Bachelor's project

NTNU
Norwegian University of Science and Technology
Faculty of Engineering
Department of Ocean Operations and Civil Engineering

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# The value of the information from the deck log book

## Is the deck log book useful?

Bachelor's project in Nautical Science
Supervisor: Tron Resnes
June 2021

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## Summary

The deck log book is well known within the maritime industry and can be found on larger vessels all around the world. This thesis has studied the use of today's deck log book and analysed the usefulness of the deck log book. This was done considering which columns in the deck log book that are important, to what degree the information written down can be used, and who is eventually interested in this information. To have a clear goal of the thesis the main issue is:

**«Is the deck log book useful?"**

The thesis has gathered information by interviewing different parties within the maritime industry who use the deck log book. Current rules and regulations regarding the use of the deck log book, historical use of the deck log book, and other systems logging this information, is used as theoretical framework for the thesis. The main issue for this thesis was developed with the help of DNV.

The data collection, using interviews, revealed that both crew on board the ships and stakeholders on shore has a similar attitude towards the deck log book. Extracted from the interviews, the crew indicate that they are entering the information in the deck log book to comply with requirements. They do this without considering whether it has a purpose. The same attitude of complying with requirements is also clear from personnel on shore. Something else that emerges from the interviews is that the deck log book is an important source for one type of information, the one that cannot be standardized. This is information regarding assessments and measures taken based on these assessments by the crew.

As told by the interviewees, the deck log book is a good source for non-standardized information. Much of the information that can be standardized is also registered on other systems on the bridge, additionally to the deck log book. This means that the same information is stored in several different ways. On this basis the deck log book can, as it is today, be reduced in extent. This can be done by removing the columns that contain information already being stored elsewhere. The purpose is to reduce the time used by the crew to note standardizable information. This information is found more accurate in other systems. As a conclusion the deck log book is outdated as it is today.

# Sammendrag

Dekksdagboka er velkjent i den maritime industrien og er om bord i større fartøy verden over. Denne oppgaven har studert bruken av dagens dekksdagbok og undersøkt nytten av denne. Dette ble undersøkt ved å se nærmere på hvilke kolonner som dekksdagboka består av som er viktige, i hvilken grad informasjonen som er skrevet ned kan brukes, og hvem som eventuelt er interessert i informasjonen. Følgende problemstilling ble utarbeidet:

**«Er dekksdagboka nyttig?»**

Studien har hentet inn informasjon ved å intervjue representanter fra ulike deler av den maritime bransjen som bruker dekksdagboka. Gjeldende regler for bruk av dekksdagbok, historisk bruk av dekksdagboken og andre systemer som logger informasjon blir brukt som teoretisk rammeverk i oppgaven. Problemstillingen ble utarbeidet i samarbeid med klassifiseringsselskapet DNV.

Datainnsamlingen, i form av intervju, viser at både mannskap ombord på skip og interessenter på land har en gjennomgående lik holdning til dekksdagboka. Fra mannskapets perspektiv viser intervjuene at en stadig er opptatt av å føre inn informasjon i dekksdagboka for å oppfylle krav, uten å tenke mer på om det har noen hensikt. For personell på land fremkommer også holdningene om å oppfylle krav. Videre fremkommer det at dekksdagboka er en viktig kilde til én type informasjon, nemlig den som ikke kan standardiseres. Dette er for eksempel informasjon som angår vurderinger og tiltak basert på disse vurderingene.

Det kommer frem av intervjuene at dekksdagboka er en god kilde til ikke-standardisert informasjon. Mye av informasjonen som kan standardiseres blir registrert av andre systemer på broa, i tillegg til i dekksdagboka. Dette medfører at samme informasjon blir lagret på flere forskjellige måter. På bakgrunn av dette kan dekksdagboka slik den er i dag reduseres i omfang, ved å fjerne kolonner som inneholder informasjon som allerede finnes. Formålet med dette er å redusere tiden mannskapet bruker på å notere standardiserbar informasjon. Denne informasjonen finnes mer nøyaktig i andre systemer. Det konkluderes med at dekksdagboka er utdatert slik den er i dag.

# Abbreviations

| | |
|---|---|
| IMO | International Maritime Organization |
| ISO | International Organization for Standardization |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| TELSCOPE | Digital deck log book from Telko and Furuno |
| GMDSS | Global Maritime Distress and Safety System. A set of systems for improving the safety onboard vessels and aiding in emergency situations. |
| NMA | Norwegian Maritime Authority |
| AIS | Automatic Identification System |
| VDR | Voyage Data Recorder |
| NSD | Norsk Senter for Forskningsdata, the Norwegian Center for Research Data |
| GDPR | General Data Protection Regulation, privacy law |
| Digitalization | A total transformation of the entire system into a digital solution with automation and communication between systems. |
| Unisea | A digital software for HSEQ and Operations. Used for checklists, incidents and other operational processes on a digital platform. |
| ECDIS | Electronic Chart Display and Information System. A tool that can replace paper charts, now widely used on board most larger vessels. |
| Stakeholder | A person, group or organization that can affect, will get affected from or experience that they get affected from a project or in this case an established system. |

| | |
|---|---|
| Contemporaneous evidence | Principle that puts significant weight to the evidence arising just after an incident. |

# 1. Introduction

Documentation has always been important for all industries. When a company have to prove that their work has been done as agreed and in accordance with current rules, documentation along the way will be decisive. This be it for work on a house, delivery of goods or safe navigation of a ship. To document a voyage, the deck log book has throughout history been valid to record the position of the ship at a specific time, and what the crew has done during the voyage. In the maritime industry, the deck log book has been used frequently during the investigation of accidents, especially before the modern satellite coverage.

The background for this thesis is the experience we have gained from using the deck log book in the navigational subjects at the nautical science study at NTNU in Aalesund. This thesis takes a closer look on the use of the deck log book and the usefulness of it as it is today. It started with trying to see if a digitalized deck log book would be more useful than the paper version. As the thesis progressed, we discovered how much of the information from the deck log book that was superfluous and already being logged automatically in different electronical systems. This led to the thesis exploring the usefulness of the deck log book, either it was digital or on paper. In cooperation with the classification company DNV, the following main issue was developed:

**"Is the deck log book useful?"**

This thesis will analyse the value of the deck log book. To find which information that is necessary in the aftermath of a voyage is the aim of this thesis. Especially when an incident has occurred.

The group came up with three research questions as a basis to answer the main issue. The research questions are: Which columns are important? Is it possible to use the information from the deck log book? Which stakeholders are interested in the various information?

To get a basic understanding of how the deck log book should be used, this thesis will start with a presentation of the defining rules. These rules are ratified and enforced by the Norwegian Maritime Authority.

## 1.1. Defining rules

Today the ships that intend to enter the Norwegian register of ships have to comply with the *Regulations of 15 September 1992 No. 693 on the form and keeping of log book for ships and mobile units* (Sjøfartsdirektoratet, 2018), from now on called the *Regulation*, laid down by the Norwegian Maritime Authority (NMA). These regulations contain general provisions and duties concerning log books on board a ship in addition to guidance on what form the log book shall appear and how it shall be kept. It also addresses current guidelines concerning the inspection of log books.

The Regulation´s chapter 3 contains how log books are to be kept on board Norwegian ships. In § 9 *Deck log book* it is defined that a deck log book shall be kept on board four categories of floating units, specifically a) ships engaged on foreign voyages; b) ships of 50 gross tonnage and upwards engaged in domestic operations; c) fishing vessels of 50 gross tonnage and upwards; and d) mobile offshore units. It also follows from this Regulation that the navigator on watch shall keep the deck log book and that it shall be kept for every day in port and for every watch at sea. During the watch, it is permitted to note events occurring provisionally in a note book, however this shall be transferred to the deck log book no later than by the end of the next day. The Regulation also clarifies that the keeper of the deck log book shall confirm that the watch has been entered in the deck log book by his or her signature. Furthermore, the master shall sign the deck log book at the end of the day (Sjøfartsdirektoratet, 2018).

The Regulation´s chapter 4 contains details regarding entries to be made in log books. § 15 is divided into four sections, each addressing how and what to write in the deck log book, both general information and more specific concerning each column. The first section addresses how to make the first entry of the day for ships on foreign voyages and furthermore that the main information fields 6 – 22 “shall be filled in as appropriate with the conditions prevailing at 24 hrs” (Sjøfartsdirektoratet, 2018). It also specifies that during a voyage, important positions as well as information about drift and current shall be entered. Positions shall be indicated by latitude and longitude or by bearing and distance to a named object.

Concerning entries regarding events and circumstances occurring during the voyage, any information that may be useful for “authorities, shipowners, cargo owners, insurance company,

or others having legal interests in the voyage" shall be entered. This includes the crew´s time of service. Besides the Regulation includes additionally 11 points (a-k) that shall be entered in the deck log book as an addition to what the printed text on top of each page indicates. This is the variable or "miscellaneous" information that is needed to reconstruct the voyage, also referred as column 23. This information, including notes based on the text above these points, is meant to create a full picture of the voyage, as shown in Figure 1 and 2. These are two extracts from a deck log book.

