Ship first: Seafarers’ adjustment of records on work and rest hours

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1. Introduction

The elimination of barriers to trade and lowering of transportation costs has widely boosted globalization and seaborne trade over the past decades [1,87]. Globalization in maritime transportation has been further facilitated by technological advancement, including containerization and automation, as well as flag competition, which has enabled regulatory avoidance [2]. As a result, the number of crew on each cargo ship has been significantly reduced [3] and a global labour market of seafarers established [4]. Such economy-driven nature of the maritime industry is still the critical characteristic in today’s increasingly regulated operations by the International Maritime Organization (IMO) as well as by national and regional bodies (e.g., United States of America, European Union). Stricter rules and regulations to promote safety, security, and environmental protection have increased. Consequently, the volume of work, including administrative tasks, has exploded, requiring more resources for a fixed crew size [5-10].

The human element is often referred to in the maritime industry when concerning the onboard safety of ships, which may be compromised by seafarers’ fatigue, lack of sleep, stress, isolation, loneliness, miscommunication, and education and training matters, among other factors. Indeed, human errors accounted for 75%–96% of the total marine insurance claims between 2011 and 2016 [11], while other sources estimate higher figures [12]. The role of the human element in ensuring the occupational safety and health (OSH) of seafarers is primarily addressed by the International Safety Management (ISM) Code. The Code aims to provide an international standard for the safety management and operation of ships at sea, under Chapter IX of the International Convention for the Safety of Life at Sea (SOLAS).

Among a variety of issues within the human element, fatigue is one of the most critical. From an under-researched area of shipping [13], fatigue-related research and academic publications have expanded in the maritime domain [14]. The IMO concern remains high, as exemplified by the 2019 Guidelines on Fatigue (MSC.1/Circ.1598) adopted by its Maritime Safety Committee (MSC), after extensive discussions (2014–2018) by its Subcommittee on Human Element, Training and Watchkeeping (HTW). These guidelines complement two international instruments quantifying the minimum hours of rest and maximum hours of work for seafarers. The International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW), 1978, as amended, and the Maritime Labour Convention (MLC), 2006, provide the standards on work and rest hours for seafarers. The assumption is...
that if these regulations are implemented onboard, the issue of fatigue will be addressed.

While fatigue is on the increase [10], research provides evidence showing malpractices associated with the recording of work and rest hours. This ascertainment raises questions as to the effectiveness of the current recording system at revealing what is happening in everyday life on board. Without accurate feedback related to workload and rest, it remains challenging to consider any regulatory developments.

This paper explores how seafarers experience their day-to-day recording of work and rest hours onboard through qualitative interviews with seafarers from various regions. Two reasons justified this central use of the term ‘adjustment’: (1) the word is not negatively connotated, which facilitated data collection; and, (2) it is broad enough to encompass any form of modification of records, including those identified in literature as underreporting, forging or falsified. In total, 20 semi-structured interviews were conducted and transcribed. The data were coded and analyzed using the qualitative analysis software NVivo.

The paper is organized as follows. Section 2 provides a literature review on fatigue and recording practices, followed by a discussion in Section 3 on how work and rest hours emerged onboard ships. The methodology and methods adopted in this study are detailed in Section 4. Research results and discussions are presented in Section 5. Finally, the discussion and conclusions are drawn in Section 6.

2. When fatigue undermines ship safety and OSH

By affecting the cognitive and physical abilities of seafarers [15–18], insufficiently rested crew fatigue jeopardizes ship safety [19] and own OSH [14,20,21]. There is a need to control fatigue because “the relative accident risk is doubled after the 12th hour and tripled after the 14th hour at work” [22].

Initially focused on the prevention of major accidents, the trend of fatigue management that penetrated maritime regulations and fatigue-related studies expanded to highlight the detrimental incidence of fatigue and inadequate sleep on short-term, mid-term, and long-term safety and health among the general public [23] and seafaring population [17].

2.1. Regulations to mitigate fatigue in shipping

In the wake of the maritime accidents of Herald of Free Enterprise in 1987 and Exxon Valdez in 1989, casualty investigations and research revealed the role of human error and, inter alia, fatigue as critical contributors to marine casualties [24]. The National Research Council [3] of the United States underlined the lack of attention to reduced crew size, identifying fatigue as one of the main concerns for maritime safety.

Consequently, the IMO initiated regulatory developments to control operators’ errors (e.g., the ISM Code) and fatigue (e.g., Resolution A.772 (18) on Fatigue factors in manning and safety) [83,84]. The core of the IMO’s response to fatigue was the inclusion of ‘fitness for duty’ provisions (Regulation VIII/1, and Sections A-VIII/1 and B-VIII/1) in the 1995 amendments to the 1978 International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW). Since the introduction of Section A-VIII/1 paragraph 1, the IMO strictly quantifies “the danger posed by fatigue of seafarers” by requiring minimum periods of rest for watchkeepers (10 h of rest in any 24-h period).

