporting	3	6
Greviance report system	2	3
Ship	8	15
Crew role	5	5
Master authority	4	5
Master role	3	5
7b. Manning Level, workload	20	66
Manning level	19	55
Employing addional crew	16	26
Quality	2	3
Safe manning	11	29
Flag State	2	2
IMO role	7	10
Safe operating-type, route an...	9	17
Workload	7	11
3rd party involvement	1	2
Awareness	3	4
Provide good supplies	1	1
Reduce paperwork	3	3
Work planning	1	1
Other measures	11	19
Commitment from the shipping ind...	7	11
Fatigue management by office	1	1
Research and data collection	5	7

Figure 17: Node and child nodes- Recommendation for improvement

3.10 Sample of interview text coding

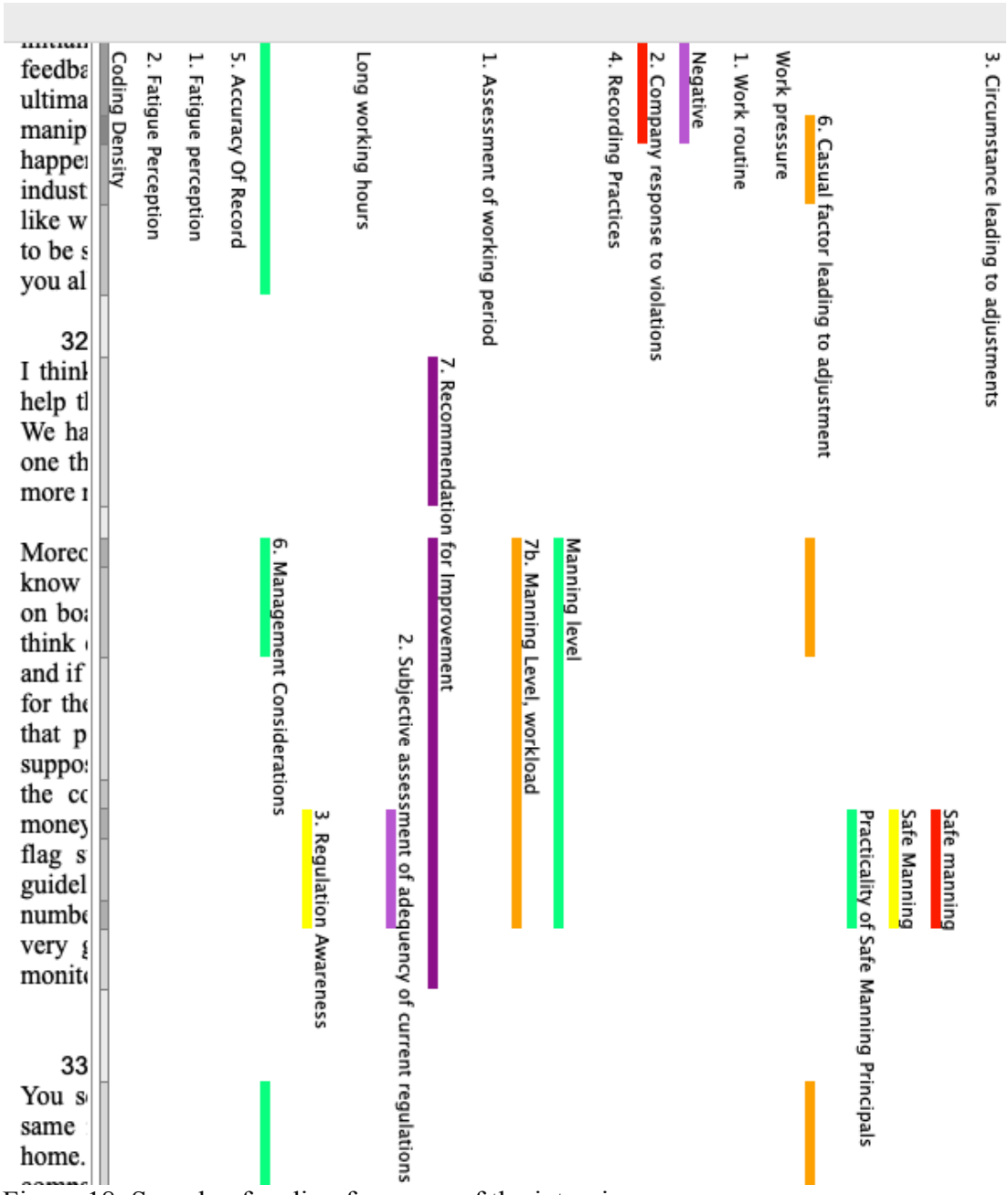


Figure 18: Sample of coding from one of the interviews

Figure 19: Sample coding of the same text as in figure 18

Appendix 4: Ethics considerations

4.1 Sample of consent form

Interview Consent Form

Research topic: Exploration on implementation and reporting of hours of work and hours of rest onboard ships

Date of interview:
Expected duration:
Name of participant:
Name of researcher: Bikram Singh Bhatia

Dear Ms/Mr.

Thank you for agreeing to participate in this interview, which is carried out in connection with a research project which will be conducted by the interviewer, in partial fulfilment of the requirements for the degree of Master of Science in Maritime affairs at the World Maritime University in Malmo, Sweden.

This consent form intends to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation.

- Your interview will be recorded and notes will be taken during the meeting.
- From the interview, there will be a transcript of main points retained by the researcher.
- The transcript will be sent to you to provide you with the opportunity to correct any factual errors.
- The transcript will be analyzed by the researcher to support the investigation.
- The access to the transcript will be limited to researchers and academics involved in the research.
- The information provided will be used for research purposes and will form part of a research reports or/and academic papers as well as eventually in presentations.
- Any extract or quotation of the interview used for publicly available publication will be anonymized.

