YRKESHÖGSKOLAN
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Sense of safety among seafarers working onboard Finnish cargo ships

How seafarers feel about dangerousness of their profession?

Ville Torikka

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BACHELOR'S THESIS

Author: Ville Torikka
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Supervisors: Peter Björkroth, Ritva Lindell, Tony Karlsson

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Abstract

Working conditions onboard cargo ships can be very challenging and contain many risks for seafarers. Depending on source, there is ten to twenty times higher risk for fatality than for any other industry. Purpose of this thesis was to find out do seafarers consider their profession more dangerous than average or not, and what seafarers think about the safety culture onboard.

The literature used as reference for this thesis consisted of relevant scientific studies, articles and statistics. Results of this study are based on the questionnaire that was spread for relevant sample group. The study was limited to seafarers working onboard Finnish cargo ships. For this study a quantitative method was used.

Results of the survey are presented with charts and explanations. Seafaring still showed to be dangerous profession according to statistics and majority of the seafarers participating on this survey. 70% of the respondents felt that seafaring is more dangerous profession than average and over 40% felt they are risking their health because of the choice of career. As major risks for health were seen fatigue and poor attitudes towards safety onboard. Over 30% of the respondents had been considering a change of career because of safety related problems onboard.

Language: English
Key words: Maritime, Occupational safety, Safety culture, Sense of safety

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OPINNÄYTETYÖ

Tekijä: Ville Torikka

Koulutus ja paikkakunta: Merenkulun koulutusohjelma, Turku

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Ohjaajat: Peter Björkroth, Ritva Lindell, Tony Karlsson

Nimike: Merenkulkijoiden näkemys turvallisuudesta suomalaisilla rahtialuksilla

- Kuinka merenkulkijat kokevat ammattinsa vaarallisuuden?

Päivämäärä 11.11.2021 Sivumäärä 24 Liitteet 2

Tiivistelmä

Työskentelyolosuhteet lastialuksilla voivat olla hyvinkin haastavat ja merenkulkijat kohtaavat työssään useita riskejä. Lähteestä riippuen merenkulkijoiden kuolleisuusriski voi olla jopa kymmenen-kaksikymmentä kertainen muihin ammatinharjoittajiin verrattuna. Tämän opinnäytetyön tarkoituksena oli selvittää pitävätkö merenkulkijat ammattiaan keskimääräistä vaarallisempana, sekä mitä merenkulkijat ajattelevat turvallisuuskulttuurin tämänhetkisestä tilasta.

Työn teoreettisen osuuden lähteinä käytettiin relevantteja tieteellisiä tutkimuksia ja artikkeleita sekä alan vaaroja käsitteleviä tilastoja. Tutkimuksellinen osio perustui määrälliseen tutkimukseen merenkulkijoiden kokemuksista, joita kerättiin anonyymin kyselylomakkeen avulla. Tutkimus rajoitettiin koskemaan suomalaisilla rahtialuksilla työskenteleviä merenkulkijoita.

Kyselyn tulokset esitetään selityksin ja kaavakkein. Merenkulku näyttäytyy edelleen vaarallisena ammattina niin tilastojen valossa kuin myös merenkulkijoiden omien kokemusten mukaan. Kyselyyn vastanneista merenkulkijoista 70 % koki merenkulun muita ammatteja vaarallisemmaksi ja yli 40 % koki vaarantavansa terveytensä uravalintansa vuoksi. Suurimmiksi terveyttä uhkaaviksi riskeiksi nähtiin uupumus sekä asenteet turvallisuutta kohtaan laivalla. Yli 30 % tutkimukseen osallistuneista merenkulkijoista kertoi harkinneensa alan vaihtoa turvallisuuteen liittyvien ongelmien vuoksi.

Kieli: Englanti
Avainsanat: Merenkulku, Työturvallisuus, Turvallisuuskulttuuri, Turvallisuuden tunne

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EXAMENSARBETE

Författare: Ville Torikka
Utbildning och ort: Utbildning i sjöfart - Åbo
Profilering: Sjökapten
Handledare: Peter Björkroth, Ritva Lindell, Tony Karlsson

Titel: Känslan av säkerhet bland sjöfolk som arbetar ombord på finska lastfartyg

- Hur sjöfolk känner om det farliga med sitt yrke?

Datum: 11.11.2021 Sidantal: 24 Bilagor: 2

Abstrakt

Arbetsförhållandena ombord på lastfartyg kan vara mycket utmanande och innehålla många risker för sjöfolk. Beroende på källa finns det tio till tjugo gånger högre risk för dödsfall än för någon annan bransch. Syftet med detta examensarbete var att ta reda på om sjöfolk anser att sitt yrke är farligare än genomsnittet eller inte, och vad sjöfolk tycker om säkerhetskulturen ombord.

Litteraturen som användes som referens för detta examensarbete bestod av relevanta vetenskapliga studier, artiklar och statistik. Resultaten av denna studie är baserade på frågeformuläret som spreds för relevant urvalsgrupp. Studien begränsades till sjöfolk som arbetar ombord på finska lastfartyg. För denna studie användes en kvantitativ metod.