Following the IMO regulatory development, research has continued to emphasize fatigue mitigation. McCallum et al. [25] stressed that “fatigue was a contributor to 16% of the critical vessel casualties and 33% of the personnel injury casualties”. In their extensive survey on Australian seafarers, Parker et al. [26] recommended addressing, as a matter of priority, long working hours and inadequate rest.

Notably, the fatigue management approach penetrated the ILO. The adoption of the 1996 Convention on Seafarers’ Hours of Work and the Manning of Ships, No. 180 (C180) established “[…] specific daily and weekly limitations on hours of work, or, conversely, daily or weekly minimum rest periods for seafarers with the aim of preventing fatigue associated with excessive work” [27]. Accordingly, the ILO institutionalized the 14-h workday reference for seafarers. This threshold clearly breached the 1919 ILO reference system based on an 8-h workday for workers. Next, the Maritime Labour Convention, 2006 (MLC, 2006) integrated the C180 provisions into Regulation 2.3.

Contrary to STCW 78, as amended in 1995, the ILO C180 and MLC, 2006, require recordkeeping to monitor compliance. The Manila conference (2010) streamlined STCW requirements with the MLC, 2006, and required, among other things, monitoring of hours of rest. Since 2002, two working time standards intended to manage fatigue coexist, but the difference between ILO and IMO standards is deemed compatible [28].

2.2. Unsolved issue of fatigue

Post-2002 research [17,29–36] revealed endemic fatigue among seafarers (particularly concerning the 6On/6Off watch system). The mitigation of fatigue seems unresolved, as exemplified by past and recent casualties [37,38]. In its work on Bridge Watchkeeping Safety, the Maritime Accident Investigation Board (MAIB) (2004) also stressed that fatigue was a contributing factor in “82% of the groundings in the study, which occurred between 00:00 and 06:00 h”. Despite such high numbers, Houtman et al. [21] suggested that the lack of systematic evaluation of fatigue in marine casualty investigations has resulted in its prevalence being underestimated.

Indeed, despite a wide awareness of the detrimental impacts of fatigue in all transport sectors [39,40] and current regulations, the level of fatigue among seafarers remains a challenge that tends to grow [10]. This suggests cracks in the implementation of working time regulations and that regulation itself may be insufficient to address the problem because strain and fatigue are directly related to the work environment and working conditions.

2.3. Structural challenges in shipping

Shipping structural functioning determines seafarers’ working conditions such as workload and manning [22,24,29], stressors and isolations [41], and unstable employment environments [42,43]. Combined, these factors directly or indirectly affect crew capacity to rest.

Globalization and flag competition position shipowners as arbitrators benchmarking favorable legislation and enforcement regimes in a race to the bottom [44]. This impacts the determination of minimum safe manning levels and seafarers’ working conditions [2,43,45]. Additionally, seafarers have to compete in a global labour market [4]. In such an open environment [46], most seafarers struggle to secure and keep short-term and unstable jobs [42]. So, workers’ bargaining power is affected by these structural changes [45,47,48] and their capacity to resist unfair working conditions is diminished.

In addition to legal innovation to lower manning expenses and control workers, technology and automation have been utilized to downsize crew. The introduction of automation on ships since the 1980s (e.g., unmanned engines) justified the reduction of crew sizes [49,50]. For example, the implementation of the Global Maritime Distress and Safety System (GMDS) eliminated the radio officer but displaced his/her duties to other deck officers. The technology paradigm seems instrumental in crew elimination, as expected by current investments on unmanned vessels [51].

Technological developments reducing crew also collide with the continuous intrusions of shore management in ship conduct. The implementation of the ISM Code and information technology, other contractual management tools such as ISO9001 or ISO14001 [48,52], and environmental regulations [53] intensify bureaucratization of ship operation by multiplying procedures and recordkeeping.
2.4. Work/rest hours recording requirements

While recent trends of scientific publications [31,54–57] promote fatigue risk management or non-prescriptive regulations to complement strictly prescriptive working time regulations, the current study focuses on the practical implementation onboard ships of existing international instruments, because prescriptive regulations remain the initial basis of elaborating fatigue mitigation strategy [57].