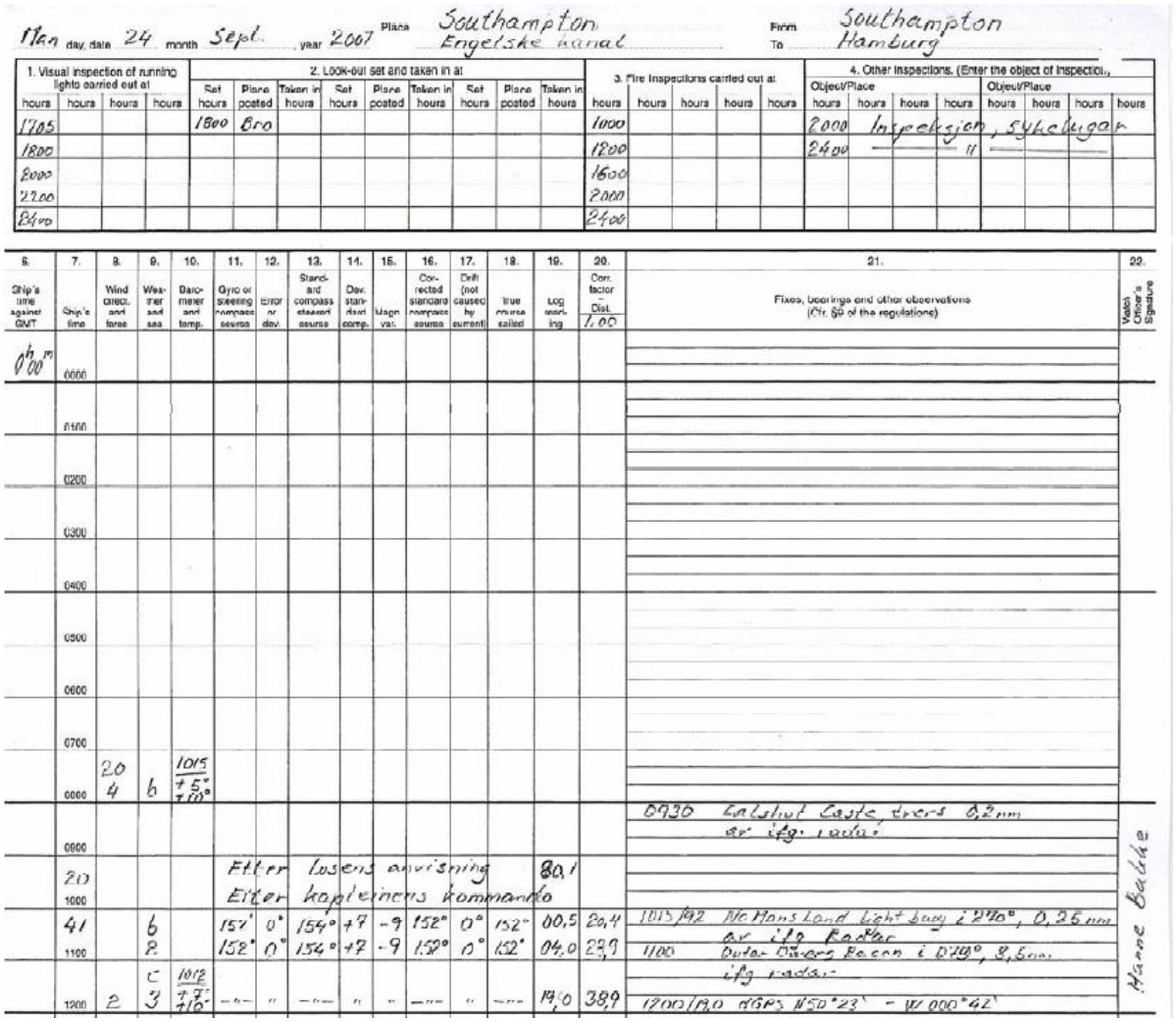


*Figure 1 A deck log book. Columns 1-22, copy from (Kjerstad, 2008)*

23. Miscellaneous (Cfr. §§ 5 and 9 of the regulations)

| | | | |
|---|---|---|---|
| 0000 – 0700 | Matros Robert Guba | er vaktmann | |
| 0700 | Tornet mannskapet, gjorde sjøklart | | |
| 0800 | Satte sjøvaktene | | |
| 0830 | Skipet sjøklart, Last forsvarlig stemplet | | |
| | Dypgående ved avgang: F 5,2 m M 5.7m A 6,2m | | |
| | Beregn dødvekt 5500 tonn, Beregnet GM = 0,45 m | | |
| 0850 | Los D. Smith ombord og briefet. Begynte å single opp. | | Tor Sire |
| 0900 | Gikk fra Pier 4 etter losens anvisning. En taubåt til assistanse | | |
| 0910 | Lot gå taubåten | | |
| 0920 | Stopp i maskin. Losen fra borde ved Calshot Caste | | |
| 0930 | Halv fart i maskin | | |
| 1000 | Full fart i maskin | | |
| | | | Hanne Bakke |
| 1210 | Sendte POSREP til | Dover Coast Guard på VHF | |
| 1330 | Pumper ballast til | bb. dobbeltbunn for å rette båten | |
| | | | Pe. Hellevik |

*Figure 2 Column 23, copy from (Kjerstad, 2008)*

## 1.2. Historical use of the deck log book

The origin of the deck log book is dated back in the early era of sailing ships. The deck log book was important in navigation when the position of the ship was found with the help of dead reckoning (Reaveley, 2012).

When the first ships got insured in the early 18th century it was shipowners and underwriters, the insurer, gambling on whether the ship was coming home or not. Many shipowners sent the ships out in horrible conditions and made a profit when the ship sank. This was the start of the classification societies (Devanney, 2006).

The deck log book was by the 18th century implemented on many ships, especially naval ships, but it was not globally standardized. It was a normal log the master kept in order to record events, weather and most importantly the position. As it was the master who signed the deck log book and it was written as it happened, or just after, the deck log book was the surest way to know what had happened on the ship. Using this, historians and historical climatologists can figure out the weather and other factors in historical events. It can also be used to get more meteorological data from the past. After several disputes where the deck log book decided the outcome, it became a more important evidence. Both insurance companies and the courts started to use this document to settle disputes in collisions and accidents (Wheeler, 2004).

As the years have gone by and more technology has been implemented on board, the deck log book has gradually become less important. Before ECDIS, VDR and AIS this was the only documentation the crew had on their voyage. According to one of the interviewees, the deck log book had to be stamped by the consulate before a new deck log book could be used. After an incident, the deck log book was the first thing the maritime inspectors looked through. In the past, the deck log book was the bible, and what was written here was the truth, at least until the opposite was proven. Today, one can use electronic aids to reconstruct parts of the voyage. Should there be discrepancies between information from the navigation aids and the deck log book, the crew have a problem. In court, this could mean that what is written in the deck log book is not truthfully written and is therefore disregarded.

The next quotations are from the interviews in connection with the data collection of this thesis. It emphasises how the use of the deck log book has changed over time.

*"From the old days we wrote all the drills, debrief and who participated in the drill. But today, in any case with us, we use Shipadmin or Fleetmanager, where everything gets registered. In the deck log book they only write one sentence."* Informant #5

*"I want to give a historical retrospective from when I started in Japan in the early 1990´s. Here, we had a lot of casualties and collisions where the deck log book was of big interest. At that time the deck log book was of great significance because there was no AIS, only two other aids. It was the mechanical course recorder, transferring all the courses on paper. In addition, we had the engine logger to register all engine orders. Besides, we also had the general courses in the deck log book. But now, the first thing we do is to ensure that the captain saves the data from the VDR."* Informant #7

### 1.3. Voyage data recorder

A Voyage Data Recorder (VDR) is similar to the black box in the aviation industry as it collects data that is relevant in the aftermath of an accident. It collects and stores the data continuously until someone, preferably the master, presses "Save", or an incident occurs where it loses power. It then stores the information from at least the last 12 hours and until someone picks up the VDR. It is made to withstand fire, deep sea pressure, shock, and penetration. Some of the data stored is time and date, position, speed, VHF communications, heading, and bridge communications (Wärtsila, 2021).

Regulation 20 of SOLAS chapter V on VDR states that passenger ships and all other ships over 3000 gross tonnage is required to carry a VDR on board. This regulation was adopted in 2000 and entered into force on 1 July 2002 (IMO, 2021).

The black box in aviation is called a flight data recorder (FDR). The FDR collects data about the flight, such as speed, altitude, communications, and a lot more. This is comparable to the VDR in the maritime industry. However, there are no equivalent to the deck log book used

aboard airplanes, they use checklists and have everything they do logged electronically (Skybrary, 2021).

### 1.4. Digital record books approved by IMO

In October 2020 the International Maritime Organization (IMO) approved the use of digital record books to log information concerning oil tanks, garbage and other standards set by the MARPOL convention. IMO is a UN organization with 174 Member States (IMO, 2021). This can indicate that the whole maritime industry is embracing the digital evolution and is slowly beginning to implement more and more digitalized solutions. The Norwegian Maritime Authority has approved the use of electronic record books as by ISO 21745. ISO 21745 is a standard set by the International Organization for Standardization (ISO) involving the technical specifications and requirements of electronical record books. ISO sets standards in every aspect, from space exploration to environmental management (ISO, 2021). They have set a standard for using electronic log books for deck and engine as well (Sjøfartsdirektoratet, 2018).

### 1.5. Existing digital log books

In today's digital world the deck log book onboard is in many cases still analogue. According to regulations, incidents and conditions shall be entered into the deck log book. Our question is whether the current use of the log book is appropriate and whether an analogue deck log book is necessary.

In particular, the frequency and number of notations in the deck log book varies with the trade area of the ships. Ships sailing in foreign areas uses the log book more than ships sailing in Norway. Foreign ports control the formalities of the deck log book more frequently than Norwegian ports (Telko, 2021).

As a renewal of the analogue log book, several digital log books have appeared on the market. An example of this is Telscope, which is a collaboration between Furuno and Telko. Telscope has data collection platform, data storage and a user and role management. It allows the user to customize the system to their ship and their business. Telscope is an electronic log book, that combines the deck log book, engine log book and GMDSS log book. It includes a checklist

module, and it allows the navigator to edit the information. The system is based on continuous input from different systems, and loss of internet connection will not be an issue. As shown in figure 3, Telscope is supposed to be the start of paperless documentation. This will give stakeholders easier access to documents onboard (Telko, 2021).

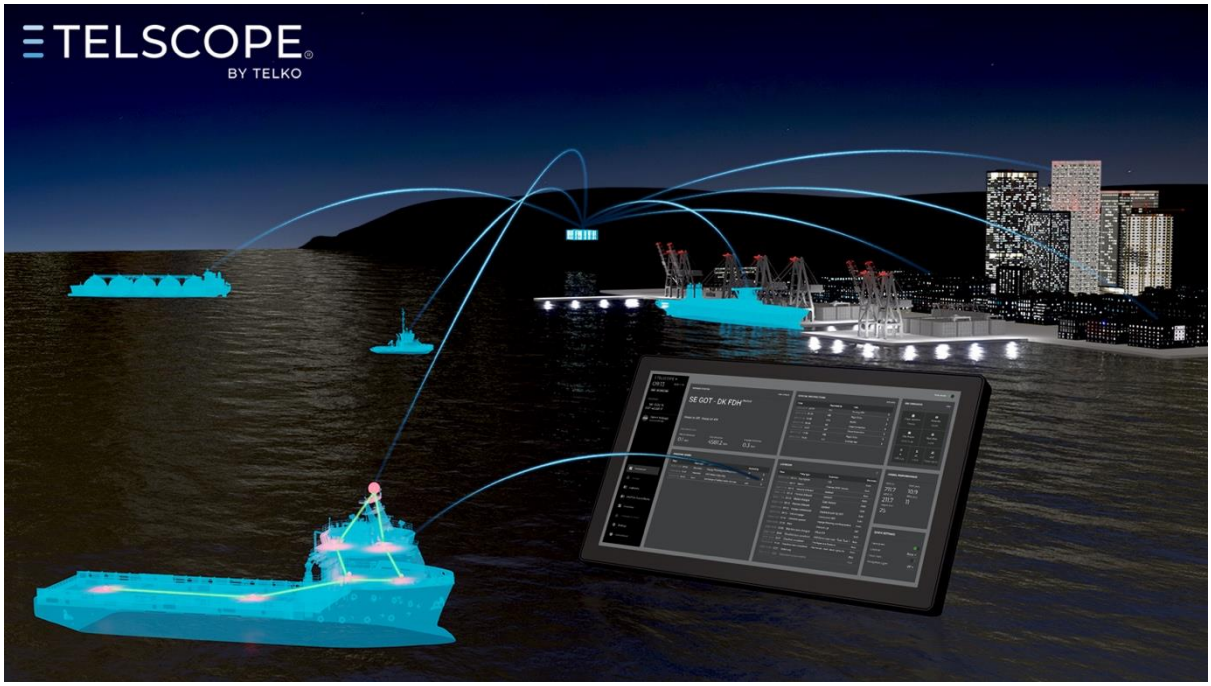


*Figure 3 TELSCOPE (Downloaded from Telko.no)*

The combination of deck, engine and GMDSS is designed to make the job easier for the crew onboard. It will also be easier for the crew to have a better overview of the whole ship, and especially the shipping company will get easier access (Telko, 2021).

