Behind the scenes – Educating to work as done or work as imagined.

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Abstract

The ISM-Code became mandatory in 1998 and with the adoption of the Code, meta-regulation was introduced into maritime regulation. The Code added a "triple loop" regulatory system, which means that shipping companies became forced to evaluate and report on their self-regulation strategies and document the effectiveness of these. The effectiveness of the ISM Code has been studied by several researchers. The point of departure for this paper is a research project that studies how the ISM Code influences practice on board and whether it is in accordance with the regulator's initial intentions. This study was conducted in the period from 2017 to 2020 and is based on case studies conducted in two Danish shipping companies. It showed that, despite intensified evaluation, reporting and auditing, there was a divergence between what was done in practice and what was documented. Observations disclosed *front stage/back stage* behaviour among the seafarers. This behaviour is regarded as a consequence of the discrepancy between requirements and resources. A newly published report from the World Maritime University describes this discrepancy as "*a culture of adjustment*". Their study emphasises that it is common among seafarers to adjust records of work/rest hours to ensure compliance with regulations. This behaviour is also acknowledged by the companies involved in the current study. Comparing the seafarers' workload based on a planned maintenance system (PMS) and their watch schedules with the resources available, a gap was identified. Even though this problem is well-known, the companies often leave it to the master to bridge the gap between procedure (work as imagined) and reality (work as done). This research project concludes that this system, to a large extent, is supported by the existing system of governance and by the industry, which ignores reality and depends on paper trails. The question is whether we, as teachers in an educational institution, support this gap by our way of teaching. The students are taught to act the "right" way and follow the rules and procedures. The issue of the matter is that, on board a vessel, they will not always be able to follow the rules and procedures;

hence, they will be forced to adapt to each situation, a conflict that may result in *front stage/back stage* behaviour.

This paper will focus on whether *front stage/back stage* behaviour is supported by the training the master mariners are given based on narratives from a case study onboard a medium-sized tanker.

Introduction

The perspective of human factors as having a decisive influence on maritime accidents, and the ambiguity of balancing financial goals and safety, has, since the late 20th century, influenced the regulatory work in the maritime industry. When Amoco Cadiz ran aground of the coast of France in 1978, the government of France in a note to the Maritime Safety Committee [1] stated that if the master of a ship is not protected by legislation, he would mainly be accountable to the shipowner. Consequently, the risk of decisions being primarily financially motivated would be increased. As a result, the International Maritime Organization (IMO) adopted resolution A.443(XI) [2], which urges the flag States to take the necessary measures to protect the master's discretionary power. Also, emphasizing the master's right to take decisions with regard to safety or environmental protection, without undue interference from shipowners, charterers or others. Noteworthy is that the master on one hand is responsible for safety and on the other hand has to ensure efficient operation, which can be inherently contradictory in some situations. In those situations, the master is required to bridge the gap between demands and reality. Concern with a lack of support from owners and the flag State in these situations has been raised and linked to substandard shipping by Australia, among others [3]. One of the initiatives to rectify this negative development in the maritime industry has been to adopt the International Management Code for Safe Operation of Ships and for Pollution Prevention, denoted the ISM Code [4]. The purpose of the Code is to provide an international standard for safe management and operation of ships, and for pollution prevention.

The ISM Code introduced a new regulatory mechanism in shipping, known as meta-regulation, thus introducing what Parker [5] calls the regulatory triple loop. The triple loop perspective is presented in figure 1 and it means that the ISM Code as a part of the flag State law forces the company to develop a Safety Management System (SMS) (the first loop). The SMS is regarded as an enforced self-regulation that the company develops to ensure compliance with regulations and the applicable industry guidelines. The SMS is applicable to all vessels operated by the company (second loop). Onboard, the master is responsible for the implementation and for the crew's compliance with the procedures (third loop). Onboard, the master shall review the SMS and report any deficiencies to shore-based management (third loop evaluation). The company