Beyond the regulatory framework resides the question of implementation. Currently, the compliance monitoring and enforcement regime strictly relies on records of hours of work or rest maintained onboard by seafarers. Since 2002, with ILO Convention No.180, the international regime requires the recording of their hours of work or rest. Next, the Manila amendments added recordkeeping requirements in STCW. Therefore, Section A-VIII/1 and Regulation 2.3 require one set of records on ships to “allow monitoring of compliance” (Regulation 2.3 Paragraph 12) and, eventually, trigger enforcement measures. So, each seafarer must complete his/her records, which “shall be endorsed by the master” or his/her representative, who endorse them to implicitly validate their accuracy. In short, the records are supposed to demonstrate compliance.

Flag State surveyors or Port State Officers (PSCO) examine the records to assess the hours of work performed by each seafarer and when such work was completed. Such records are vital to detect violations as well as to determine enforcement actions and rectification of non-conformities. Moreover, the records can be used as evidence to support proceedings leading to sanctions in the case of violation and/or fraudulent reporting.

On a higher level, the verifications and actions taken by States allow assessment of the capacity of the inspection regime to enforce international standards as required by the IMO Instruments Implementation Code (III Code) and to self-evaluate the State’s activities [58]. Finally, the compliance monitoring and enforcement systems serve to investigate whether the regulations ultimately meet their goals. Without accurate records, it is impossible to assess the fatigue level of ships and the ability of the regulations to reach their goals.

2.5. Recordkeeping malpractices in shipping

As reported in early research [59–61], the accuracy of records is subject to caution in shipping. It seems seafarers tend to adjust their records to avoid reporting violations. Additionally, other research (not centred on working time recording practices) highlighted widespread adjustment of rest hours [7,13,17,54,61,62]; [21,35].

In their questionnaire survey on fatigue, Allen et al. [63] showed that only a third (37.3%) of participants do not under-record their working hours. Similarly, Simkuva et al. [60] estimated, also through a survey, that “52% of respondents distort their work and rest period records”. Accordingly, more than half of seafarers under-record, irrespective of nationality, flag, and job type. Allen et al. [63] emphasized the detrimental effects of such malpractices on fatigue levels. They established that “seafarers who under-record are actually more fatigued and less healthy than their non-under-recording counterparts”. It is worth noting that violations of rest hours and inaccurate recordkeeping have been identified beyond academic research and in shipping publications (e.g., in Ref. [64,65].

Industry bodies and regulators have also sought to address the issues. In the IMO submission STW/ISWG 2/8 [66], the International Shipping Federation (ISF) and the International Chamber of Shipping (ICS) encouraged the member States to promote “proper recordkeeping” to “ensure enforcement of compliance with the detailed rest-hour requirements [...]” because “[c]hanging the [rest hours] regime itself will not ensure compliance and neither will it prevent the inaccurate recording of hours of rest”. Moreover, additional IMO debates stressed the quasi-impossibility of complying with hours of rest requirements for Masters and Mates operating ships on the two-watch system [67,68], which has been corroborated by the literature [32,34,35,60]. Finally, some casualty investigation reports explicitly indicate that work and rest hour records did not reflect the actual worked hours [31,37] [36].

So, the malpractice of adjusting records is not unknown in the maritime community. Indeed, the maritime literature reports multiple occurrences of improper recordkeeping, underreporting, and falsification of documents [5–7,69–71]. All sorts of records are modified (e.g., Oil Record Book, SMS procedures, ISPS code records, etc.) to elude unfavorable inspections or audits and to overcome extra workload. The bureaucratization of management in general [72] and of safety in particular [6,73] affects recordkeeping in limited-resource environments such as ships. For Supiot [74], the unachievability and unrealistic indicators generate depression and fraud among workers.

While Allen et al. [63] and Simkuva et al. [60] evidenced the existence of adjustment of work/rest hours’ records via a survey questionnaire, the current research complements and widens their investigations using a different data collection approach, namely, semi-structured interviews in order to explore why seafarers regularly hide the violation by making up records.

3. Methodology and methods

3.1. Choice and justification of research method

Qualitative methods allow deep insights to explore “why seafarers adjust work and rest hour records and what factors allow for such adjustments?”. The study method offers ways to provide a comprehensive understanding of implementation practices, seek a variety of factors, and point out underlying influences that provoke seafarers to adjust work and rest hour records.

Additionally, a pre-research discussion with a seafarer denoted that certain vocabulary terms may provoke reluctance in answering questions. Consequently, to overcome the vocabulary trap, the researchers decided to strictly investigate using the soft word “adjust” (and derivatives such as “adjustment, and adjusting”) instead of “under-record”, “forge”, “falsify”, “fabricate”, and “cheat”.

In short, semi-structured interviews using neutral vocabulary (i.e., adjustment) have been identified as the best option to complement previous research and explore the motivation of seafarers in making up of records.