Resultaten av undersökningen presenteras med diagram och förklaringar. Sjöfart visade sig fortfarande vara ett farligt yrke enligt statistik och majoriteten av de sjöfolk som deltog i denna undersökning. 70 % av de tillfrågade ansåg att sjöfart är ett farligare yrke än genomsnittet och över 40 % ansåg att de riskerar sin hälsa på grund av valet av karriär. Som stora risker för hälsan sågs trötthet och dålig attityd till säkerhet ombord. Över 30 % av de tillfrågade hade övervägt att byta karriär på grund av säkerhetsrelaterade problem ombord.

Språk: Engelska
Nyckelord: Känsla av säkerhet, Säkerhetskultur, Arbetssäkerhet, Sjöfart

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Contents

1 Introduction

Working onboard a ship can be very challenging because of the ever-changing weather, difficult working conditions and being remote from other society. (Työturvallisuuskeskus, 2020) For many people seafaring is a bit unknown occupation, and the seafarers' work can be hard to describe for the ones without experience from ships. What is commonly acknowledged, is that seafaring is considered as a dangerous choice of career with many risks for injuries or even fatality. This is not only common opinion but is also proofed with studies about seafarers' injury -and fatality rates compared to other population. (Kuntoutussäätiö, 2015) (M. Oldenburg, 2016)

Topic of this thesis got my interest because of my own experience working onboard cargo ships where I have seen that the attitudes towards safety issues onboard as well as the satisfaction on current safety culture varies a lot among crewmembers. The past few years working as an officer and being responsible for safety matters onboard, has shown me more how much the thoughts can differ even among small crew. For one, the desired safety standards defined by regulations and company seems to be too much, as others might feel that more focus should be put on bettering the safety culture onboard.

We have good statistics available to proof the grievances of seafarers' safety onboard, but not much information about the thoughts of the seafarers' themselves. What I am interested on this thesis is if seafarers' feel their occupation is dangerous or not and does the result correlate with the statistics that are already available.

1.1 Purpose and definition

In this thesis I study what are seafarers' own opinions and thoughts about their personal safety and safety culture onboard. With personal safety in this concept, is meant the seafarers' own health and whether the examined persons feel they are risking it or not while working onboard ship.

Purpose of this thesis is to find out whether seafarers consider their profession dangerous or not and possible reasons for that, in order to gain understanding about the current state of safety culture and to provide tools for improving safety culture onboard vessels.

1.2 Research question

How seafarers feel about dangerousness of their profession?

1.3 Delimitation

For practical reasons, this thesis is limited to cover persons working onboard Finnish vessels, and furthermore to Finnish cargo vessels since the safety culture and working conditions can vary a lot between different vessel types.

2 Theoretical starting points

2.1 Working environment

Working environment onboard ship is challenging and differs from other industries on land a lot. Constant movement, changing weather and being away from the sources of help makes working onboard ships bigger risk for seafarers' health than many other professions. (Työturvallisuuskeskus, 2020)

Working in different positions onboard cargo vessel contains different sources and types of dangers. Several physical hazards can be a threat for seafarers. In many spaces onboard, noise can be loud, distracting and unpleasant. Vibration is often present onboard ships, and it can affect to person's whole body when standing or sitting on a vibrating surface, or only to hands when operating vibrating tools. Vibration can have severe impact on human's health in many ways. (Työturvallisuuskeskus, 2020)

Tripping, falling and slipping are one of the most common reasons for occupational accidents especially onboard ships where tight corridors and steep staircases are common. Roughly half of the accidents are the result of these. Vibration and rolling of the vessel increase the amount of risk to fall or slip. Outdoor decks can be wet or icy and thence very slippery. (Työturvallisuuskeskus, 2020) (Alandia Insurance, 2021a) (European Maritime Safety Agency, 2020)

Lighting and temperature are differing between ship's departments and time of the day and year. Working in extreme cold or hot conditions poses extra load for working personnel. Hazards related to working environment are often present during cargo

operations and when working at heights or in compact spaces such as engine room. (Työturvallisuuskeskus, 2020)

As mechanical hazards onboard can be counted for all moving parts that could pose danger such as rotating machinery, back and forth movement and falling objects. Rolling and pitching of the vessel increases the number of risks. Moving machinery can be hazardous both to its user and people around it. Falling objects are always dangerous to people underneath and such incidents can happen for example during lifting and cargo operations. Also poorly fastened objects at heights or falling chunks of ice can be reason for this sort of incidents. (Työturvallisuuskeskus, 2020)

As the most dangerous shipboard operations can be accounted handling of heavy objects, working aloft or over the side, mooring operations, cargo operations, engine maintenance at sea and entry into enclosed spaces. (Alandia Insurance, 2021a)

2.2 Conception of safety

Safety as a concept can be quite broad and difficult to describe or measure. When looking from different aspects and in different contexts, the conception also varies. For practicality of this study some sort of conception of safety needs to be established.

One way of defining safety as a concept is “a state in which or a place where you are safe and not in danger or at risk” (Cambridge Dictionary, 2021). Safety can be defined as a state in which hazards and conditions threatening the health and well-being of people are controlled (World Health Organisation, 1998). In other words, it can be said that the fewer risks mean more safety.

All risks can never be eliminated and human itself is usually the biggest risk for safety. Studies show that average human makes 5-6 mistakes each hour, some are more serious than others. Therefore, when determining safety, human factor should be accounted for. Safety can be thence defined as “the sum of technical, human and organizational factors that allow fail safely". (Alandia Insurance, 2021a) By this meaning that in safe operations a single mistake or failure is not resulting into an accident.