shall, through internal and external audits, assess the effectiveness of the system (second loop evaluation); audit reports form the basis for corrective actions and, as part of the documentation, when the flag State is to verify compliance with the ISM Code (first level evaluation). A Document of Compliance is issued to the company as evidence of being capable of complying with the ISM Code, whereas a Safety Management Certificate is issued to a vessel upon verification of the company and its shipboard management acting in accordance with the SMS.
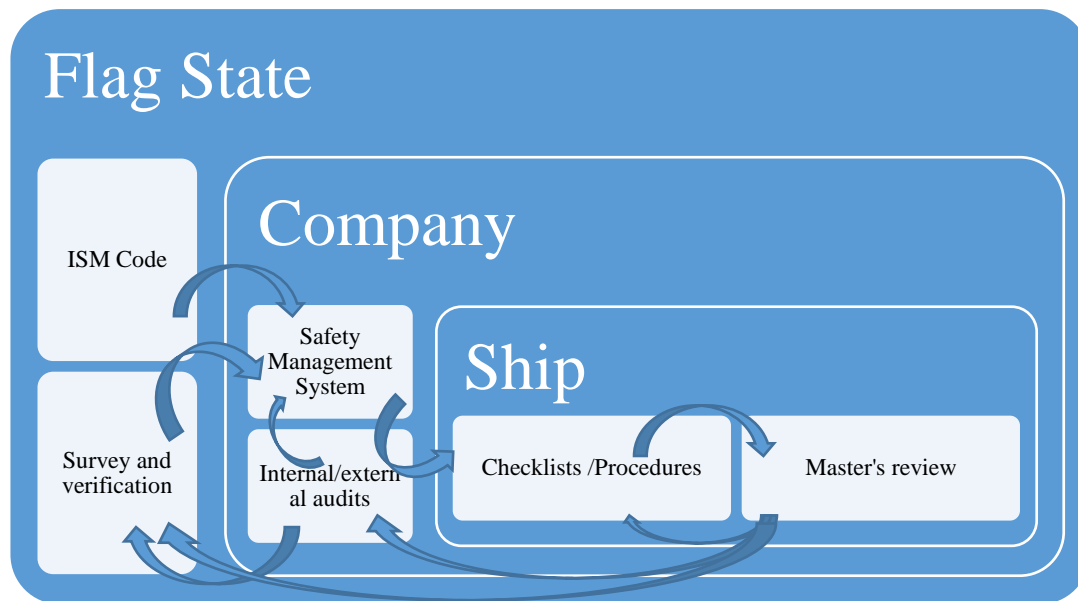

Figure 1 The ISM Code triple loop system

The current study has found that the triple loop system makes it possible for a company to appear as if it is providing a high safety standard, when in fact it is only safe on paper. Checklists, reviews and audits document one behaviour, while in fact practice onboard is another. These findings are supported by studies conducted by Størkersen [6], Bhattacharya [7] and a newly published study from WMU [8]. The current study concludes that, to a large extent, the system of governance and the industry ignores reality and depends on paper trails. The question this article asks is whether maritime education and training (MET) may even contribute to compounding the gap between practice and theory.

The structure of the article is as follows: in the next chapter the theory will be presented, followed by methods and analysis and, finally, the discussion and conclusion.

Theory

This paper focuses on two theoretical approaches: "Work as imagined" (WAI) vs "work as done" (WAD) and Goffman's front stage/back stage theory [9]. The concept of "work as imagined" vs "work as done" originates from safety research within resilience.