Further, the researchers organized the themes of the semi-structured interview to establish confidence before tackling the most sensitive topics. The sequence of the conversation was as follows: an appraisal of working time onboard, contract length, subjective experience of fatigue, knowledge of the regulatory framework, recording practices and violations, quality of records (adjustments), company support when reporting violations, the justification for adjustment, and recommendations for betterment.

Finally, as with any research on unlawful practices, data collection via interviews may be challenging. Participation was voluntary and interviewees were granted confidentiality. To establish confidence with seafarers or former seafarers, the selected interviewer was an active shipmaster on chemical tankers with personal experience of hours of work and the interview stage of 3.5 months, the researchers approached 63
potential participants through numerous sources. Most seafarers contacted declined the invitation and only 20 participants took part in the interviews.

Overall, 20 participants from 16 different nationalities were interviewed, stemming from Asia (13), Africa (3), Europe (3), and the Pacific Islands (1). They happened to be all male, reflecting the gender imbalance of an industry in which males account for 98% of the whole seafaring population [77]. The participants comprised 7 master mariners (Capt), 2 chief engineers (CEng), 4 chief officers (COff), 4 s officers (2Off), 2 third officers (3Off), and one third engineer (3Eng).

The participants have sailing experience on cargo ships such as bulk carriers, containers, general cargo, and RoRo; tanker ships such as oil, product and chemical; and offshore supply vessels. The maximum length of experience sailing was 35 years and the minimum 4 years, with an average of 12.2 years. Eight participants (n = 8) had last sailed in 2019, four (n = 4) in 2018, while other participants had last sailed between 2012 and 2017.

Twelve face-to-face interviews were conducted. Due to the distance between interviewer and interviewee, another eight interviews were conducted using various online platforms such as Skype, WhatsApp, and WeChat. Interview data were transcribed and coded using the software “NVivo” Qualitative Data Analysis (QDA). The main categories (a collection of references about a specific theme) were organized in the same sequence as the interview question headings to make meaningful sense of the coding. As the coding progressed, it generated additional categories and subcategories. Double or multi-coding was also performed on the texts, meaning that the same portion of text could be entered in more than one category.

4. Results

4.1. Workload and fatigue: ongoing concerns for seafarers

In line with previous research (e.g. Ref. [29]), participants confirmed that long working hours, inadequate manning levels, and poor sleep quality combined with commercial pressure were the main causes of fatigue. Additionally, they highlighted significant working time differences when at sea or in the port area. At sea, they estimated working on average between 8 and 11 h/day. However, on some occasions, their working hours exceed 12 h/day. For example, in port, 80% of the participants reported working between 12 and 15 h/day, and the remaining 10–12 h/day. During short periods in ports, activities such as cargo, bunkering, supply, or inspections add to long port transit and mooring stations. Capt-4 admitted:

“[on] small ship, doing taxi service [many ports in short period of time], we need to attend many mooring stations. At the mooring station, I even have slept on the mooring ropes. Because after departure, in 2 hours you will arrive at the next port”.

Further, the fast turnaround in ports also denies any opportunity for a shore leave:

“After their duties, most of them [crew] have a rare chance to go ashore and have some off time to refresh […]. I don’t remember when I’ve been ashore, I don’t remember actually when I went to ashore last time […].” (COff-2)

4.2. Recording practices

Three questions constitute the core of understanding recording practices: Who records? How often do they record? How do they record?

Three-quarters of participants kept their own records. After the initial inputs, the records may be verified for compliance by the recorder or a dedicated crewmember. The purpose is to ensure that the final document does not contain violations.

“Yes, I do record my rest hours on a paper, and then we update it on software. But yes! When there’s a non-compliance in the system, we do adjust the records, and that is done by the senior officer before sending it to the office”.

Only three participants record exclusively on paper. Most participants (n = 17) use software automatically pointing out violations among compliant entries. So, violations are immediately identified in red which allows fast identification of areas to focus on:

“If you record rest hour violations, it will show red color in the system and green color for non-violation”.

Far from being neutral, the recording software drives seafarers towards ‘good’ behavior. As highlighted by 3Off-1, when seafarers face a ‘red alert,’ they commonly respond by rectifying records:

“Because when it’s computerized, they [crewmembers] put in exactly the hours that are supposed to show compliance”.

COF-2 confirms that the software’s signals trigger clean-up responses to erase any red input (traces of non-compliance):

“[…] your working hours will show red if you are violating rest hours. And [the software] takes into account both the MLC, STCW, and OPA requirements … So, we try to [check] that […] no violations are being shown when we […] fill up the rest hours’ record”.