2.3 Measuring safety

Safety culture can be measured by looking at the focus put into it and overall attitude towards it. On lower-level, safety is not found to be major risk for business, and it concerns only part of the organization. The higher level we go on safety culture, the more it's involving the whole organization and all personnel are seen to be responsible for it. When combining the effort made for improving safety culture and accident rates, the level of safety culture can be determined. (Alandia Insurance, 2021b)

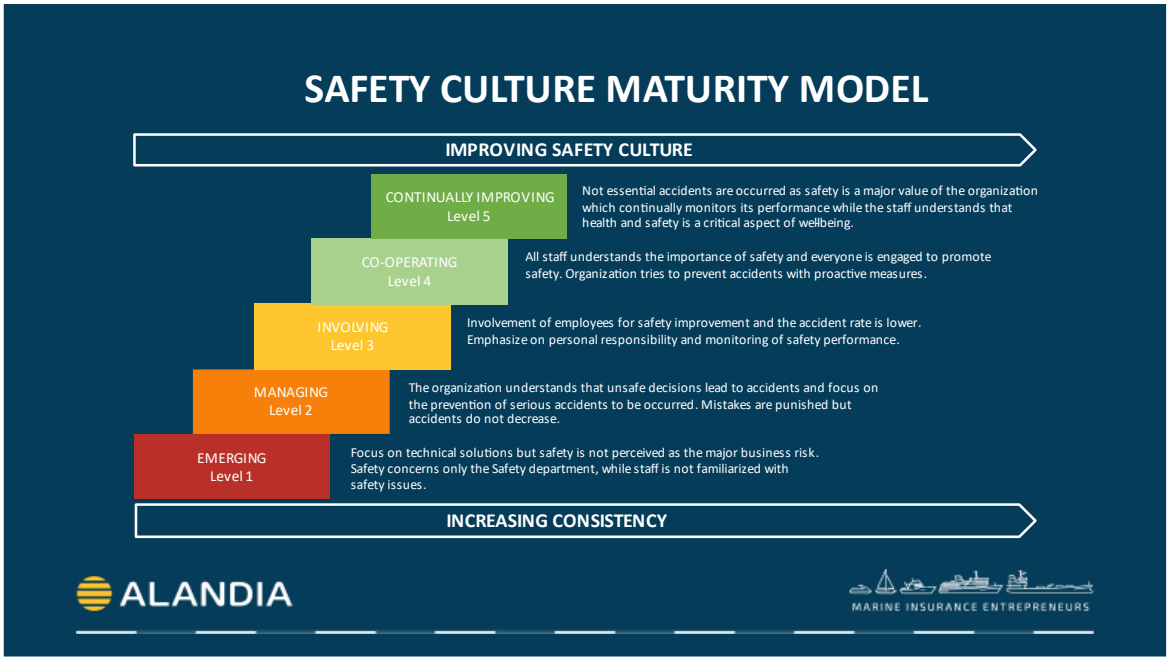

Figure 1. Safety culture maturity model (Alandia Insurance, 2021b)

2.4 Need for safety

As one way to highlight the importance of seafarers' thoughts along with accident rates, the "Mazlow's Hierarchy of needs" can be used. It is a motivational theory originally presented in 1943 by psychologist Abraham Harold Mazlow in his study "A Theory of Human Motivation". According to Mazlow's theory, humans are motivated to fulfill their needs in certain order, and only accomplishing necessary satisfaction on basic needs, makes pursuing of higher level of needs possible. (Maslow, 1943)

Mazlow's Hierarchy of Needs is often presented in a form of pyramid, where different levels of needs are drawn as layers. According to Mazlow, the "Safety needs" are one of the

human's basic needs and situated low in the pyramid, and only after need for safety is satisfied, human can be motivated to think about psychological needs. (Maslow, 1943)