According to Hollnagel [10] WAI '*refers to the various assumptions, explicit or implicit, that people have about how work should be done. WAD refers to (descriptions of) how something is actually done, either in a specific case or routinely'*. The concept of WAI emphasises how rules and regulations written by people who are not involved in the actual performance of the job are sometimes described in a way that makes it difficult for the people at 'the sharp end' to meet demands and deliver on target, as the objectives may be ambiguous or in conflict with operational practice. Legislation and procedures are considered results of WAI, while employees attempting to comply with regulations in their everyday work are seen as WAD. According to Hollnagel, there is a discrepancy between WAI and WAD. Employees attempt to adjust procedures to reality, learn to recognize the actual demand, and interpret and apply procedures to match the conditions. These attempts usually result in success, but sometimes in failure. The employees try to adjust to the situations with the help of ETTO principles [11] (efficiency thoroughness trade-off). Depending on the situation the employees try to be efficient or thorough, but in real life it will never be possible to maximise efficiency and thoroughness at the same time. In the classroom, future navigators learn WAI (thoroughness), as they are taught through legislation and procedures how an operation should be conducted, but when onboard, they experience WAD (efficiency), which can be different from MET.

Another theoretical approach used in this paper is Goffman's understanding of front stage and back stage. These concepts originate from the theory of a total institution. Goffman defines a total institution *as "a place of residence and work where a large number of like-situated individuals, cut off from the wider society for an appreciable period of time, together lead an enclosed, formally administrated round life"*[9]. In light of this definition, a ship can be regarded as a total institution because the crew are not equal but are subject to a hierarchy and a bureaucratic structure. According to Goffman, the individuals within total institutions tend to be split between back stage actions and front stage actions. The individuals have front stage behaviour when they know that others are watching. This kind of behaviour reflects internalized norms and expectations of behaviour. Back stage behaviour occurs when no one is watching, and the individuals feel free from the expectations and norms that dictate front stage behaviour. The seafarers in their everyday work use both front stage and back stage behaviour. The use of certain types of behaviour depends on the context. Documentation offers a possibility to document front stage behaviour, while in fact the seafarers use back stage behaviour while performing their duties.

These two theoretical approaches supplement each other to some degree. When the seafarers attempt to convince others that they are following the rules (WAI), they demonstrate front stage

behaviour, while in everyday work (WAD) they exercise back stage behaviour. However, MET builds on WAI and the expected front stage behaviour.

Methods

This study is based on two types of data. Data for WAI consist of regulations, company SMS and a best practice guide. Data for WAD are observation notes collected during a two-week voyage on a Danish operated tanker. Kusenbach's [12] go-along method has been applied, and observations have been supported by follow-up interviews, which have been transcribed. For this article, the case of a mooring operation has been chosen. A mooring operation is considered an everyday operation; still, it is a high-risk operation and one of the important elements of the teaching syllabus regarding safety training. The operation is quite complex and affected by several regulations, yet no regulation specific regards the conduct of operation. WAI data has been analysed to determine what from the regulators' point of view are considered key elements of a safe mooring operation, and what is considered important in MET. WAD is based on a narrative from a mooring operation, the citing is from the observation notes, also the follow-up interview is part of the analysis of the practice onboard.

Analyse

Table 1 illustrates the mooring operation as seen from the differing WAI and WAD perspectives.

Table 1 WAI and WAD perspectives on mooring operation

Regulation (WAI)	Best practice (MET) (WAI)	Practice onboard (WAD)
MLC 2006: minimum requirement for rest hours. ISM Code: Mooring Procedure	Risk assessment; 5-step (mapping, assessment, action plan, risk assessment document, and follow-up) Pre-mooring meeting; equipment, procedure, risk assessment, communication. Safety culture: tools to improve.	Lack of resources Lack of communication Documented compliance with relevant regulations such as rest hour.

Regulation (WAI)

From the regulation perspective on mooring, there are two primary regulations: The Maritime Labour Convention MLC 2006 [13] on rest hours and the ISM Code.

Rest hour regulation lays down the minimum required hours of rest. Rest hours shall be documented, so that it is possible to control compliance with regulations. It shall be noted that if a ship is found not to comply with rest hour regulations, it shall be detained by the port state

authorities until the matter is rectified. Also, and this is particularly applicable to tankers, lack of compliance would have the implication that the ship loses its vetting. Many of the oil companies only allow vessels with a positive vetting to transport its cargo, which is why the consequence of not complying with rest hour regulations would be loss of contracts.