Finally, 25% of respondents do not input any data themselves. In such cases, an appointed crewmember maintains the records for the entire crew or some groups of seafarers (e.g., Deck department or Engine department). COff-1 stated that:

“Rest hours was primarily recorded by the head of the department. So, for the deck, it was the chief or the Officer on watch. It was done to fit some aspect of compliance”.

Moreover, half of the participants (n = 8) witnessed double-bookkeeping. This practice intends to dissipate excessive overtime from official work/rest hours’ records but still need consider overtime on the payroll to avoid potential complaints. Two senior officers (COff-2 and Capt-5) explained such practices as follows:

“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”

“There are 2 different records - rest hours for official purpose and overtime sheet for payment of overtime, which has to be actual. These things are happening”.

Additionally, more than half of participants (n = 12) reported that their workload impacts the recording frequency, as exemplified by Capt-2 comments:

“Intent is to record every day. As per my experience, sometimes there are days that you don’t have the time to record because you are so busy”.

Lastly, about half of the participants (n = 9) indicated that many tasks onboard remain unrecorded, mainly when invisible in other ships’ log/record. In short, the recording of work and rest hours appears to seafarers as a ‘paper exercise’ that is easy to clean up with current IT tools guiding where to adjust.
4.3. Frequency of adjustments

All participants reported violations. They also underlined participating in or witnessing adjustments of work and rest hours’ records.

“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 up to 10–12 days in a month or sometimes more than that”. (Capt-2)

Unsurprisingly, seafarers working 6 On/6 Off (always or in ports only) and those engaged in frequent port operations are most affected. The diversity of tasks performed during port-related operations often requires participants to work beyond their working hours, resulting in violations and the adjustment of records (n = 14). While some seafarers (n = 16) admit to adjusting their own records, more than half of participants (n = 12) revealed that their records had been adjusted by others onboard (with or without their consent), as exemplified by CEng-2:

“We had an emergency and I violated my rest hours. I filled in Company’s software as it was required (explanations included). At the end of the month, he [the shipmaster] changed [my recordings]. So, there was no violation. I do not know if he donned [has done it to] other crewmembers. I have a talk with him. Afterward, he didn’t do it anymore”.

Even when some seafarers wish to report correctly, the data verifiers (in this particular case, the shipmaster) or data importer in software tend to take control of cleaning up the records before officializing them suggesting a powerful tendency towards compliance by all means.

4.4. Malpractice justification

First of all, when asked to comment about the effectiveness of the current regulatory regime, most participants (n = 15) admitted serious implementation challenges and a serious gap between the requirements and the operational demands, as summarized by two Captains:

“Practically, compliance with rest hours’ requirements has become the seafarer’s worst nightmare. You not only need to comply with the requirements but are also expected to perform multiple tasks with the same set of crews.” (Capt-7)

“Yes, actually it’s good on paper and looks easy. Practically, you don’t see it working or addressing the issue [of fatigue]. It does not serve the purpose at first place”. (Capt-1)

Furthermore, some participants (n = 4) accentuate this gap by supporting that current regulations cannot at all address the 6On/6Off watch system in port or at sea, as COff-2 quipped:

“With six hours of doing 6On/6Off port watches, normally you don’t sleep for all six hours effectively, you only sleep for four hours”.

In short, the participants highlighted the impossibility of meeting ship operational demands with the current manning level. Consequently, violations are recurrent and facing this deadlock, the participants unanimously and unambiguously stressed that the deliberate adjustment of log books serves to clean up records to avert problems. COff-4 is particularly clear on the question “how often these adjustments were done?”:

“Every time. All the violations during the period were adjusted in order to show compliance with the rest hours regulation.”

It is noteworthy to recall that any enforcement measure taken against a ship (deficiencies, detentions, or other control actions) are documented and shared. Afterwards, such evidence of non-compliance are used to sanction and prioritize ships for additional scrutiny. For example, Port State Control (PSC) deficiencies will factor into the targeting of ships when plugged into various national PSC scoring matrices; and, a poor vetting outcome may have severe impacts on chartering, as stated by COF-2:

“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 shipowner”.

To a great degree, any documented non-compliance affects the operation, the reputation and the profitability of the operating company. This constitutes a major motivation to erase indisputable evidence of violations and, subsequently, elude contractual partners or States to initiate actions against the ship and consequently against the crew. Capt-2 confirms the risk of keeping accurate records and proposed his way forward:

“It is no secret. If any violations are noted or verified by any Port States or any official, then it becomes problematic and has negative impacts on the vessel. In order to avoid such consequences, corrections are done and initiated by the ship officers”.