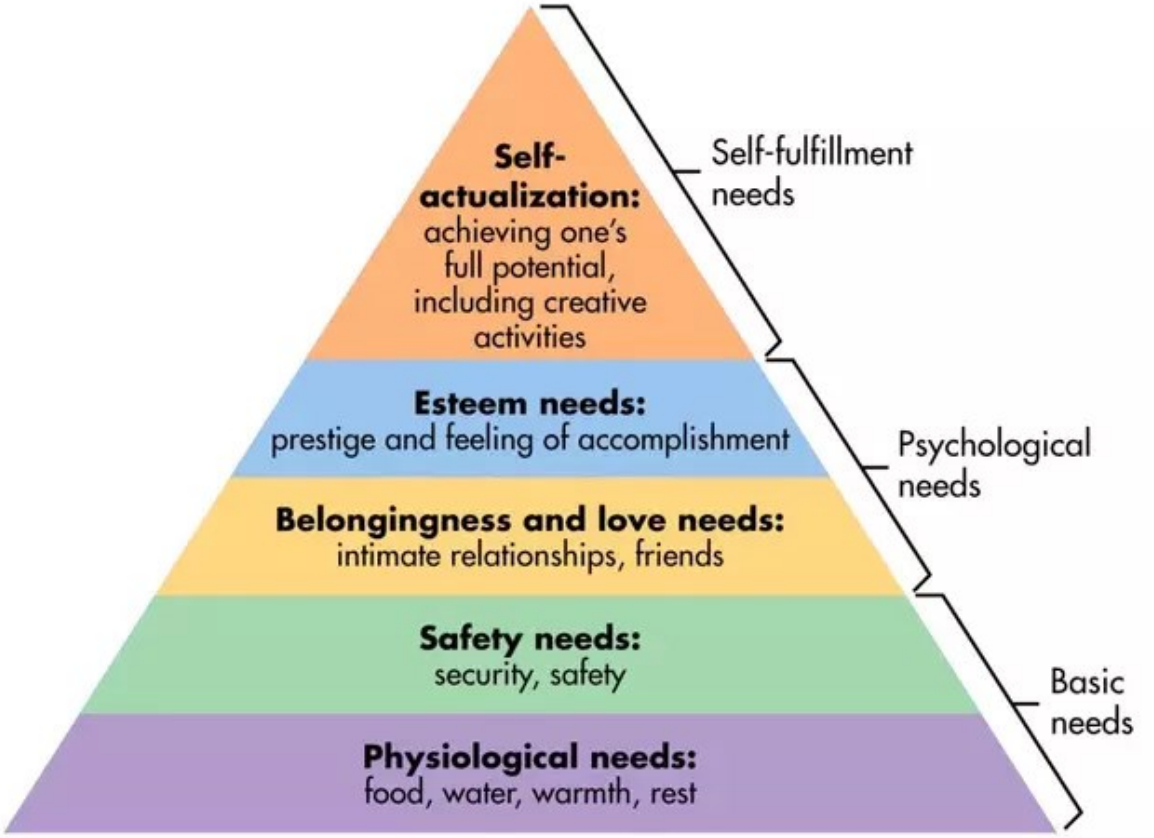

Figure 2. Maslow's hierarchy of needs (McLeod, 2020)

3 Theoretical background

Because of the well-known risks that working onboard a ship contains, the situation of shipboard safety has been studied throughout the years. Injury and mortality rates among seafarers have been recorded for decades and reliable data has been developed about the risks of seafaring.

European Maritime Safety Agency is collecting data from the maritime sector within European Union. According to statistics collected by EMSA, there were 438 fatalities among crew members during the period of 2014-2019, from which 214 fatalities happened on cargo vessels, marking 43% of the total amount. More than half of the casualties leading to fatality occurred during collisions and flooding or foundering. When looking at all vessel

types, the main deviation was slipping and falling causing 174 fatalities, from which 100 fatalities was caused by falling overboard. (European Maritime Safety Agency, 2020)

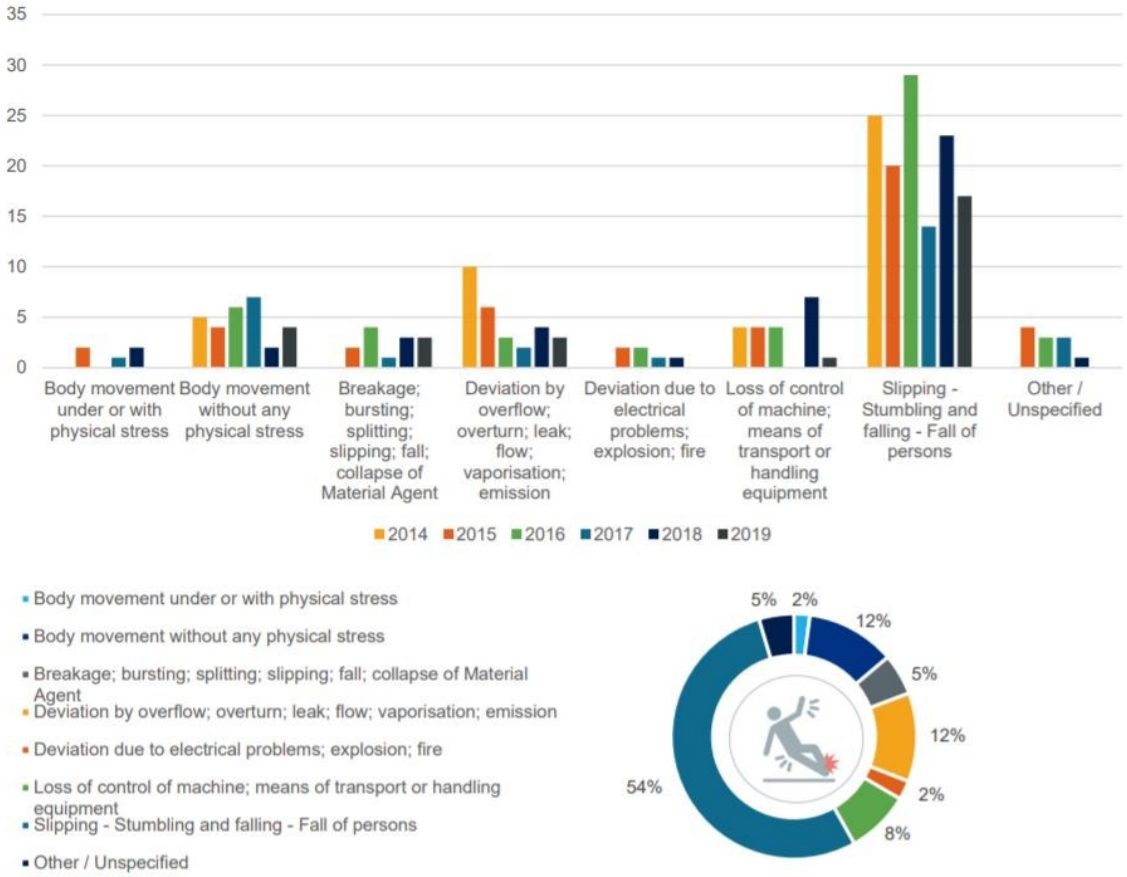

Figure 3. Distribution of fatalities by deviation (European Maritime Safety Agency, 2020)