## 1.6. The effect of change

The maritime industry can be compared to an organization when it comes to development. Organizational development is the process of changing an organization through changes in structure, training or optimization of work tasks (Dahlen, 1995).

The reason why an organization changes varies, but the reason why an organization exists is the purpose of producing goods or a service in the industry. Since the maritime industry is in

continuous change, the needs for goods and services also change. Satisfying needs is what an organization does, and if it does not, it will no longer survive.
Times change, and so do the needs. Therefore, it is important for the maritime industry to always strive to get better in different areas. The risk for organizations that fail to change is that they lose customers and legitimacy, they stagnate and must reduce operations (Johansen, 2013).

Organizational change is both the process that leads to the change and the result of the change. This change is different in form, quality or condition over time in an organization`s enterprise. Enterprises can be anything from an individual`s work, to subgroups, strategy or the entire organization`s design. A successful effective change has occurred when the organization has been moved to the ideal state and functions as expected. When changing an organization there are three conditions that must be present. The first is a desire for a future state, the second is to create changes and the third is focusing on period of change (Johansen, 2013).

According to Forskningsrådet (2020), one of the factors that especially has changed in the maritime industry is technology. The industry consists of aquaculture, fisheries, offshore oil and gas extraction, offshore renewable energy, and new offshore industries. This includes innovative utilization of new markets, technologies and business models for the companies that own, operate, build, and deliver equipment and services to all types of vessels and installations for utilization of the ocean space (Forskningsrådet, 2020).

The goal is increased competitiveness, strengthened adaptability and improved interaction and knowledge transfer and this must be within sustainable framework. The interplay between theory and experiments has been important in maritime industry and is becoming even more important for understanding new contexts.

To reach these goals it is necessary with research that contributes to new competence and innovations within priority areas, including digitalization of the maritime industry. In order to have a competitive advantage, it is important to develop competence and ownership within digitization. According to Forskningsrådet (2020) this can make further development easier.

It might be easy to be relaxed as new technology is implemented to help us carry out a piece of work. The implementation of for example GNSS and ECDIS allowed the navigator to have

continuously position and shown on an electronic chart. This is arguably more efficient than conventional paper charts, but it also might affect the situational awareness. Therefore, it will be necessary to mention situational awareness in combination with the technological change in the maritime industry.

Situational awareness can be defined as the "up-to-the-minute cognizance or awareness to move about, operate equipment, or maintain a system" (National Research Council, 1998) according to The National Research Council's study on Modelling Human and Organizational Behaviour. Situational awareness considers perception of different elements in the environment. Perception is the interpretation of the sensory impressions which we perceive through our senses and then organized by our brain. These are cognitive processes that create the basis for our acquisition, memory and reuse of new knowledge to use for further problem solving and decision making (NTNU, Nautical Science, 2018). Situational awareness can therefore be considered as the volume of time and space where we find ourselves (Level 1) and the understanding of this volume (Level 2). Furthermore, is the projection of this volume in the near future (Level 3) a big part of our situational awareness. The attempt to predict the development supports the planning and evaluation of options for the immediate future of the situation (National Research Council, 1998).

The generic decision-making model present by Mika Endsley (Figure 4) shows how the situational awareness is divided into three levels. These three levels occur from the state of the environment and cause the navigator to make a decision so he or she can perform appropriate actions.

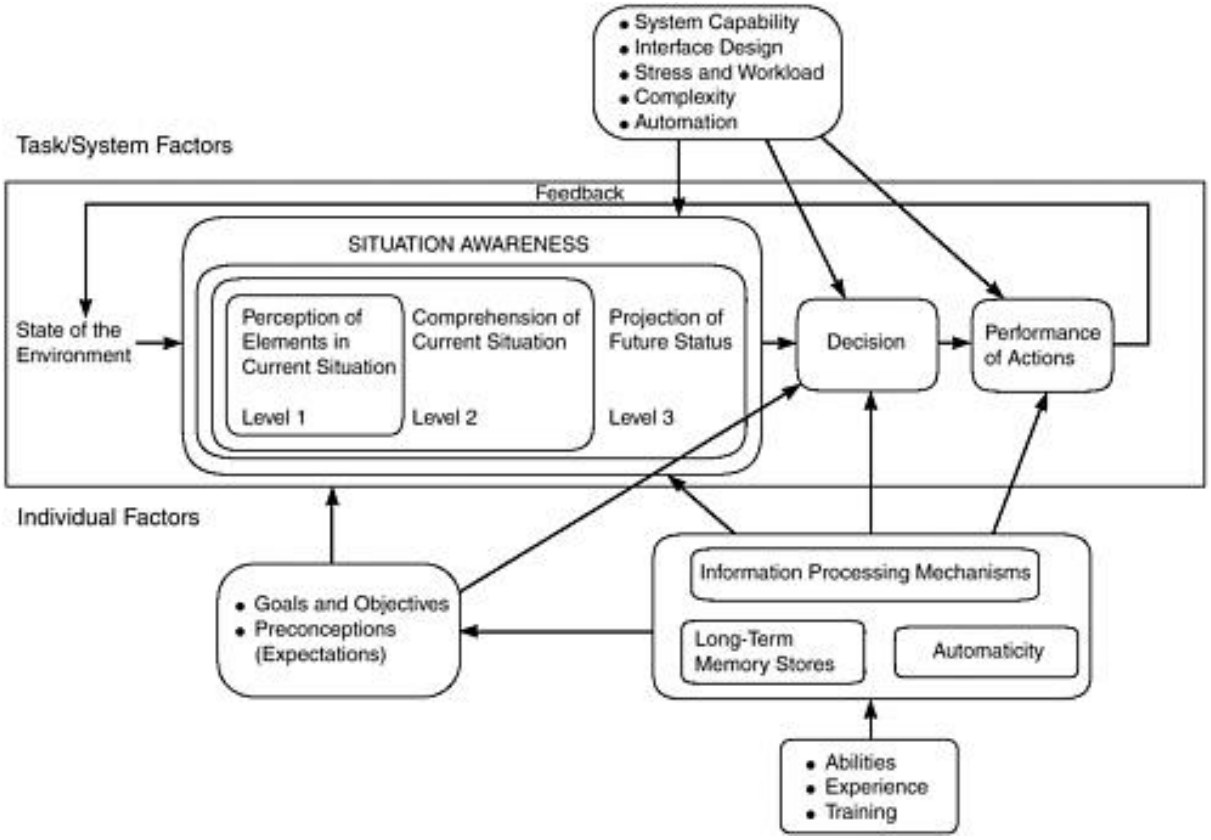


*Figure 4 Generic decision-making model centered on the situation awareness process (Endsley, 1995)*

# 2. Material and method

## 2.1 Working method

As an introduction to the thesis DNV recommended the use of a working method called Scrum. We chose to adopt this method in our work. The goal of Scrum is to have a simple framework that can optimize product development. Scrum is often used in software development and in programming but is effective in other lines of work as well. The framework is based on development and deliveries in short iterations with a fixed length, in our case fortnightly. This period is called a sprint. This is shown in figure 5. We only commit to what we plan for the short term and will show this at the next meeting (Glasspaper, 2021).

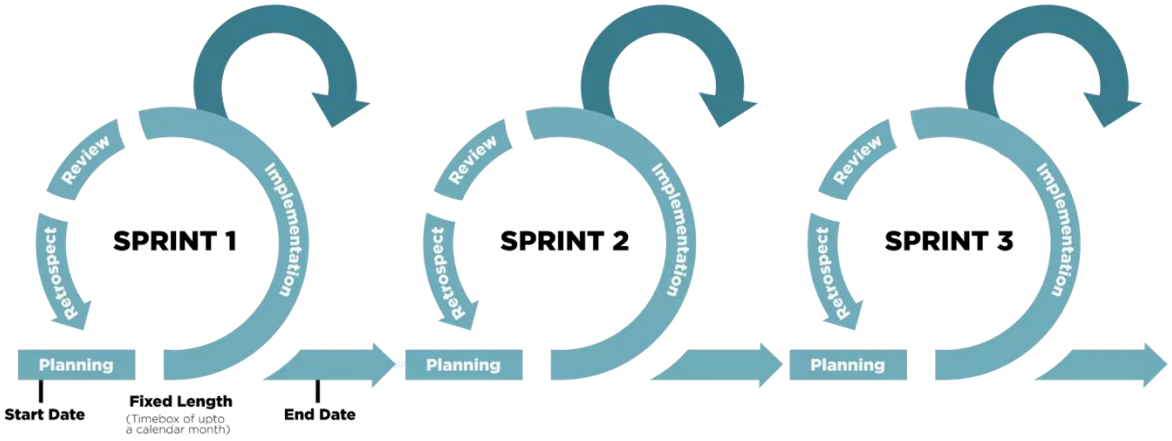


*Figure 5 - Scrum-process (Downloaded from visual-paradigm.com)*

According to Glasspaper (2021), Scrum is based on the idea of solving problems in self-directed teams of appropriate size. A scrum-team works closely together and has frequent smaller meetings during such a period. In every scrum the team meets and inform each other about what has been done, what to do and most importantly what they have trouble with. The point is that the team should be able to help each other, and that there should be an open dialogue between all group members. During the sprint the team finish task by task. When starting a new sprint, it is important that you believe you can achieve what you have planned. To achieve this, you need peace of mind, but also limited dependence on others to succeed.

High quality is central, and it is therefore important that the team together define the term "complete". According to Glasspaper (2021), this will make the organization work better. Frequent meetings will give the team-members feedback frequently and can therefore detect poor quality early. This continuous learning highlights problems, which can increase productivity. A leader is important for a team to function, and in this case, it is a scrum-master. This person controls the meetings and makes sure that the progress is good enough.

The Scrum has improved the progress of this group, especially in the early stage. It took some time to implement, as this was completely new for the group. Eventually it became a good tool to get a better overview of what was done and what had to be done. Additionally, Scrum creates an external motivation because the whole group can see your progress. Therefore, you feel that you should complete the tasks given, which speeds up the process. In our group there were room for failure, this made the Scrum work as a working method.

## 2.2 Data collection method

To gather information this thesis is based on a qualitative interview method. A qualitative interview method gives a more in-depth knowledge about the situation and a bigger possibility for the interview object to state their own opinion. It gives a bigger picture about events, opinions, assessments, and own statements than quantitative interviews. A qualitative method is easy to use as a supplement to the rest of the base information as well as a main source of information. This supports the goal of this thesis as it is not necessary with a lot of different sources, but a deeper knowledge from each source (Uio, 2021).

The interviews are formal with the use of an interview-guide (see appendix) with written questions and options for different outcomes of the questions. Every different party using the deck log book have their own use for it. To get the most accurate information there were used two different interview guides. One was for the people operating on board vessels, the other one was for people working on shore.