Additionally, ship audits and inspections also represent assessments for seafarers who are particularly “[…] vulnerable to reprimand from their companies and to the possibility of criminalisation and imprisonment at the hands of port officials” [78]. In fact, it is the individual and collective capacity of the crew to maintain compliance that is verified but not the ship, which is just an inert object. Therefore, any non-conformity must be justified and addressed by the crew.

Furthermore, non-conformities may be used by companies to enhance their power on ship by questioning skills of certain individuals or collective capacities to run the ship. For Bhattacharya [71]; seafarers live and work with the ‘fear of blame’. He considers that shore managers use reported violations or deficiencies to question shipboard capacity, as stated by ZOF-2:

“We had violations. So, […] it was sent to the office, but they came back with their questions - what was the reason for violation and in the future, planning should be done in properly so that there are no violations.”

Several participants (n = 7) consider that reporting violations generates an unpleasant flow of paperwork and increased workload. The ship’s crew will have to justify and detail the situations leading to violations through a formalized process (ISM Code-related procedures) and, eventually, propose corrective measures, as COF-3 expressed:

“The company asks hundred paperwork, a hundred questions about why it happened, why you didn’t plan. They actually blame the master and the other crewmembers. It actually backfires us”.

Facing such risks (questioning and additional workload), seafarers prefer to give up and adjust records as stated by the same COF-3:

“We always reported [hours of rest violations] to the company … but they don’t take any action with this. It actually backfires on us, and then we start manipulating these records”.

Additionally, the reported or documented non-conformity also enhances the risks of personal or collective sanctions by the company and/or the authorities. The majority of participants (n = 17) confirmed that

2 SIRE – Ship Inspection Reporting Programme launched by OCIMF (Oil Companies International Marine Forum) as a risk assessment tool in tanker trade and valued to charterers, ship operators, terminal operators, and government bodies. CDI – Chemical Distribution Institute marine programme intends to assess the risk related to each vessel through a dedicated inspection regime.
their fear of losing employment constitutes a strong motivation to adjust records, as Capt-1 stated:

“You don’t want to be in the limelight of the company [by reporting] 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 [the] company may not take me next time. So, after this, I have to keep doing that [adjusting records]”.

Therefore, seafarers endeavor to protect the ship first. They place the smooth continuance of ship operations above all else, even when detrimental to their health and safety (e.g., in the case of fatigue). Seafarers shield the ship operation to avoid any unexpected disruption that may affect their workload and determine their future good standing with the company. Essentially, seafarers assimilate their interests to those of the ship and its owner.

Worryingly, this behavior generalizes a culture of adjustment of records for compliance purpose. COff-3 disclosed that the culture of forging is passed down from senior officers to junior crewmembers:

“It is actually becoming a culture onboard. When I was a cadet, I used to do [the recordings] for other crewmembers. Now, I am a chief officer, and I instruct my cadet to record for everybody; and I know [that] once my cadet will become chief officer, he will also do the same.”

About half of the participants (n = 11) suggested that seafarers have adopted a culture of modifying work hour records with the primary objective of protecting the companies’ interests and avoiding repercussions. Such an attitude, unfortunately, seems perfectly rational from the seafarers’ viewpoint. Indeed, the current risk of being caught and penalized for falsification of work hour records is very low compared to the seafarers’ fear of losing employment constitutes a strong motivation to adjust records, as Capt-1 stated:

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4.5. Limited support from companies

One participant explained that fear of reprisal prevents seafarers from communicating with shore management concerning rest hours violations. Nonetheless, all the other participants reported or witnessed reporting of cases of violations to companies. When reporting, seafarers know that they expose themselves to criticism and retaliation. They send messages highlighting operational challenges with limited manpower, including explicit or implicit requests for support in terms of extra crew and/or workload reduction.

Generally, seafarers communicate their concerns via email, phone or directly to company representatives during ship visits or audits. Additionally, COff-2 asserts that discussions on rest hours and manning have also occurred during shoreside seminars:

“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 does not seem interested in these issues until and unless we have a big incident”.

In short, seafarers have reported or regularly report to shore managers, who cannot ignore the existence of rest hour violations. However, nearly all participants (n = 18) expressed their frustration when receiving feedback. Most shipping companies do not respond positively to explicit or implicit requests to enhance manning levels or reduce workload. This view was clearly expressed by 2Off-1: “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”.

According to participants’ views, the responses of shipping companies can be classified into four categories:

(1) The fight-back approach. The shore managers question crew capabilities and particularly senior officers’ competency to manage the ship. CEng-1 states: “When we reported to the office […], the company started asking the reason for such violations and questioned our capability in managing the vessel”.