During the 2014-2019 period, 4926 incidents resulting into crewmember's injury took place. Roughly half of the injuries were caused during navigational events such as contact, collision and grounding. Damage of equipment and fire onboard were other significant events resulting to injuries with 15% share each. When taking a look at the causes of injuries, the most frequent cause was slipping and falling, causing 2468 injuries onboard. Out of all injuries 27% took place on cargo vessels. (European Maritime Safety Agency, 2020)

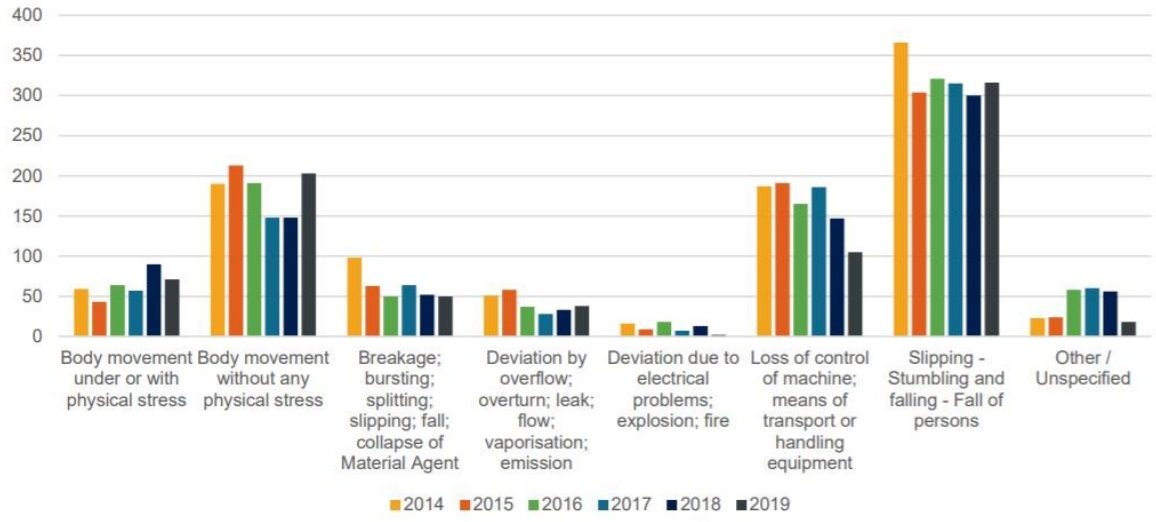

Figure 4. Distribution of injuries by deviation (European Maritime Safety Agency, 2020)

According to study covering Finnish seafarers, between 2001-2013 a total number of 427 deaths were recorded among 106 477 person-years done by seafarers aged 25-64 years. Compared to other population, the number of deaths was 1,3 times higher. According to statistics covering Finnish seafarers, considerably more deaths were recorded among persons working on dry-cargo vessels and tankers, than on passenger vessels or icebreakers where the mortality rate was much closer to the average population in Finland. Major causes of death were lung cancer and respiratory deceases, deaths related to alcohol consumption were also high. About 1,3 times more deaths caused by accidents were recorded than among other population. (Kuntoutussäätiö, 2015)

Table 1. Seafarers' mortality rate in Finland

Merenkulkijoiden ja muiden palkansaajien kuolleisuus Suomessa 2001–2013, 25–64-vuotiaat miehet ja naiset

	Henkilö-vuodet (hv)	Kuolleet	SDR/ 10 000 hv	95 % lv	SMR	95 % lv
Miehet						
Merenkulkijat	70 177	341	51	(45-56)	**130**	(117-145)
Muut palkansaajat	10 833 493	40 711	39	(39-40)	100	
Naiset						
Merenkulkijat	36 300	86	24	(19-29)	**127**	(103-157)
Muut palkansaajat	11 121 752	21 535	19	(18-19)	100	

SDR = ikävakioitu kuolleisuusluku
SMR = vakioitu kuolleisuussuhde

(Kuntoutussäätiö, 2015)

Same kind of results were found when studying the rate of disability pensions between seafarers and other population. It was 1,6 times more likely to end up on disability pension among men working onboard ships. For females, the rate even double compared to other population. Most often the diagnose leading to disability pension is mental health or support and musculoskeletal diseases. Especially injuries and poisonings were more common reasons among seafarers than other population, for both genders. (Kuntoutussäätiö, 2015)

Sense of safety is not only depending on the prevalence of major injuries but also near-misses and minor injuries are affecting the atmosphere onboard and are often not recorded. If the safety culture is not recognising this, it will be shown on people's attitudes towards safety and later as more serious incidents. Studies show that there is a relationship between unsafe actions, minor injuries and serious injuries leading even to fatality. In many industries it is common to measure LTI rate for which one way to calculate is one Lost Time Injury per one million working hours. If besides lost time injuries, also minor injuries and near-misses are recorded, it is possible to avoid LTIs and to determine from which actions accidents can be resulting. Some sources suggest that out of every 330 unsafe actions, 30 will result into minor injury, from which one will be counted as lost time injury. According to Finnish insurance company Alandia, there is between 6-8 near-misses before accident happens. (International Chamber of Shipping, 2013) (Alandia Insurance, 2021a)