Quantitative research gives countable data or "Hard data" according to Larsen (2017). Countable data in the form of "How many sailors use the deck log book daily?" is better to get through an online survey, to reach out to as many people as possible. As this thesis focuses on

specific scenarios and more in-depth opinions, an online survey would not produce appropriate data.

Gathering information from fewer sources can result in biased opinions. To counter this, interviews from different parts of the maritime sector is necessary. The different parties in the maritime industry are henceforth called stakeholders. A stakeholder is a party that has an interest in a company and can either affect or be affected by the business, according to Jason Fernando (2021). Typical stakeholders would be customers and suppliers but can also be communities and governments. In this thesis we chose the stakeholders based on what appears in the Regulation. In the Regulation´s Chapter 4 § 15 it appears that an entry regarding any event and circumstance occurring with "the knowledge of which may be useful to the authorities, shipowners, cargo owners, insurance companies or others having a legal interest in the voyage" shall be made in the deck log book (Sjøfartsdirektoratet, 2018).

By keeping the interviews anonymous in the thesis, the persons being interviewed are more likely to express their own opinion as this means less possibility of any recognition. Keeping the interviews anonymous gives us the opportunity to log the data without breaking any privacy laws after publication. During the process of choosing our method we found that the most purposeful way to get a precise transcription, was to record the interview. According to the Personal Data Act, the one in charge of the data processing shall: "(…) implement suitable technical and organizational measures to ensure and show that the process is in accordance with this act (…)" (Justis- og Beredskapsdepartementet, 2019). Because of the recording we had to apply for a permit from NSD. This is mandatory to comply with the General Data Protection Regulation (GDPR) for keeping personal information from the interview objects during the writing process.

In order to make the interview guide as comprehensive and understandable as possible, without asking unnecessary questions, the guide must be tested. This test can be called a trial interview. During and after the trial interview the person doing the interview will get some practice and any flaws or deficiencies will be uncovered (Dalen, 2004). The test subject is an experienced captain who is now retired but still sail every now and then. This is an optimal subject as he has sailed his whole life and has used the deck log book over a long period of time. Thus, he has insight and knowledge to answer the questions in the same manner as the "real" subjects.

## 2.3 Interview process

This study has evaluated how important the deck log book is in the industry, and different users of the deck log book were therefore chosen to be interviewed: A navigation officer, two captains, three insurance claims executives, one HSEQ, one maritime lawyer and one technical supervisor. The different users had different backgrounds and experiences, this is somewhat representative for different opinions that resides in the maritime industry. This will give us more insight on different opinions.

| "NAME" | INTERVIEW TYPE | INTERVIEW DATE | INDUSTRY |
|---|---|---|---|
| Informant #1 | Individual | Spring 2021 | Captain |
| Informant #2 | Individual, phone call | Spring 2021 | Insurance |
| Informant #3 | Individual, phone call | Spring 2021 | Chief Officer |
| Informant #4 | Individual, phone call | Spring 2021 | Captain |
| Informant #5 | Individual, Teams call | Spring 2021 | Shipping company |
| Informant #6 | Group, phone call | Spring 2021 | Insurance |
| Informant #7 | Individual, phone call | Spring 2021 | Maritime lawyer |
| Informant #8 | Mail correspondence | Spring 2021 | Authorities |
| Informant #9 | Individual, phone call | Spring 2021 | Shipping company |

*Figure 6: Interviews with information including industry*

We used two different interview guides, one for navigational officers and captains and the other for shipping and insurance companies. When designing the interview guide, we focused on making the questions open-ended and easy to be followed up, allowing the informant to speak freely. The interviews were conducted over phone-calls or Microsoft Teams, and were recorded. We also sent questions to one informant by e-mail and got the answers we needed. The data was handled according to GDPR. All the informants permitted to record the interview. This was necessary for us in order to be able to process the interview afterwards accurately. The interview was transcribed afterwards and anonymized when used in the thesis. To gather information from different users of the deck log book, it was important to interview people on shore. In this case managers and health and safety managers were contacted to get an understanding how frequently and how the deck log book was used on shore, if it was used at all.

## 2.4 Validity and reliability

To draw a conclusion from what we want to analyse we have to say something about validity and reliability in our results. (Dahlum, 2021) Validity says something about the relevance the results have to the issue. This thesis has focused on the use of the deck log book in various Norwegian environments. This means that our results are only representing one part of an international industry. This can have an impact on the validity of the study on an international scale.

Validity is divided into three different sub-categories concerning *confirmability*, *credibility,* and *applicability*. Confirmability is about gathering the data that is relevant for our issue. To consider the conclusion as valid, the questions asked must give answers to the issue, and not something else. Credibility says something about whether the interpretations of the results are valid for the reality that is studied. Applicability is important in a quantitative research because it intends to transfer the results to other groups than those asked. The informants in this thesis are representing different parts of the maritime industry. This strengthens the credibility in the results and the applicability to the rest of the maritime industry (Larsen, 2017).

Validity is about the extent of usability of the material. Validity is divided into two sub-categories. We talk about external and internal validity (Dahlum, 2021). Confirmability, credibility and applicability can be compared with the distinction between internal and external validity. Internal validity says something about whether it is consistency between the findings and the theoretical framework. External validity says something about if the results can be transferred to a greater context than the embrace of the study by generalization (Larsen, 2017).

Reliability is the other consideration to include in a quantitative study. Reliability explains the accuracy of the research. Reliability in a quantitative research can be tested by performing the research several times by different scientists, where the same conclusions will indicate a large extent of reliability. To ensure high extent of reliability can be hard in quantitative studies where a lot of interpretations of the results are the basis for the conclusion (Larsen, 2017). For example, the interviewee could become influenced by the situation and the interviewer. This thesis has included nine informants to the basis of the research. This might affect the reliability of the answers and therefore also the study. The maritime industry consists of a huge number

of potential informants and only a few of them have been interviewed. However, our aim with this thesis is to gather and present a general opinion of deck log book. Therefore, we consider the reliability to the results in this thesis as sufficient. This is because we experienced the same attitude among the different informants.

# 3. Results

To get a better understanding of the main issue, and to answer it properly, we made three research questions. The data collected with this methodology is presented in this chapter. The research questions are together meant to give an answer to our main issue. The collected data concerning these three questions is therefore gathered and presented systematically in this chapter, and the data is to be further used in the discussion chapter later in the thesis.

The chapter addresses the following three research questions and the main issue:

1. Which columns are important?

2. Is it possible to use the information from the deck log book?

3. Which stakeholders are interested in the information?

The main issue:

- Is the deck log book useful?

The research questions are answered with both recapitulations and citations from the different interview objects representing different parts of the maritime industry.

## 3.1 Which columns are important?

This research question is aiming to find out which of the information being useful. Additionally, which is less useful.

When interviewing the navigators, it appears that the use of the deck log book onboard varies. Some hardly use it, and some use it more. This varies from shipping company to shipping company, but also within the shipping company. Common to all is that none of our interview objects uses it completely. There can be many reasons for this, but what emerges in our interviews is that today there are other systems where such information is entered. This

information is also often passed on to, for example, customers and the shipping company. Once this information has been documented one place, writing in the deck log book can feel like double work. The navigators also experience that there is not enough time, and that the deck log book comes last. It is described by several interviewees as a "necessary evil". It is not the deck log book itself that takes so much time, but it is the total of all the paperwork onboard that becomes too much and makes the deck log book come last.

It may seem that the navigators select the information they are to write in the deck log book and chooses the information they consider the most important. This is often the information that has not been entered anywhere else. Information often noted is departure/arrival, passing of objects and miscellaneous. In addition, it is usually noted if the weather is bad, as this can lead to damage to cargo. This is all about having sufficient documentation if a litigation should become relevant. When asking if these notations make them more aware of the conditions, there is a small gap between the answers:

*"No, absolutely not"* Informant #4
*"No"* Informant #1
*"A little bit aware"* Informant #3

This gap can be caused by different amount of experience and confidence. As the quotes tell, the notations in themselves do not make the navigator more aware of the surroundings.

The information from the interviews shows that internal reports are becoming more and more common, and these may take over some of the documentation that previously was found in the deck log book. It is also mentioned that after ECDIS was approved as a complete electronical chart solution, there are many good position-confirmations. It may be perceived as unnecessary to confirm the position in the deck log book as often as they used to before ECDIS came along. Common to the interviewees is that everyone feels they have to write in the log book, because of the law.

*"For our sake, we only do it because of the law"* Informant #4

It is therefore noteworthy that deficient documentation in the deck log book hardly is noticed in audits, neither internally nor externally. One of the interviewees mentions that one can get

remarks on internal auditing, but that is often not done. Another interviewee has experienced that a remark was made on an external audit, but this will depend on who performs the audit. It is therefore conceivable that the perception of the importance of the deck log book varies, and a common understanding is lacking. Deck log books that are not sufficiently kept are approved, and this can undermine the importance of keeping a correct deck log book.

From the interviews with the navigators, it appears to them that the shipping companies hardly use the deck log book. During the interviews with the shipping companies they also confirm, on behalf of themselves, that they hardly use the deck log book in their daily work.

*"It is being used maybe not enough or wrong as it is now, but the shipping company does not use it at all."* Informant #9

The informant talks about it not being used a lot on board the ships and that the shipping company does not use it at all.

The information that may be in the deck log book is also available digitally. Electronic systems are becoming more and more implemented in everyday life onboard, and the deck log book is therefore used less. One of the interviewees describes it as a bit old-fashioned and ready for replacement.

It is said by several interviewees that the deck log book is used for documentation in the event of an unwanted incident. It therefore became important for us to interview experts in the field, in this case it is insurance companies and lawyers. From these interviews it appears that the deck log book is less important in such cases. It is usually electronic systems that are used and become decisive evidence. The importance of the deck log book is declining, and today it is much more important to analyse AIS and VDR than to analyse the deck log book. In fact, they can never sign a "statement" until it has been checked against VDR.

It is worth to mention that the deck log book is still functional as a back-up, and there is also column 23, "miscellaneous", that can be of importance. An example of this is in bad weather when the crew have checked on the cargo during the voyage. This can help the crew and shipping company in a possible lawsuit. If this is documented, it is a more immediate evidence compared to someone saying it in an interrogation several days later. In addition, it can be

difficult to perceive the change of roles on a VDR, especially in situations where not much is said.

As a summary of the interviews, it can be said that it is column 23, miscellaneous, that is the most interesting in retrospect. In some cases, it can also be important to figure out who is on duty, if this cannot be concluded with the VDR. Apart from this, the deck log book has no special significance. Weather, wind, course, and speed written in the deck log book are not that interesting when it is registered without any assessments concerning the circumstances.

## 3.2 Is it possible to use the information from the deck log book?

If a column is important, it is essential to consider whether the information can be used. This research question addresses the relevance of the notations in the deck log book and whether they are useful in different situations. To answer this question several interviews were conducted.

Much of the information from the deck log book is found elsewhere. According to the lawyers and insurance representatives the information found in the deck log book is still relevant and valid. The deck log book is still counted as a Contemporaneous evidence and is presented in court in almost any dispute. However, all the information from the deck log book is originating from somewhere else or is noted or recorded somewhere else as well.