(2) The do-it-yourself solution. The shore managers tend to minimize the issue and reject any responsibility to remedy the situation. Capt-7 states: “We do report it, but 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’”.

(3) The imperative instruction. Nearly half of the participants (n = 8)
reported having received implicit or explicit instructions from the
company to adjust records. Imperative instructions are never
given in writing to avoid traceability and possibilities to incrim-
inate the company. The 20If-1 described his experience when the
company directed the vessel to falsify records: “[…] it usually
comes from the company and usually via telephone. The company
requests the master ‘not to leave any traces’. So, the master
or any of the deck officers adjusts the rest hours or edits the sheet
before resending them’. In this case, the company is aware but
does not assume its responsibility to address the issue. The
company uses its authoritative position to control the process and
ensure that adjustments have been completed. This case exem-
plifies the mistrust between shore and sea staff, as already iden-
tified by Bhattacharya [48]. Other participants highlighted that
the company assesses the records on a weekly or monthly basis
before authorizing them to be archived. The requirement to send
files for shoreside validation represents an additional pressure to
ensure compliance by any means necessary.

(4) The positive response. Only one participant reported that the
company sent an extra officer. Capt-1 working on a tanker scru-
pulously following OCIMF guidance praised the support of the company in the following terms: “We are reporting every month.
Response just to take some corrective action (plan well) and
company has provided additional officer to reduce these violations”.

It seems that accepting and responding positively to seafarers’
feedback and requests remains rare among shipping companies.

5. Discussions and limitations

In line with earlier research, the sample of seafarers confirms that
fatigue remains a major issue in shipping and highlights that the current
regulatory framework fails to address it. In response to a question about the frequency of adjustments, all participants reported that, every
month, they participate or witness adjustments of work and rest hours’
records.

The study indicates that the type of recordkeeping system influences seafarers’ behaviour. Based on manual inputs, paper or software records can be tampered with or/and post-adjusted. When explaining their recording practices, the participants highlighted that the current
manning system does not meet the demands of ship operations. Conse-
quently, inadequate manning combined with regulatory pressure trig-
gers recurrent violations of rest hours.

Fearing the consequences of observable violations during third party
inspections, the seafarers suppress evidence of non-compliance through
the unlawful adjustments of records. The concealment of data seems a
low risk option for seafarers compared to dissatisfying the company
following inspections noting non-conformity.

To ensure that final records will show compliance, ships and com-
panies possess verification processes. On some ships, ‘trustworthy’ sea-
farers input for some or all crewmembers. On other ships, the input is
verified onboard or ashore and adjusted accordingly before final
endorsement. Indeed, some super users (often senior officers or com-
pany staff) can scrutinize and authoritatively modify records or utilize
them to question the crew capacity to run the vessel efficiently. Some
participants (n = 2) clearly expressed their frustration that super users’
rights allow them to change records without consent.

Not only does software design simplify input and verification, it also
facilitates adjustments. The color codes (usually red and green) in
software instantly highlight violations, which guides seafarers towards
conformity. Adjustments are effortless and precise. With a few clicks,
yany evidence of violation disappears. Then, the fear of being caught with
non-compliance evaporates. When the electronic records look good, the
ship crew escape unpleasant trouble. The adjustments reposition the
seafarer into a ‘safe position’ exempt from non-compliance questioning,
as expressed by 20If-4: “[…] sometimes we just don’t want to make any
trouble. So, I just make all green color”. Notably, this indicates the will
to avoid being assimilated as trouble-makers by providing the accurate
feedback nobody wants to see. So, exposure to fatigue and the potential
legal consequences of falsification seem preferable to seafarers than ‘troubling’ the company management.

The consistent adjustment of records demonstrates the limits of
current recordkeeping methods to assess compliance. Improper record-
keeping practices are not limited to rest hours but extend to other areas,
including ship defects [61] and bunkering [69]. Furthermore, the sys-
tematic cover-up of violations underscores the inability of the regulatory
framework to adequately address the complexity of shipboard opera-
tions with limited crew resources and the shore/ship disconnect.

Shipping companies, as well as maritime authorities, are not only
aware of the problem but are seemingly unwilling to tackle it. Com-
panies often minimize or deny the problem, while enforcement agencies
overlook it. This also indicates a serious failure of the ISM Code, which
was, inter alia, developed to facilitate ship/shore circulation of infor-
mation (1.4) and ensure compliance with applicable regulations (1.2).
Many companies do not seem willing to listen and support seafarers’
needs, as found in previous research [48,79], which has lead to
shore/ship disconnect and mistrust. By violating STCW 1978 and MLC
2006 and not responding appropriately to ISM Code requirements, it is
suggested that companies fail to comply with the responsibility “to
ensure compliance with other mandatory rules and regulations” (ISM
Code 1.2.3.1). These contraventions seriously damage the foundation of
three of the four pillars of the shipping industry regulatory regime.