Moreover, you have the right to stop the interview or withdraw from the research at any time, and your personal data will be immediately deleted on your request.
Anonymized research data will be archived on a secure drive linked to a World Maritime University email address. All the data will be deleted after completion of the research.

Your participation in the interview is highly appreciated.

Student's name Bikram Singh Bhatia
Specialization Maritime Safety & Environmental Administration
Email address w1701511@wmu.se

* * *

Quotation agreement

I consent to my interview, as outlined above, being used for this study. I understand that all personal data relating to participants is held and processed in the strictest confidence.

I also understand that my words may be quoted directly. With regards to being quoted, please initial next to any of the statements that you agree with:

	I wish to review the notes, transcripts, or other data collected during the research pertaining to my participation.
	I agree to be quoted directly.
	I agree to be quoted directly if my name is not published and a made-up name (pseudonym) is used.
	I agree that the researchers may publish documents that contain quotations by me.

By signing this agreement, I agree that;

1. I am voluntarily participating in this research project and I can stop the interview at any time;
2. The transcribed interview or extracts from it may be used as described above;
3. I have read the Information sheet;
4. I can request a copy of the transcript of my interview and may make edits;
5. I am free to ask any questions I wish to researchers and to contact them in the future.

Name: ……

Signature: ……

Date: ……

Contact Information

This research has been approved under WMU Ethics. For additional questions or concerns, please contact:

Student's name Bikram Singh Bhatia
Specialization Maritime Safety & Environmental Administration
Email address w1701511@wmu.se

You can also contact research supervisor

Supervisor's name Dr. Raphael Baumler
Position Associate Professor

Email address rb@wmu.se

4.2: WMU REC Protocol

WORLD MARITIME UNIVERSITY

WMU Research Ethics Committee Protocol

Name of principal researcher:	Bikram Singh Daya Singh Bhatia
Name(s) of any co-researcher(s):	NA
If applicable, for which degree is each researcher registered?	MSc. in Maritime Affairs-Specialisation in Maritime Safety & Environmental Administration
Name of supervisor, if any:	Dr. Raphael Baumler
Title of project:	Practical implementation and reporting of hours of work and hours of rest on board ships
Is the research funded externally?	No
If so, by which agency?	No
Where will the research be carried out?	World Maritime University
How will the participants be recruited?	To be confirmed
How many participants will take part?	To be confirmed
Will they be paid?	NA
If so, please supply details:	NA
How will the research data be collected (by interview, by questionnaires, etc.)?	Interview, questionnaires/Surveys.
How will the research data be stored?	In my personal laptop with strong password.
How and when will the research data be disposed of?	Data will be deleted upon completion of MSc Studies by Nov 2019.
Is a risk assessment necessary? If so, please attach	NA

Signature(s) of Researcher(s): Bikram Date: 06 FEB 2019

Signature of Supervisor: Date: 06 FEB 2019

Please attach:

- A copy of the research proposal
- A copy of any risk assessment
- A copy of the consent form to be given to participants
- A copy of the information sheet to be given to participants
- A copy of any item used to recruit participants

4.3: WMU REC Approval

REC Decision # REC19/01(M)
1 message

Email, PhD <PhD@wmu.se> Wed, Feb 6, 2019 at 4:24 PM
To: "BHATIA, Bikram Singh Daya Singh" <w1701511@wmu.se>
Cc: Raphael Baumler <rb@wmu.se>

Dear Bikram,

This is to let you know that the members of the WMU Research Ethics Committee (REC) have now **approved** the research related documents that you submitted to this office on 31 January, 1 February and 6 February 2019 concerning your research study involving human participation.

With kind regards,

On behalf of REC:

Carla Escalante Fischer
Faculty Support Officer
Research Projects and Doctoral Programs

REC Secretary
World Maritime University

Malmö, Sweden
Tel: +46 40 35 63 91
Fax: +46 40 12 84 42
E-mail: phd@wmu.se

On Wed, Feb 6, 2019 at 2:58 PM BHATIA, Bikram Singh Daya Singh <w1701511@wmu.se> wrote:
Dear Carla,

Many thanks for your email.

Please find attached amended documents as requested. Kindly confirm safe receipt and all in order.

Warm regards
Bikram Singh Bhatia
Student of MSc. Maritime Affairs (Maritime Safety & Environmental Administration)
World Maritime University, Class 2019
Email: W1701511@wmu.se
Mobile: +91 9819206965 (Whatsapp)
Disponentgatan 4, Malmö 2 1157, Sweden

On Wed, Feb 6, 2019 at 9:52 AM Email, PhD <PhD@wmu.se> wrote:
Dear Bikram,

The WMU Research Ethics Committee (REC) has reviewed the documentation you submitted on 31 January 2019 (including the revised consent sent by Dr Baumler on 1 February) and has raised the following comments for your attention:

- the Protocol should include the **title** (research topic) as per the one included in the revised Interview Consent Form submitted by your supervisor on 1 Feb.
(the original title included in the protocol form was not correct enough for its meaning to be clear to REC).

- the Protocol should include clear information on how will the research **data be stored**; for instance: "Research data will be stored in my personal laptop and hard disc with strong password" (and not only to refer to the REC guidelines)

- same applies for the question on how will the research **data be disposed of**: the Protocol should include clear information on this; for instance: "the data will be deleted within one month after the dissertation is accepted and given a passing mark"; or even better with more precise information, such as "the data will be deleted upon completion of my MSc studies, degree scheduled to be awarded in November 2019"

- In your letter, the 3rd line of the first paragraph is missing the word "Affairs" after "Master of Science in Maritime".

Once you send us your revised documents, REC can then proceed with the approval.

Looking forward to hearing back from you.