*"The deck log book is a little old fashioned. It is ready for replacement. (…) Everything that stands in it can be found somewhere else."* Informant #9

The positions are logged in the ECDIS or via the AIS. One can receive weather information from for example metrological institutes. The course steered, the speed and even voice recordings of the bridge is stored in the VDR. All the measurable information in the deck log book can be gathered from other sources. Additionally, the information is often more elaborative and fulfilling, and easier to attain, as it is digital. All the informants mentioned that important information can be found somewhere else, and that they use other instruments to acquire the necessary information, not the deck log book.

None of the interviewed officers said they ever looked in the deck log book while sailing to find necessary information for the voyage. Several talked about reading out of curiosity or checking how others filled in the deck log book. But none searched for information that could either improve the safety or the situational awareness, for that purpose they checked other instruments or logs.

*"No, not really, but I check that the opposite shift does it correct."* Informant #4

The personnel responsible for the deck log book on shore rarely even look at the deck log book. In some internal revisions the deck log book is checked, but then it is only made sure that the notations are noted correctly according to regulations and that important incidents are noted. Otherwise, the personnel on shore stores the deck log book when it is complete, and a new book is on the ship. The deck log book must stay on the vessel for a minimum of two years and then in the company's control for a minimum period of three years (Sjøfartsdirektoratet, 2018). After that they do not have to keep the deck log book anymore. And for companies with a large fleet, keeping the log books takes a lot of space. As informant #5 tells us: They have had Unisea for over a decade and the information is still stored in the system. Unisea makes it easier to see a trend for more than just five years. It is also easier to access the information as it is on a digital platform and somewhat searchable with the possibility to make charts and diagrams. Although very comprehensive, not all the information from the deck log book is logged in Unisea. The problem now is that there are several different systems that overlap each other which creates a lot of double reporting. As the deck log book is in paper format on many vessels it is not "compatible" with all the digital solutions out there.

*"It is first when something has happened that one goes back and see: 'wow, it is lacking a lot of information, we should have written that down.' Then we are back to the VDR, we checked the VDR and got all the «missing» information."* Informant #6

As our interviewee tells us here, much of the important information that should have been in the deck log book is often forgotten or written a while after it happened. The deck log book is first of all a log. Something that has happened. Therefore, almost all the information is irrelevant for the officer on watch to ensure a safe voyage.

*"Not everybody has come as far as us (…) I have personally gotten a fine if the deck log book is not correctly written, many use that way to get a little income. If you arrived with a ship with everything electronic, I don't know if some countries would accept it."* Informant #5

This thesis is focused on how the deck log book is being used among Norwegians in the maritime environment, but as our informants keep reminding us the maritime industry is an international industry. To summarize the research question: "Is it possible to use the information from the deck log book?" Yes, it is possible. However, alle the information written here can be found in other systems. The insurance companies and the legal section are the most frequent users of the information from the deck log book. As the informants from this section depict there is not that much weight on the information from the deck log book, as it is humans who wrote it down, and humans make mistakes. It is only in cases where there is no other system that has this information, that the deck log book is somewhat relevant. But even in those rare cases there are other pieces of information that are more weighted. How the person writes the information in the deck log book indicates more about the situational awareness than the actual circumstances. The actual circumstances are processed by the navigator and written down as his situational awareness which may not correctly reflect the actual situation. This type of information can therefore be interpreted as level 2 (Comprehension of the current situation) in the situational awareness process, explained by Endsley, Mika (1995) as shown in figure 4 (p.20). The most relevant information today is level 2. However, the intention of the deck log book is to record level 1 (Perception of elements in the current situation). To understand how or why the accident happened it is important to know how the navigators understood the situation they were in. Did they know that it could go bad? Or did they think they had control? When did they realize they had lost control of the situation? If information considered as level 2 is noted in the deck log book it could supplement the VDR in the aftermath of an incident.

Who has in any case use of this information? Who wants this information? This will be discussed in the next chapter.

## 3.3 Which stakeholders are interested in the information?

*"Whoever benefits from the deck log book is generally everyone who has an interest in the ship´s movements and operations at the relevant time. But it is primarily used as a document after something has gone wrong."* Informant #2

This research question addresses who the deck log book is relevant for. The deck log book contains a lot of information concerning the operation of the ship. One of the main reasons we are addressing this question is to find out what information stakeholders are interested in. We wonder to what extent the information is obtained from the deck log book compared to the other sources of information.

To find out which stakeholders that are interested in the various information from the deck log book, we asked them what information from the deck log book they see as relevant for their work. Different answers were given showing us that some did not use the deck log book and its information at all, while others did. Figure 7 shows a map of the stakeholders and how they use the information.

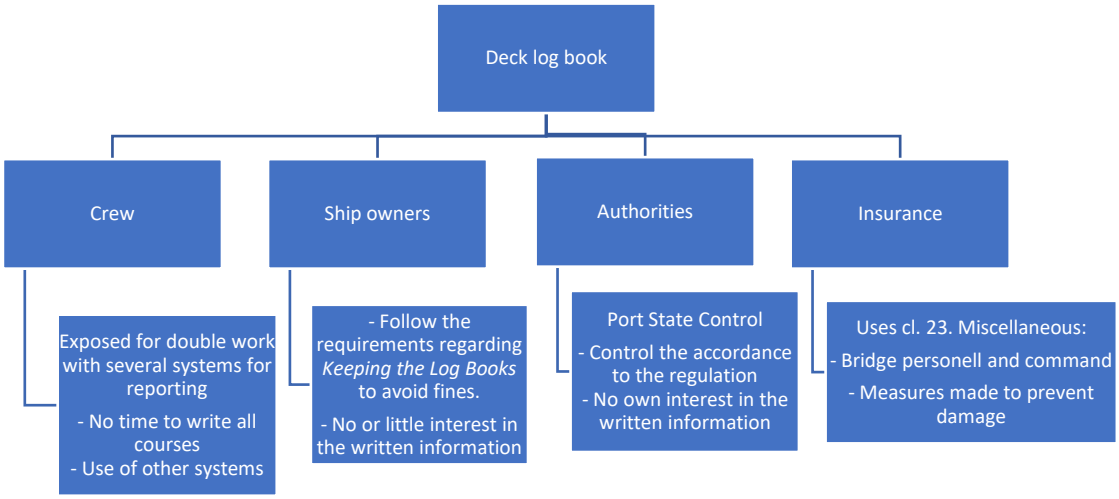


*Figure 7 Map of institutions involved with the deck log book*

*"I use position and weather observations. The rest is irrelevant. The rubric for courses is only used once during each watch. We have not got the capacity to write all the courses we sail along the coast. This is something the authorities remarks."* Informant #4

The captain behind this citation explains how the rest of the information he writes in the deck log book is irrelevant for him, except from position and weather observations. Furthermore, he also mentions that the authorities give a remark when the deck log book does not contain all the information that is described in The Regulation. This brings us over to the authorities as another stakeholder.

The Norwegian Maritime Authorities is the authority in Norway that enforce rules and regulations related to the maritime industry. The NMA have supervisory authority that includes inspection and auditing to ensure compliance with the Regulation. They are the ones to carry out inspections onboard ships, hence they are regarded as a stakeholder in this context. The NMA explain that they control the notes in the deck log book and that same are written according to the instructions given in the deck log book and in The Regulation. In addition to this, the NMA say that the deck log book does not have any special function during a PSC.

*"The deck log book does not have any special function in conjunction with a PSC. It is, as well as the other log books onboard, inspected and controlled to be in accordance with the regulations."* Informant #8

The NMA also explains that a Port State Control can occur from an incident onboard the ship. They make sure to control the deck log book in that occasion, to confirm that the incident is entered in line with the regulations.

*"In this case, we control that the incident is written in the deck log book."* Informant #8

This saying tells us that the NMA, as a supervisory body, follow up that the deck log book is kept in accordance with the regulation, as a matter of routine only. During the interview, they do not state that they use any of the information from the deck log book for their own interest or work.

Another important stakeholder is the marine insurance industry. A statement from one informant from the marine insurance industry explains the process of collecting information after the VDR has been established in business this way:

*"One must admit that after ships have VDR installed, one does not go and retrieve information in such incidents from the deck log book."* Informant #6

With that said, the marine insurance companies use the deck log book, partly because it exists, and therefore they are considered as an important stakeholder. From the marine insurance perspective, they use the deck log book as a tool after an incident has occurred. They consider the actions that were made to prevent the incident from happen and therefore they need all the information they can get. However, the marine insurance industry is often represented in the courts where the principle of contemporaneous evidence is important. This means that the marine insurance industry is conscious in having the notes written early after the incident rather than having it presented in a statement several days later. The deck log book is therefore an important source to information from the events that occurred; *"therefore it is important that the events are actually written down."* Informant #6

The informant also adds that information concerning the personnel represented on bridge and who is in command is both potentially very important pieces of information for the outcome of the case, and therefore information the insurance company want from the deck log book. However, the informant also discusses whether the person in charge of the navigation should focus on taking notes at the expense of the focus on safe navigation of the ship.

The informant therefore explains how the VDR, in many of the cases the marine insurance industry is facing, is an important tool for bringing out the actual facts from the situation. The VDR is used to find evidence to allocate the right amount of blame to the different parties involved in a potential incident.

*"(…) But then again, we are back to the VDR, we play it and hear all these things. Therefore, how much do you actually need to write down today, when everything is stored electronically?"* Informant #6

Furthermore, the informant points out the principal in navigation concerning to plan ahead of the voyage.

*"(…) when you write a position, you write it after it is already passed. You would rather stay ahead of the voyage, by thinking of where you are going to be in three minutes, and not spend time on writing where you just were a minute ago. This might be unnecessary focus (…) specially with all this new technology taking notes on the exact position at all times."* Informant #6

On the other hand, the informant tells us that the different measures that are made based on the considerations are important information for the outcome of the case. Information of the measures made following the considerations is not registered by any system but will still be important to bring out for the investigation.

*"As with everything else, many people will consider the deck log book as less important, but when something has happened you must have written down what´s important. At that point it is important. But then again, it is column 23 that is important to us. Let´s say that you are out in bad weather, and you therefore consider it as necessary to reduce speed and might also change course. It will potentially be important to note in the deck log book why these changes were made. These notes might be important later in relation to the charterer when the ship arrives later than planned. Also, if there is a damage to the cargo, notes on what have been done to prevent this damage in advance will be important to help you out in a dispute against the cargo owner."* Informant #6

The insurance executive does repeatedly stress the importance of writing why measures have been made. This may strengthen the case in any dispute to follow. It also emerges during the interview how column 23 is the most important column for the insurance industry.