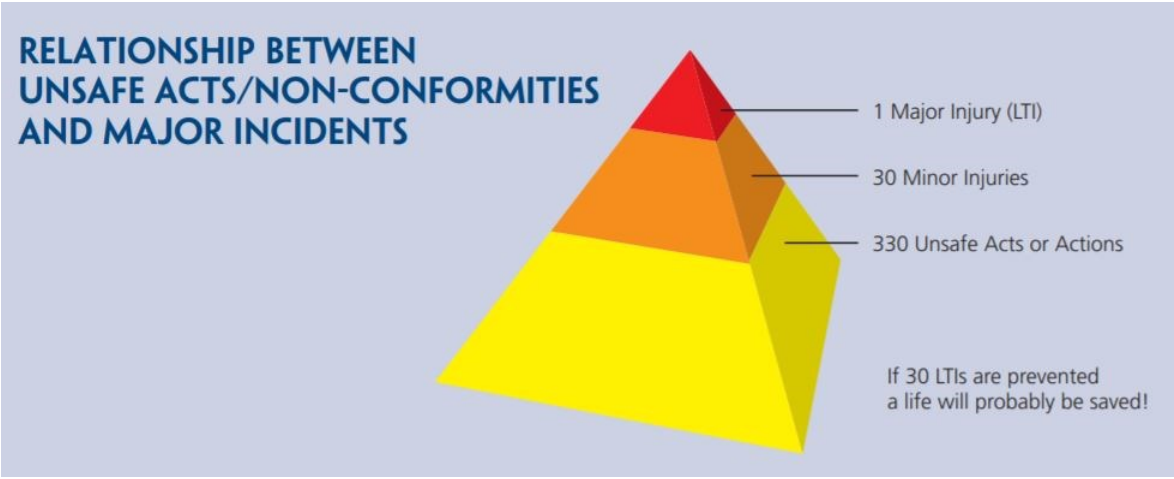

Figure 5. Relationship between near-miss and LTI (International Chamber of Shipping, 2013)

4 Previous research

Maritime safety, occupational safety and well-being of the seafarers are relevant topics for this thesis, and these have all become more and more important aspects for the whole industry nowadays. Many related studies have been made from different starting points and angles, from which a couple of most relevant works for my thesis are gone through below.

Bachelor's thesis *"Työturvallisuus rahtialuksilla"*, published in 2015, was focusing on occupational safety onboard cargo vessels managed by BORE Ltd and was aiming to find out in what way safety management could be improved onboard BORE Ltd.'s vessels. Study was conducted by comparing data received from insurance company and a questionnaire made for deck officers, engineers and masters working onboard the studied vessels and being responsible for safety management onboard. Conclusion was that the responsible persons were quite satisfied with the safety culture onboard and with company's safety management system. Answers were in line with the accident statistics and the study stated that accident rates onboard BORE Ltd. vessels were quite low. Complaints were concerning attitudes among crew members onboard. (Kotro, 2015)

Doctoral thesis *"Finnish maritime personnel's conceptions on safety management and safety culture"*, published in 2016, was exploring what kind of conceptions Finnish seafarers have on safety culture and safety management and evaluating the impact the ISM-Code is having on maritime safety culture in Finland. Study was conducted by using thematic interviews and total number of 94 persons were interviewed, and the answers analyzed. The study concluded that maritime personnel have a positive attitude towards safety management systems since they consider safety management beneficial and essential in general. Criticism was however given for the application of the ISM-Code, but not the ISM-Code as such. (Lappalainen, 2016)

Previous studies have been concentrating more on the safety management and how the systems developed for this use are working. For both studies presented above, the main perspective was on the personnel who are responsible for safety matters. In thesis *"Työturvallisuus rahtialuksilla"*, only officers and masters were interviewed, where as the *"Finnish maritime personnel's conceptions on safety management and safety culture"*, contained interviews from variety of personnel working in shipping industry. Out of 94

interviewees, 62 were active seafarers and total number of five were ratings. (Kotro, 2015) (Lappalainen, 2016)

The total formation of safety culture is depending on all personnel in connection with the shipping industry, but what differs my thesis from the previous studies, is that the focus is on the thoughts of the seafarers and how they see the current state of safety culture, not how the safety management systems are working.

5 Methods and procedures

For this thesis, a quantitative method was used, and the data was collected with an online inquiry. Using this method did not require travelling from the author and the study was not bound for any certain time or location. To get reliable results about the thoughts of the seafarers', quite large sample is needed. With quantitative research method it was possible to measure the level of satisfaction on current safety culture, and to present numbers about seafarers' thoughts for the use of further studies.

The questionnaire consisted of multiple-choice questions from which the collected data could be analyzed to gain understanding about the thoughts of the seafarers. This method was chosen for couple of reasons. First to make participation for questionary easy and get bigger sample group, secondary to get easily analyzable data from which the result could be formed. In the questionnaire was total number of 16 questions, first three questions were for collecting background information of the sample group, following 12 multiple-choice questions regarding the actual topic of the survey. In the end was one open-ended question to let the respondents write their thoughts in open form.