Additionally, by denying additional crew/resources, many com-
panies violate their obligation to provide support to the ship master (ISM
Code 6.1.3) and to operate a ship “[…] appropriately manned in order to
ensurcompass all aspects of maintaining safe operations on board [ […]”
(A.1047(27)). Additionally, questioning and scrutinizing the actions of
shipboard management demonstrates the companies’ lack of faith in the
shipmaster’s capacities and expertise, thereby undermining the over-
riding authority of the master under the ISM Code (5.2). Finally, the
incapacity of Flag State ISM audits to go beyond paper compliance calls
into doubt the very relevance of the current audit scheme.

In short, the study suggests a systemic failure in the implementation
of regulations related to work/rest hours: (1) by systematically adjusting
records, seafarers consider such recordkeeping as a paper exercise with
limited value and fail to protect themselves from the detrimental con-
sequences of overwork; (2) many shipping companies seem unwilling to
address the issue as it implies reviewing ship manning; (3) the incapacity
to accept and respond to seafarers’ feedback jeopardizes ship/shore
relationships and causes disconnect; (4) third-party inspectors fly over
records without examining their accuracy, which undermines their
credibility in enforcing regulations; and, (5) the regulations related to
work/rest periods and manning seem unsuitable to meet shipboard
operational demands.

Consequently, new methods of recording hours of work and limiting
manual input and post-adjustment should be investigated. A selection of
advanced technology or options should be initiated and each of them
properly assessed to ensure that they are ethically acceptable and non-
invasive.

Beyond recordkeeping, three structural problems remain: the gap
between operational demands and manning levels; the lack of accurate
feedback from ships; and, the limited enforcement. At present, IMO [80] resolution A.1047(27) remains unable to address the issue. Therefore,
past ILO debates deserve recollection. Intending to adapt the 8-h
workday and 48-h workweek in shipping, the 1920 “Proposed Draft
Convention limiting working hours on board ship” laid down that
The significance of adjustments calls into question such methods of verification. While it is noticeable that enforcement agencies have developed methods to cross-check records, the outcomes of this study on record adjustment cannot meet the extent of the problem. The research also did not consider the participants’ backgrounds (e.g., nationality, origin, culture, and region) as factors of influence. While McCallum et al. [25] indicated that seafarers typically provide true information on fatigue during casual investigation, it is difficult to estimate whether or to what extent the current information provided is true. Participant bias could affect the data collection process. Influenced by a victim mentality, the data provided could be exaggerated. However, the multiplication of the same information and the validation by cross-checking with evidence provided in other research indicates a certain level of confidence in the quality of the information provided by the participants. The research is only limited to the adjustment of records of work/rest hours and overtime records. The outcomes of this study on record adjustment cannot therefore be generalized to any other recording onboard ships or be taken as representative of a general practice of deceiving authorities. However, adjustments of records are considered to be a global problem affecting all segments of the maritime industry across the world, as demonstrated in several studies. It is also noticeable that some companies seem to address the issue with additional care and oversight. Despite such evidence, the malpractices related to records and their inspections by third parties require additional data. The research should be replicated and cross-checked using other data points.

6. Conclusions

This study presents evidence of violations of required rest hours and modification of shipboard logs by seafarers to conceal these violations. The significance of adjustments calls into question such methods of compliance. This paper argues that seafarers are trapped between shipboard operational demands and an inadequate regulatory framework. This study also corroborates the schizophrenic situation described by Hughes (2019:4–5):

“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”.

Consequently, the unsatisfactory but only practical solution identified by seafarers has been to adjust records, as this currently remains the lowest risk option because inspectors rarely assess the accuracy of records. While it is noticeable that enforcement agencies have developed strong abilities to assess the accuracy of oil record books, there are still no robust verification procedures for hours of rest. This stance is surprising for countries such as the United States of America, which identified insufficient manning, resulting in crew fatigue, as a critical contributor to their worst ship-related oil spill (Exxon Valdez). Further research on the implementation of work/rest hours from the enforcement viewpoint would complement and open this work.

Finally, the ISM Code and its audit system seem unable to solve the problem, which raises doubts as to their current usefulness. The development of a ‘just culture’ based on trustful relationships ensuring quality feedback and response is deemed necessary in shipping to improve organizational performance and safety [82]. Incentivizing seafarers’ feedback and incorporating their views in safety are necessary to enhance safety in shipping and close the gap between shore and ships.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.marpol.2020.104186.

References

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