*"The fact that you have changed course to up wind, reduced speed and done inspection of the cargo must be written in the deck log book."* Informant #6

Another informant from the industry presents his perspective on the deck log book, where he also incorporates the importance of writing down the measures. He points out the "comments"

that would be of interest for the case. However, he also adds "*if* there are any" indicating this not always being the case:

*"(…) The importance of the deck log book is falling in general, and it has lost a lot of its significance because of the new solutions. But as a backup it is still ok and it is still of our interest what comments that are written, if there are any. And if this is written down immediately this can give more contemporaneously evidence than something someone fires off in an interrogation three days later."* Informant #7

During the interviews we noted how the marine insurance industry points out the "if" several times. Besides, the same attitude concerning the decreasing importance of the deck log book as a source to information, was also clearly present with this informant.

From the interviews we got the understanding that the shipping companies use the deck log book to no extent. They store it because the Regulation demands so. They have implemented other systems such as Unisea, FleetManager etc. to satisfy their need for information from the ships.

*"From the shipping company's side, it is not used at all."* Informant #9

This statement is not representing the whole shipping company industry but may indicate how they look on the need of the deck log book as it is today.

## 3.4 Is the deck log book useful?

This is our main issue and main question. The research questions were made with the purpose of addressing this very issue. It is an issue several people have thought about, and every interviewee had an opinion about it. The result will be presented here, and further discussed later.

*"The deck log book is a necessary evil."* Informant #1 and #4

Two captains who have worked at sea for a long time both referred to the deck log book as "a necessary evil". These two don't know each other but both answered the same when we asked about their relation to the deck log book. They continued with how they understand that it is important to write properly and clearly, and that it is an important document. The question is whether the deck log book has any positive effect on board.

*"But it is a legal document. Though everything in ISM is a legal document, checklists are also legal document. But the deck log book is legally binding in a totally different way, but how important is it? Is it only because it is legally binding? Does it have so much value and meaning in the big context? Then I would almost say no, that it is less meaning and more in the sake of nostalgia that we hold on to it."* Informant #6

This explains a lot of the mentality as we have understood it during our interviews and our insight in the maritime industry. The deck log book has been important for a long time and it has always just been there. It is, as the informant mentions, a legal document and it is used because of that. But should it be a legal document? Everyone we have been in contact with explains that they use it because it is the law and if they do not use it correctly there will be consequences. During the education to become a licensed officer there is a focus on how to write and note in the deck log book correctly to satisfy the regulations.

*"The deck log book is basically for keeping your back clear."* Informant #3

Informant #3 mentions why some of the navigators do make notations. It is not necessarily for their own sake, but as he points out, it is to keep their back clear.

*"We used the deck log book and it was the most important book on board. When I started sailing I had a captain who always said: (…)'Everything that stands in the deck log book is to be true, but that doesn't mean everything that is true should stand in the deck log book."* Informant #5

Many of the officers and captains who have used the deck log book their entire career has this mentality. They understand that it is necessary to log what they do, but they are also aware that everything they log is a piece of evidence. This could make them hesitate to write essential information when it might be misinterpreted or controversial.

*"Interviewer: How does the deck log book stay true to its purpose?*
*Informant: Soon it has no more purpose, there is no benefit in it. Everything you write can be checked. It is soon unnecessary. If there are other incidents on board I make a note in the deck log book."* Informant #1

As so many of the officers we have talked to, this captain does not see any use of the deck log book as it is today. Most of the officers we have talked to have not used an electronic deck log book. But how the regulations are the electronic deck log books contain the same information they are just more time efficient when you do your notation, and they are available online.

# 4. Discussion

The following chapter will discuss the three research questions and the main issue: “Is the deck log book useful?” Using the results from our interviews and the theory to answer the questions, this chapter creates a basis for answering the main issue.

Figure 8 shows the columns in the deck log book and the important columns is marked with yellow. The columns marked with orange, show where you can find the information that should be noted in the deck log book. With this we try to simplify what we have found out with our interviews and with the theory of which instrument is used to get the information for each column. This table is meant to visualize how information is logged in several different systems, see column “other systems” in figure 8.

| Column | Information | Notations | Other systems |
|---|---|---|---|
| 1 | Visual inspection of running lights carried out | Time of inspection by eye | Checklists, Unisea and similar |
| 2 | Look-out set and taken in at | Time of look-out and place | Checklists, Unisea and similar |
| 3 | Fire inspections | Time | Checklists, Unisea and similar |
| 4 | Other inspections | Time | Checklists, Unisea and similar |
| 6 | Ship's time against GMT | Relation to GMT: -1, +2 etc. | |
| 7 | Ship's time | Time of entry | |
| 8 | Wind dir. and force | Uses own scale | Meteorological services |
| 9 | Weather and sea | Uses own scale | Meteorological services |
| 10 | Barometer and temp | Barometer pressure and temperature | Meteorological services |
| 11 | Gyro or steering compass course | Used to control both compasses | VDR, ECDIS, AIS |
| 12 | Error or dev. | | Deviation and error tables |
| 13 | Standard compass steering course | | VDR, ECDIS, AIS |

| | | | |
|---|---|---|---|
| 14 | Dev. Standard compass | | Deviation tables |
| 15 | Magn. Variation | | Charts |
| 16 | Corrected standard compass course | | ECDIS, Radar |
| 17 | Drift not caused by current | | ECDIS, Radar |
| 18 | True course sailed | Is the important one. True course sailed or corrected gyro compass course. | ECDIS, Radar |
| 19 | Log reading | Log reading | Log reader, ECDIS |
| 20 | Corr factor = Distance | Percentage error and distance in nm | Log reader, ECDIS |
| 21 | Fixed bearings and other information | Note of position, often noted by longitude and latitude, but should be noted as bearings when possible | GNSS receiver, ECDIS |
| 23 | Miscellaneous | Note relevant information, according to the Regulation §15 | |

*Figure 8 Information contained within the columns of the deck log book*

## 4.1 Important columns

There is a big difference between doing something just for it to be done and doing something to raise awareness or to double check that systems are working as they should. It seems like the officers are writing in the deck log book just to please the regulations, instead of doing it for their own safety. There can be several reasons for this, but it is conceivable to think that the officers might feel that they get enough information from the navigational systems to get a good situational awareness. Writing in the deck log book is therefore done just because they have to, not because they feel the need to do it. This leads to the deck log book being less used than intended.

What appears in the interviews is that column 23 is of great importance. A good example of this is, as mentioned in the result part of this thesis, in bad weather when the cargo has been damaged. In a possible lawsuit, this column can help the crew documenting their work on board, such as measures made to prevent damage to the cargo. Additionally, it can sometimes be important to establish who was on duty at what time, especially if this can not be concluded with the VDR. From our interviews it appears that the column 23 should be kept in some form. The question is therefore whether some of the other columns can be revised or even removed.

The information that is registered by other systems, as seen in figure 8, is among others: course, sailed distance, weather, wind and position. What is the purpose of writing this in the deck log book? One can say it is as back-up, but is this information so important that it needs to have a back-up? Today vessels are equipped to withstand blackouts for several hours afterwards. This means that the ship is also monitored after a possible black-out, which weakens the argument of using the deck log book as back-up.

When it comes to the column containing the ship`s course, this should be taken either from the gyro compass or the magnetic compass. If this is done correctly, this column can be used to cross-check that the gyro compass, magnetic compass and compass-solutions show the same. This can make the navigator aware that something is wrong, and the navigator can avoid a potentially dangerous situation by fixing the problem early. Nevertheless, if this column is not used correctly, it is hard to see any particular benefit from it. Additionally, to this column there should also be written a "steered course". To figure this out, it is normal to use the ECDIS and find course over ground. Although this gives the navigator a better understanding of how the ship sails, it is still conceivable to think that he gets a worse situational awareness, because he was preoccupied. The question is whether this column has any value when it is copied from the ECDIS. If this can make the navigator more aware of the situation and how the ship is reacting on external forces, it has value. If it does not make the navigator more aware of the situation, it is hard to see any other value than back-up.

On the columns where the navigators are supposed to write the sailed distance and position, the navigator finds all of this information on the ECDIS and write it directly into the deck log book. If the navigator copies the coordinates from the ECDIS, the column loses its purpose. This column should be used to find a location reference with the radar to double check that the ECDIS is showing the correct position. About the column with the sailed distance, it is hard to see any other value than back-up. And if the position is taken from the ECDIS, it is the same for this column.

The columns concerning weather, sea and wind can potentially make the navigator more aware of the situation. But according to our interviewees who were asked this question, it is not necessarily so:

*Interviewer: "Do you become more aware of the weather, sea and wind when writing it in the deck log book?"*
*Informant #4: "No, absolutely not."*

It should also be mentioned that this column, combined with position and time can be important if there are any damages to the cargo. For example, if the weather is worse than the forecast predicted or if the weather suddenly changes for the worse. One can then prove that the damage to the cargo can be caused by the weather, and then write in column 23 what the crew did to prevent same.

To answer the research question; "what is the most important columns?", it is the columns 23, position, time, and weather we find as the most important columns. The rest of the columns could be used as back-up, but our interviewees find it hard to see any specific value other than this. Reading information on a screen and writing it in a book, does not seem to give any improvement to the understanding of the situation.

## 4.2 Relevant information

When the deck log book was made, every column was important and was used both to ensure a safe voyage and to clarify what had happened after an incident. Over the last few decades, the use of technology on board vessels has increased. This has caused much of the information being logged twice.

The information has potential to be valuable. However, the weather is being monitored all over the world with more accurate instruments than the human eye. The information can nonetheless supplement the weather monitoring. The same goes with the recollection of events from the officer on watch's perspective. Everything about the course, speed, position etc. is being recorded and logged electronically. But the thoughts and considerations of the officer and other important factors that does not happen on the bridge, will not be recorded other than in the person's memory. A few days after the incident it will then appear in a statement – from the person's memory. This information could be more fulfilling or less, this depends on the person, nevertheless this information degrades over time. The ink on paper decays at a much slower rate, and information put in a computer will remain the same if there is power present.

If it was not mandatory according to the Regulation to enter this information in the deck log book, this could cause it not to be written down at all. As stated earlier, most of the important information is already being automatically logged in an electronic system. Therefore, there is no necessity for the officers on watch to use their time to write down seemingly irrelevant information when they could have focused on keeping the voyage safe.

The main purpose of the deck log book is to record what the vessel has done on the voyage and when at berth. Technology has surpassed regulations in the maritime industry and the deck log book is a sure proof of that. As so much is monitored and stored digitally the deck log book becomes an inconvenience, especially as the competence of the crew grows with the technology. Most crew members know how well monitored they are, and they see that most of the information they write down already is stored on a server or have already been sent to the office ashore.

The purpose of this information is to reconstruct the voyage. The deck log book is a log, said in other words; the information is history and something that has happened. To the crew on board the information is therefore often “old” news. During the training and education to become an officer one learns to stay ahead of the voyage. To be able to stay ahead of the voyage one must know where the vessel is and where it is supposed to go. This is something the officer on watch need to know as it happens. The officer gets this information from somewhere, either by taking a bearing or just reading out the position from a GNSS-receiver, then he does any changes or preparations for what to come. After all this, he then writes in the deck log book. Thus, this information is irrelevant as an aid to stay ahead of the voyage, and he must collect new information and begin the process again. The information is not usable to enhance the situational awareness.