The link for the questionnaire was shared via author's social media accounts and direct e-mails to seafarers. E-mails were sent for six Finnish shipowners which are operating cargo vessels, and the link for the questionnaire was asked to be shared for their employees. The link was also shared via e-mail for the maritime students of Novia university of applied sciences.

All answers for the inquiry were given anonymously and questions were not specified to any certain vessel nor company, so there should not be any ethical problems regarding the study and its' results.

6 Results and their interpretation

The questionnaire was published on 29.10.2021 and it was possible to leave responses for a period of two weeks, until 10.11.2021. Total number of 86 seafarers answered the questionnaire, of which 63 respondents also answered to the open form question.

6.1 Working experience of the respondents

Length of career was asked from the respondents in order to see if the time spent at sea and amount of experience reflects in the answers given into other questions. The most represented group with 30 respondents, was the group with 11-20 years of experience. The second largest group with 20 persons, was the one with more than 20 years of experience. Three to five years of experience was represented by 14 persons and 12 respondents stated they have zero to two years of experience. The smallest group with six to ten years of working experience was represented by ten persons.

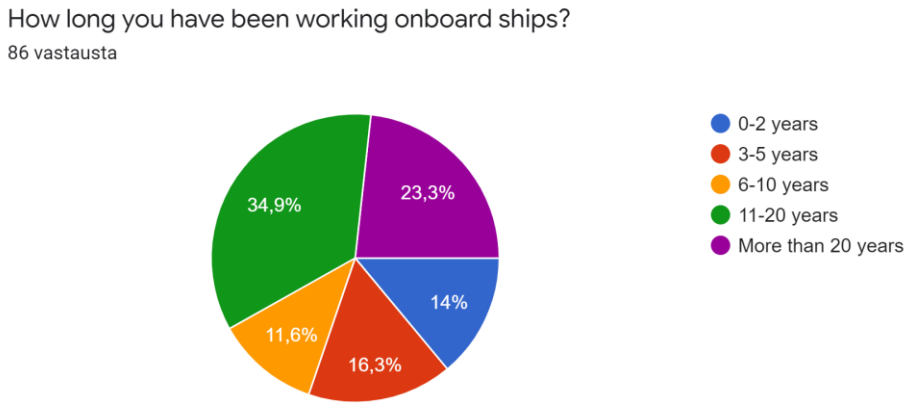

Figure 6. Working experience of the respondents

6.2 Vacancies of the respondents

Positions of the respondents were asked because responsibilities onboard differ which might have an influence on persons' thoughts. All departments were represented on the questionnaire, deck officers being the biggest group with 29 persons. Surprisingly active group was masters with 22 respondents, especially compared to engineers with seven respondents although this should be bigger or at least as big group as masters. Six

respondents were engine crew, 18 were deck crew and four were working in galley. 32% of the respondents were ratings.

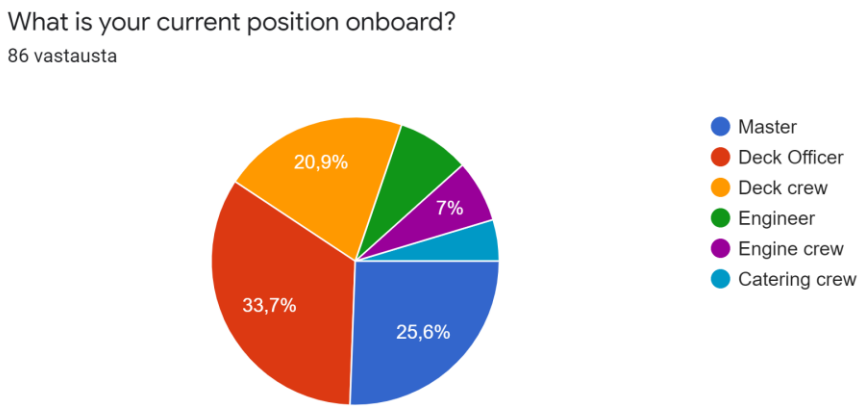

Figure 7. Vacancies of the respondents'

6.3 Gender distribution

Some statistics covering injuries and mortality are giving different numbers for males and females and therefore the gender of the respondents was asked to compare answers with the statistics. Ten respondents were females, and 76 males.

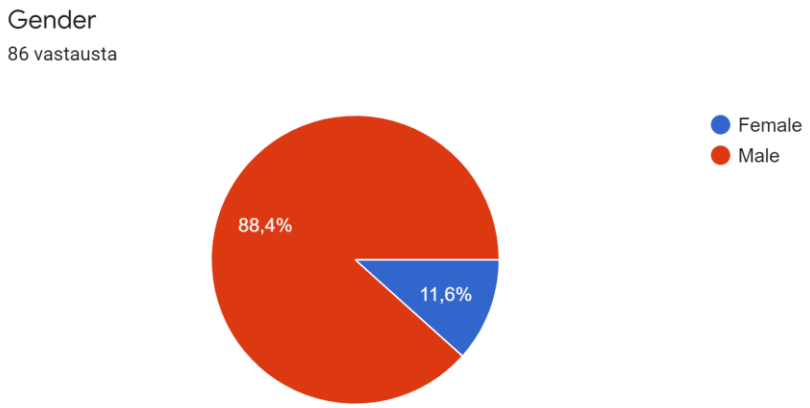

Figure 8. Gender distribution

6.4 Satisfaction with safety culture

Respondents were asked if they are satisfied with the safety culture onboard their vessel. 64 respondents answered yes and 22 answered no. Negative answers were over fourth of the total sample group, which is already quite alarming.