The ISM Code does not specifically address the mooring operation, however, in accordance with the Code the company shall develop plans and procedures to ensure that shipboard operations are conducted in a safe manner. In accordance with the company's SMS, in order to ensure safe operation, the mooring operation should be supervised by an officer not involved in the operation of winch or handling rope, her or his main task is to communicate with mooring team onboard and ashore. It is noted in the company's SMS that the number of persons needed for the mooring operation is to be decided by the master. Thus, how the operation is conduced is at the master's discretion.

Best Practice, Training and Education (WAI)

The mooring operation is one of the most common and important ship operations, which is taught in every maritime school in Denmark. The teaching material used is a best practice guide on mooring, published in 2013 by the Danish organisation Seahealth [14]. According to this guide, the preparation phase is the basis for a safe and efficient mooring operation, which is why it is recommended to conduct a pre-arrival meeting that include the following:

- Control of mooring equipment and gear.
- The mooring team must read and understand the SMS procedure and potential variations must be identified.
- Everybody is to be instructed about the risk assessment and latest near miss reports.
- Instruction in communication, and check of radios.

Furthermore, the importance of risk assessments; repairs and maintenance; near miss reviews, instruction and training; and safety culture sessions are emphasised. The process of how to conduct a risk assessment is a key subject within the safety training in the Danish MET. It was also noted while attending the company's training sessions on the SMS that risk assessment was a key subject here as well. All crew members, regardless of rank, were to participate in a company safety culture course. Here, the key focus was risk assessments, pre-work meetings and the creation of a participating culture. The MET reflects the society and the company's required behaviour, and therefore forms the norm for front stage behaviour.

The MET assumes that during a pre-work meeting the equipment is checked and the crew who are to be involved in the work discuss the work process, using the procedure from the SMS as

a starting point. Regarding the risk assessment, it is in the material used in MET in Denmark described as a 5-step process. The first step is mapping that includes identifying the hazards; then comes the assessment, where each hazard is assessed according to danger and probability; thirdly, the action plan, possible solutions to reduce risk are discussed in a meeting; next, the risk assessment document, which is a documentation of what is decided in order to reduce risks, this is the document that is part of the pre-mooring meeting. It is emphasised that periodical evaluation must be conducted by an officer.

Practice onboard (WAD)

The following narratives are based on observations made onboard a vessel during an observation voyage in the first quarter of 2020. It shall be noted that this was not an exceptional mooring operation, but it was similar to what had been experienced in other ports.

"Arrival [Port D]. Observations made from a position on the forecastle. The mooring deck forward is manned by two ABs and the motorman. Instructions on which pier number and to what side to have alongside are passed to the crew by radio from the bridge, following the arrival of the pilot. The crew start preparing the lines. Instruction was 2 – 2 – 2, however they ended up with 3 – 0 – 2 and no breast line ashore. The three people work alongside each other, none of them taking leadership. The motorman operates the winch, while the others are handling the lines, communication with shore is sporadic and they don't manage to get the linemen to put the mooring lines in the preferred positions. The aft station is manned by an officer and one ordinary seaman, a tugboat has to be made fast, hence he [crew member] leaves his station to help them with the line, but otherwise he is at the manifold, passing on distances to the bridge via radio, the helmsman (AB on duty) came down to help as soon as he was finished by the wheel." (observation book).

To be able to comply with rest hour regulations the master had decided that upon arrival the deck officer not on duty was left to sleep, thus, the mooring deck forward would be manned by rating only. A decision that also caused a lack of resources at the aft station. The master explained his considerations concerning his decision during interview. Here he stated *"... normally the deviance* [related to rest hours] *is for the bridge officers – because in port they are doing a 6 on 6 off watch, so the loading and then the mooring, so they will of course have to breach [the rules], that is why in my system, only the officer on duty is the one awake, the officer off duty is asleep" (respondent G).*

Prior to the operations which are described in the narrative no pre-mooring meeting was held. A standard risk assessment for the mooring operation was part of the SMS. When asked, the

officers referred to this document and they did state that pre-mooring meetings were conducted, however during my time onboard I did not experience this. Considering the master's statement, that the reason for only one officer being called on deck because otherwise rest hour regulations would be violated, it is difficult to see what resources would be devoted to conducting a pre-mooring meeting.