The next chapter will go further into whom might be interested in the information that is in the deck log book. Among them are insurance companies and the courts after an accident or bigger incident. Then this information is usable and interesting. The only thing standing in the way is all the other instruments that are more reliable than humans. Recordings of voice from the bridge is much more reliable than something the person using this voice has written down. The navigator could either write in the deck log book or use the time to avoid an incident. Therefore,

the human factor plays a big part where he could have remembered it wrong, written poorly, used wrong words or simply forgotten to write it down.

Not everyone has access to as fully equipped bridges as the case often is in the Norwegian part of the industry, especially the offshore segment. However, even the smaller vessels around the world is getting more and more technological. Any changes around regulations and requirements should look ahead and not wait for everyone to reach the same level of effectiveness. The rules should rather incentivize further progress and include both "worlds" and be of help to all and not to be of hindrance.

The reusability of the information in the deck log book is when you look on what happened and when trying to find out why it happened. And as the technology advances and the maritime industry embraces it the deck log book has to adapt. When fully automated ships are operated without human personnel aboard, shouldn't they have the same rules and regulations as ordinary vessels? Then something should be done with the rules and regulations regarding the deck log book. This example will not come to pass before several years. Yet the soon-to-become-operational vessel "Yara Birkeland" is supposed to be operated fully autonomous by 2022. There is no need to wait until the technology has surpassed the deck log book to then react and change. It is better to act and stay ahead of the technology with the ability to form the future. New technology has changed the way different stakeholders gather the information they need, and it is therefore important to explore which stakeholders that still want this information.

## 4.3 Stakeholders

Several of the stakeholders addressed in this thesis presents the deck log book as something that is not needed anymore. Furthermore, it appears that many of the different stakeholders also use the deck log book to more than just to follow the regulations. Therefore, we have discussed if the parties we thought of as stakeholders in this case need this information for their work.

### 4.3.1 Crew

To start with, we put the focus on the crew. We can read how one of the captains uses the columns in the deck log book containing position and weather. He might use this to be aware of the situation that he finds himself and the ship in. For the person in charge of a ship and the

safe navigation during the whole voyage, the situation and right situational awareness is important. To gain the right situational awareness people use different techniques. In this case the deck log book might be a part of one of them.

However, he might also be using these columns to get his deck log book approved by the authorities. If he does not use the deck log book to gain a better situational awareness, to increase the safety of the navigation or make the voyage more effective, but just to get approval from the authorities, the captain is not what we would consider as a stakeholder. The way the captain uses the deck log book might therefore be entirely to satisfy the authorities' requirements.

On the other hand, a fresh chief mate told us he uses the deck log book to keep his head busy during the night shift. This might play a role when talking about situational awareness. For his matter, the notes in deck log book are something for him to do and a way of staying focused during the watch. However, this is again an example of a personal preference. The chief mate uses the deck log book to increase the control and situation awareness of his own voyage. Even though this chief mate uses the deck log book more active, he also adds that the notes is a part of double work. This may indicate that the information he writes to keep his head busy during the watch is most for his own purpose rather than keeping up with the regulations.

Based on the examples above, the crew is not considered as stakeholders in this thesis.

### 4.3.2 Authorities

The authorities enforcing the regulation are also among the parties that we considered as stakeholders in this thesis. We expected that during inspections, the NMA used the information from the deck log book to keep some sort of statistics for own use as a maritime authority. This seemed to be wrong, as one informant from the NMA stated the deck log book "does not have any special function in conjunction with a PSC". Their role as an enforcement body makes them a necessary part, but not as a stakeholder that is interested in the information for further use.

Furthermore, when an incident has occurred, the authorities also check that it is written in the deck log book. This may be a cross check to see whether the crew are used to write down

happenings that may be investigated later. If there are no entries, this may indicate that the crew do not keep up with the regulations to the full extent, as they are supposed to do according to the instructions.

With this statement in mind, combined with the fact that the authorities´ task is to enforce the regulations, we find it hard to name the authorities as stakeholders in our thesis. With no, or almost no need for the contents in the deck log book, the authorities will not be considered as stakeholders. The information we got from the NMA indicates that their role would have been a considerable minor part or not existing at all, if the deck log book as we know it would have been changed and the need for physical inspection of the notes would have been gone. This might also reduce the cost for the customer being inspected.

### 4.3.3 Marine insurance

The marine insurance industry is another part we considered as an important stakeholder. Our consideration based on the insurance industry being a part gathering all available information from the ship and its surroundings after an incident has happened. This is also confirmed through the interviews presented in the results in this thesis. What is interesting is that informants from the marine insurance industry tells us how they use the deck log book, because it exists.

It appears to us that the deck log book is a source used by the marine insurance industry when the requirement to the contents is fulfilled. Something they do not take for granted, and therefore they do not consider it as a vital source today. This is, as they tell us, because they have other sources to get the exact information from, most importantly the VDR.

However, they do point out their interest in in the comments written by the officers on watch. What the officer has considered as necessary to do, and why it is important, is explicitly important information for the insurance executives. And, they say, this is something they get from column 23 in the deck log book. By saying: “You must have written down what´s important. But then again, it is column 23 that is important to us.” We understand that they strive to get considerations and assessments made, from this column.

Another important issue pointed out by the marine insurance industry is the time spent looking down rather than looking out on the surroundings. Entering information in the deck log book that is important in the moment of the event removes the focus from the most important place, out and forward. However, the industry tells us that they need the information from column 23 in their job, and it does not need to be changed from their point of view. This might be a conflict today when a lot of vessels have digital navigation systems such as ECDIS, AIS etc. that saves the planning, manoeuvres and a lot of the information concerning the navigation. To what extent should the navigator focus on manual notes? Even the insurance companies say that a lot of it is needless information because it can be found in other systems.

The maritime insurance industry is an important stakeholder in this thesis. This is based on how they emphasize the importance of the information not possible registered by electronical devices but written down by the person who has been in the situation and done the considerations leading to the measures.

### 4.3.4 Shipping companies

The shipping companies contacted in this thesis said they only kept the log books to satisfy the regulations and sometimes made sure on internal audits that the crew filled it out correctly. All the information they needed, they got from other systems such as Unisea, Fleet Manager or by sending e-mails to the ship. However, the shipping companies contacted are considered as more technologically advanced, and therefore they might not be representative for the whole shipping industry worldwide.

We have discussed the research questions to get a foundation to further discuss the main issue: “Is the deck log book useful?”. The main issue could be interpreted in several ways, but we have used the three research questions to define the main issue and use them to help understand which way the deck log book could be useful.

## 4.4 Is the deck log book useful?

One of the views that are repeated several times by different informants is that the deck log book is a tool where you write down things you already know and that is recorded somewhere else as well. This makes them feel the deck log book is unnecessary and it causes it to be a

moment of irritation instead of a tool to both improve safety and to record that the things which should be done are done. Now the officers note the bare minimum to not get a remark from the authorities.

Some see it as a “necessary evil”, but then again: Is it necessary? Those who believe it is a “necessary evil” know it is necessary because of the rules and regulations. If those rules and regulations were to disappear, would the deck log book then just be “evil”? Even though we just interviewed a few officers, it implies that there is a general doubt of the usefulness of the deck log book.

As one captain talked about, they barely have time to note anything during their voyage when they sail on the Norwegian coast. Some places the route is narrow, other places there is a lot of traffic, there are also other obstacles that can be of hindrance. This means that the navigator must be on guard if he is to prevent an incident. If the navigator then uses the time to note in the deck log book it would be at the expense of the safety.

It is not always this hectic on the bridge and there is a lot of time to write down the course steered and a position. Especially on other vessels on deep sea voyages. They often have days between each course alteration. The navigators on these voyages have time to write in the deck log book. But how necessary is this? They sail the same course, keep the same speed and the weather does not change every hour. What this can tell us is that when there is a lot of time to write in the deck log book there are not a lot to write. Vice versa, when there is no time to write there are a lot of things that should possibly have been written in the deck log book. This can be somewhat compensated by using a digital deck log book. Most of the digital deck log books currently on the market, however, are just an electronic version of the paper deck log book. You must personally make an entry. It takes a lot less time than a conventional one, but you still have to think of making an entry. You press a button to tell the computer to log this position and the course, speed, and everything else the computer gets from the different electronic instruments. What takes time or is a disturbance is that the deck log book is not where the navigational and steering instruments are. The navigator then has to leave their station and look down in either a book or on a screen to log something which is being recorded by several instruments. There is nothing wrong with the current electronic deck log books, they made the software so it could be approved and be in compliance with the rules and regulations. It is an

improvement from the original deck log book, but is that good enough? It still takes time and attention away from the navigation.

One of the navigators mentioned that he used the deck log book quite often. This was to confirm that the electronic systems were working. Nevertheless, it is important to remember that this is not the main purpose of the deck log book, and this task could easily be replaced by a simple notebook, a checklist, or making it a routine. The same navigator mentions that making entries to the deck log book could possibly help navigators stay awake. This is not the main purpose of the deck log book and could easily be replaced by an alarm-system.

It emerges from the interviews that an argument to keep the deck log book is that it may serve as a back-up. Technology depends on power, and in worst case a ship can lose all of its power. If this happens, an analogue deck log book will still be functional. In an emergency it is essential that the crew take it with them during the evacuation. Possibly it can also be taken out from the ship afterwards, but then it must be in readable condition. In this kind of situation, if the VDR is broken or not sufficient, the deck log book can be used as evidence in the aftermath of an incident.

If the deck log book is used as intended, it should be possible to reconstruct the voyage with the information written in it. What comes out of the interviews is that the deck log book is not used as much as it should, and it can therefore be difficult to use it for reconstruction purposes or as evidence afterwards. What could be of interest is column 23 “miscellaneous” if anything is written here after the ship lost all its power. Nevertheless, writing in the deck log book is not the priority in an emergency, and it is therefore doubtful that much is written down. One can always say that back-up is important, but there should be a better reason for keeping the deck log book as it is today.

As mentioned in the earlier chapters it appears that the only columns which are somewhat usable are the columns concerning the weather, the ship’s time, the ship’s position, and column 23 “miscellaneous”. As the position is logged and tracked in systems like ECDIS, AIS, and VDR, it is irrelevant to write down the position on a piece of paper or in an electronic deck log that could note the position automatically. Most officers write down positions directly from the ECDIS or the GNSS receiver. The only thing is that the officer on watch must control the position with visual bearings and by using the radar. This is something that everyone should

do and that the deck log book might help with. The column in the deck log book where you note the position is made to write down fixed bearings. Fixed bearings are considered as "truer" as the navigators finds this position by using their eyes and more reliable instruments as radar, instead of a GNSS-receiver. Navigators who take bearings do it whether the regulations make them to do it or not. And navigators who does not take bearings, would probably not take bearings regardless of the regulations.

One of the reasons we are pointing out some of the columns as relevant are whether the information is important or not. From the analysis we can find that the marine insurance industry is the only stakeholder that wants the information. And the informants from this industry tells us that they use the information because it exists. From a stakeholder-perspective the deck log book is therefore a tool that is mandatory to use but without significant usefulness.