Onboard the ship there are three ABs, one motorman and one ordinary seaman. There are 3 navigating officers and the master, and then there are 3 officers in the engine room who are not part of the mooring operation. On bridge, during arrival, there is the master, a navigation officer and a helmsman. The officer on watch (OOW) is relieved by the chief officer shortly before the pilot arrive. Then the OOW goes to the pilot ladder, (s)he is the one on deck who meets the pilot and follows her or him to the bridge, then (s)he returns to the aft mooring deck. When the helmsman is no longer needed on bridge, (s)he hurries to the aft station to assist with the mooring.

Discussion

The three perspectives presented above illustrate how the mooring operation is perceived by different actors. The first perspective is based on regulation. It is very general as it should "fit" different types of ships and companies. The second perspective shows in more detail what should be included in safe mooring operation. However, as the narrative illustrates, reality is very different from what is written in regulations and training materials. Both regulations and the training materials show how things should work in an "ideal world". When conducting a mooring operation, the master has to take into account several regulations and requirements from the company, customers and authorities. The master and the crew are aware of what is expected of them and try to adapt their behaviour to those expectations. In the documentation, the master and the crew will follow procedure and document "front stage" behaviour, while on deck they adapt their behaviour to be able to fulfil the task. They apply the ETTO principle, maximizing efficiency, while the documentation allows them to appear as if they are being thorough. It shall be noted that how the mooring operation is conducted is not documented. Only if an accident occurs would it become visible to others apart from the person operating on deck.

The mooring deck is the back stage, whereas as soon as the pilot arrives the bridge is the front stage, reporting is considered a part of this front stage behaviour. Here, compliance is documented. The SMS procedure describes the operation and the measures that are to be taken, and even though this is not followed on deck, because of the procedure and the fact that no one

observes WAD, to the outsider the operation is perceived as being conducted in a safe manner. This is what Størkersen and Bhattacharya have termed paper safety.

In the narrative on the forecastle, a few corrective actions would have changed the operation from being unsafe to become safe. If one of the ABs had been appointed to be in charge of the operation, (s)he would assume responsibility for directing the operation, (s)he would not be handling the ropes but retaining an overview of the deck and communicating with shore, as described in the SMS procedure.

In MET and the best practice guide it is assumed that the mooring team consists of one officer and two ABs, however this is far from possible under all conditions due to a lack of human resources onboard. Both MET and SMS procedures have been conducted based on WAI and, as DMAIB [15] criticized in their report, it is the seafarer who has to bridge the gap between WAI and WAD. The MET do very little to close the gap or even discuss it. Underlying factors such as fatigue or being too busy are mentioned but the recommended course of action is risk assessments and pre-mooring meetings, which absorb even more resources.

The skills that are taught belong to the front stage behaviour. This enables the seafarer to reply correctly during a PSC, assessment, or vetting, but in daily operation the seafarers are bound to make it work with the resources with which they are provided. Thus, even in those situations it is possible to enhance safety if we dare to bring reality into the classroom, make the seafarers discuss what could be done if they find themselves in a situation that is not ideal yet have to adapt to reality.

Conclusion

As illustrated above, regulations and procedures stem from WAI, whereas onboard operation is WAD. This article argues that MET, by departing from WAI, not reflecting on conditions onboard and WAD, supports front stage/back stage behaviour. Taken to extremes, one could say that MET only trains the seafarers to perform at the front stage, while they are on their own when they need to bridge the gap between WAI and WAD. The MET materials analysed in the present case are found to support the triple loop and the system of paper safety, while failing to train the seafarers for real life.

Based on the current study I call for a reflection on how MET may bridge the gap between WAI and WAD and whether it would promote safety awareness.

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