## 4.5 Possible improvements

There is a need for change, but the question is how this should be done. From our interviews we discovered that the deck log book is being used less than intended.

*Informant: "... I see the importance of the information that is kept in the log book. But it is the total of the paperwork that becomes too much."* Informant #4

It seems like the total of the paperwork is too much overall, and that the deck log book unfortunately comes last. The result of this is that it is not used as intended, and this can cause it to lose its purpose. The question is, if it is not used properly, is there any point of using it at all? From our interviews it emerges that especially one of the columns is of great importance, column 23 "miscellaneous". It turns out the information written in this column is not entered anywhere else. The column is useful for the crew, in addition to stakeholders being interested in it. It is therefore important that this column continues to be on board, not necessarily as column in the deck log book as it is today, but in some shape or form.

A suggestion to an improvement could be to keep a deck log book, but in an amended version. This will make it possible to remove some of the columns that is not important anymore and make more space for those that are important. It is also possible to add something if needed.

Additionally, column 6 “Ship`s time against GMT” and 7 “Ship`s time”, will be of great importance to confirm when the event from column 23, “miscellaneous”, happened. It is conceivable to think that keeping both columns 6 and 7 are unnecessary. Nevertheless, removing one of them will make room for human errors, both if you go from GMT to local time or the other way round.

Implementing new standards for the deck log book could be used to cope with the steady increase in use of technology. Standards are used to get everyone to pull in the same direction. New regulations have made electronic deck log books more common. The electronic deck log books are considered as more efficient to use than regular deck log books. They do however still contain the same information as analogue deck log books. As concluded earlier most of this information is logged elsewhere and there should be no need to log it again in another system. The electronic deck log book could be used as a valid back-up, if it logged everything automatically. The regulations today create limitations to the deck log books. To ensure a better development with the use of technology the regulations should set a standard that will work in the future, not a standard that limits the possibilities for future development. To get an effective change the industry needs to have a desired future state, then make a change to get there, and then monitor the change and see if it works the way they intended. If the industry looks ahead to what is to come and not at what is and what has been, it could make standards fit for the future and not just for the present.

As new technology is being developed and implemented in industries, new standards concerning requirements for both users and producers of the technology will appear. We can see how the IMO opens up for digital record books. This allows users to implement digital solutions of log books. Furthermore, it gives the producers standards with different requirements for their products that they have to satisfy to be allowed to sell their products on the marked. However, not everyone will implement digital record books from the day IMO approves them. This is something that will happen with time. Besides, not everyone has to implement digital record books since the old standards to conventional record books will still be valid.

We think the transition to the less detailed deck log book we are presenting will be a project happening over time, because not all ships have got VDR installed, which might be a

requirement to be allowed to use a less detailed deck log book. It will take time to allow everyone to use this solution, because of potential requirements to equipment such as VDR.

To cope with this, we have sketched a draft of a potential less time consuming and more concise version of the deck log book.

Ship: _____ Place _____ From:_____

____day, date _____ month _____ Year _____ To: _____

| Ship's time against GMT | Ship's time | Notations, special events and important information |
|---|---|---|
| | | |
| | | |
| | | |

Signed (date) _____

_____ _____

Keeper of the log Master

*Figure 9 Revised deck log book*

This version is just an example to show which columns that are necessary. Here the keeper of the log is freer to note the most important observations, calculations, and considerations. If the keeper of the log uses less time to find deviation and magnetic variation from the compasses, he will most likely and hopefully spend the time noting important information in the few columns in this new log book. When the time is noted for an event, it is possible to get all other useful information from the other systems. Today, the keeper of the log has to spend time writing this information in the deck log book.

# 5. Conclusion

This thesis aimed to analyse the information contained in the deck log book, the retrieval, and the usefulness of this information. The background of this conclusion is based on depth interviews with objects representing different segments in the maritime industry. This combined with conversations with different officers, we got an insight on their relation to the deck log book.

Complying with the regulations is one of the main reasons for the deck log book to be used at all. Our study shows that the incorporation of digital solutions has changed the way different segments retrieve the same information as the deck log book provides. This information is saved with less need to involve the crew.

The columns that are important is column 23 combined with ship´s time and ship´s time against GMT to get the exact time of the incident. Other important columns are weather, true course and position. However, these are all logged in other reliable systems. The important columns contain information used when settling disputes.

The stakeholders we thought wanted information from the deck log book do not necessarily want the information, or more specifically; they do not need it. It appears that the only ones having a desire to learn what is entered in the deck log book are insurance companies and law firms when an incident results in legal proceedings.

The information in the columns that are not included in figure 9 is registered elsewhere by other systems. Therefore, we find it unnecessary to spend time copying it into the deck log book. As the deck log book is today it is a lot more time consuming than necessary to keep and it contains information that is found, logged, and used in other systems. The deck log book is obsolete.

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# Appendix

## Interview-guide

### Intro:

«Vi studerer nautikk ved NTNU i Ålesund. Vi skal skrive en bacheloroppgave hvor vi ser på dekksdagboka og verdien av denne.  Vi er derfor interessert i dine tanker rundt dekksdagboka i sammenheng med dine arbeidsoppgaver.»

Vi ønsker å notere innholdet i samtalen og anonymisere deg. OK?

### Generelle spørsmål:

- Hvor jobber du og hva er din stilling?
- Hva er de daglige oppgavene i denne jobben kort fortalt?
- Hvor lang «fartstid» har du i antall år?
    - For å kategorisere dataene til analysen

### Styrmenn:

- Hva er ditt forhold til dekksdagboka?
- Når brukte du dekksdagboka sist?
    - Hva noterte du da?
- Hvordan bruker du loggboka i dag?
    - Hvilken informasjon fra dekksdagboka mener du er relevant til ditt arbeid
    - Når du noterer, for eksempel vær, hva tenker du på da?
    - Blir du mer bevisst på forholda når du noterer i loggboka?
- Til kaptein: Ser du over innholdet i dekksdagboka før du signerer?
- Hvorfor tror du dekksdagboka eksisterer?
    - Format,
- Hvem tenker du har nytte av innholdet i dekksdagboka?

- Er det noen punkt som blir brukt til noe annet enn kun for å føres i dekksdagboka?

- Ser du på hva andre har notert i dekksdagboka?

    - Hva da?
    - Når da?

    - Hvorfor?

- Hjelper loggboka på sikkerheten?

    - Hvordan/på hvilken måte?
    - (tilfredsstille IMO?)

- Er det noe du har lyst å tilføye?

## Forsikring/rederi:

- Hva er ditt forhold til dekksboka?
- Når jobbet du med en dekksdagbok sist?
- Finnes det et typisk eksempel på sak hvor dekksdagboka er/har vært avgjørende for sakens utfall?

    - Har det vært en større sak (nylig) der dekksdagboka var sentral?

- Hvilken informasjon fra dekksdagboka mener du er relevant til ditt arbeid?

    - Hvorfor?

- Hvor ofte er loggboka en avgjørende faktor for å avgjøre en sak?

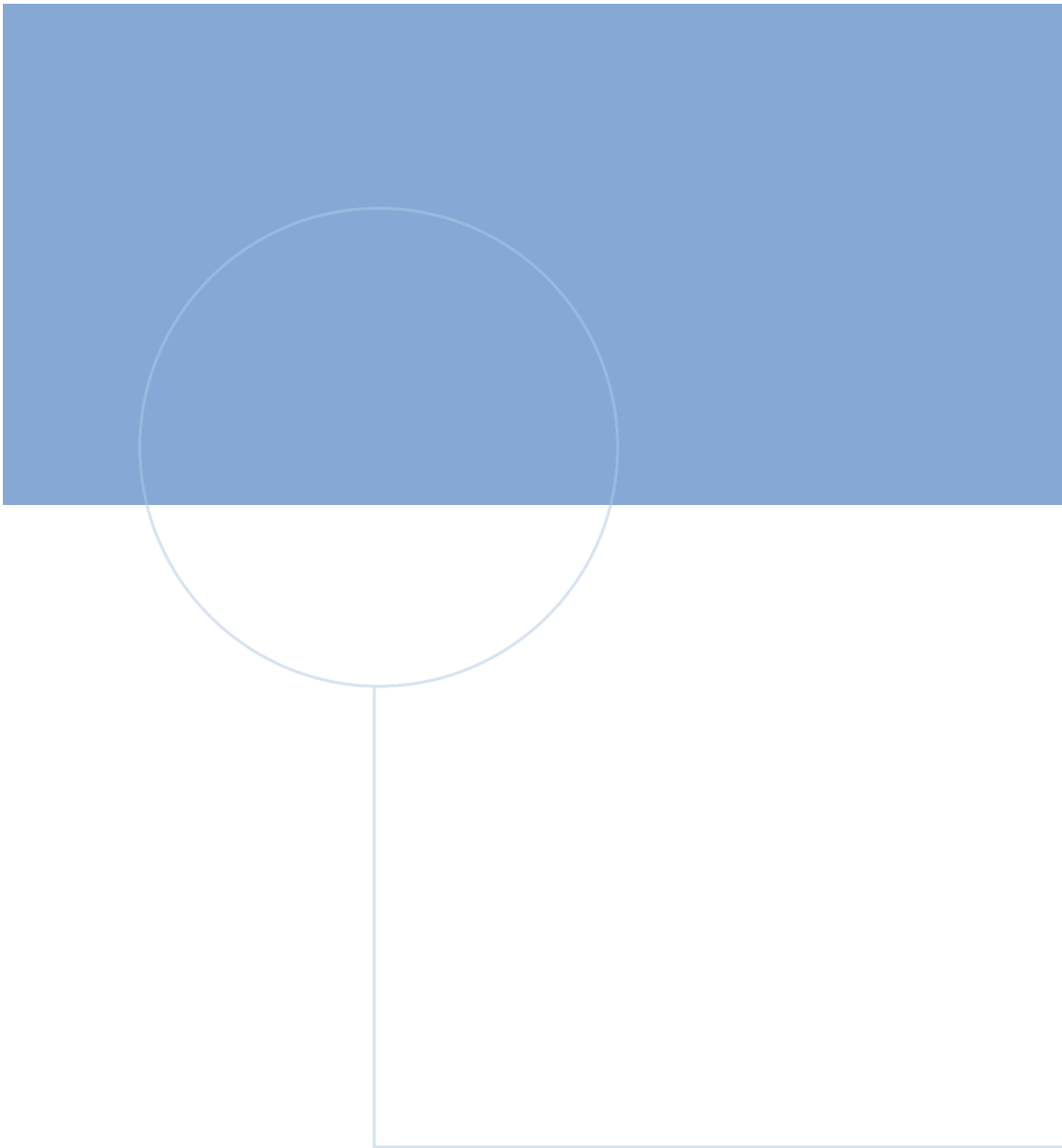
    - Har det skjedd?

    - Hvorfor/hvorfor ikke?

- Hvorfor tror du dekksdagboka eksisterer?
- Hvem tenker du har nytte av innholdet i dekksdagboka?

    - Er det noen punkt som blir brukt til noe annet enn kun for å føres i dekksdagboka?

- Har du noe du vil tilføye?



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