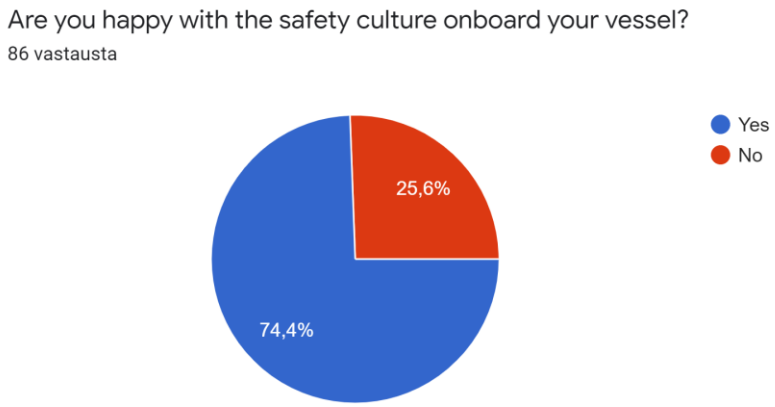

Figure 9. Satisfaction with safety culture

6.5 Thoughts about co-workers' attitudes

State of safety culture was tried to evaluate with a question regarding thoughts about other persons attitudes. 49 respondents felt that their co-workers are interested about safety, 33 answered no. As almost 40% of the respondents were unsatisfied with their colleagues' actions, there is clearly some problems with the safety culture onboard. Only four persons answered that safety matters don't concern them, which is a good sign.

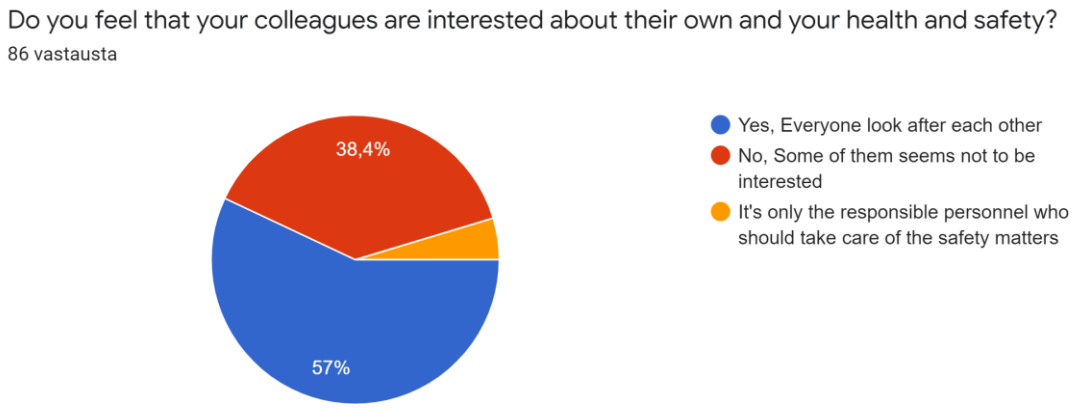

Figure 10. Thoughts about co-workers' attitudes

6.6 Thoughts about foreman's and employer's attitudes

When asking if the respondents feel that their safety is taken seriously from the side of foreman or employer, 68 persons answered yes and 18 answered no. If employees are afraid that their safety is not important for the foreman or employer, the motivation on both safety and other duties can suffer and it will highly impact on employee's wellbeing. In a well working safety culture this number should be close to zero.

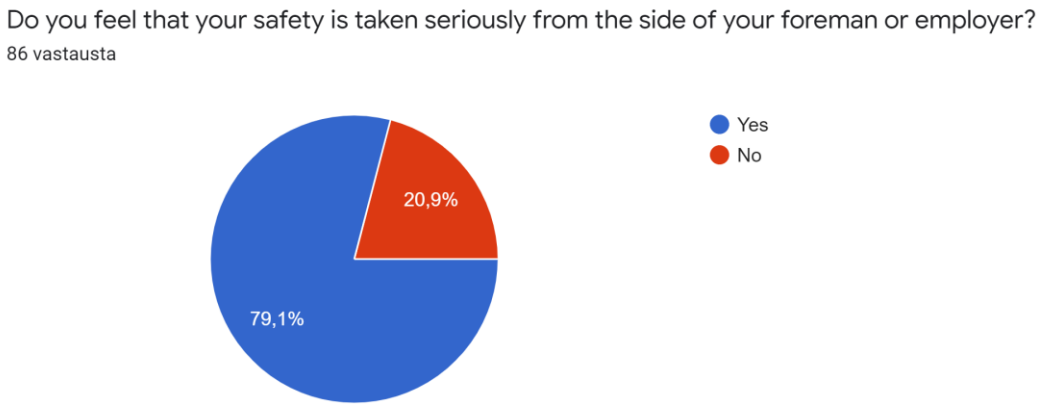

Figure 11. Thoughts about foreman's and employer's attitudes

6.7 Belief in the possibility of influence

Safety culture is a sum of many factors, and all personnel are part of it. For this question, 69 answered that they have possibility to influence on safety culture, whereas 15 felt that they don't. The reason for this can be poor safety management or the attitude of the respondents themselves. Nevertheless, if 20% of the crew feel they have no share on safety culture, the work for improved safety onboard will be negatively affected. Two persons answered that it's not part of their job.

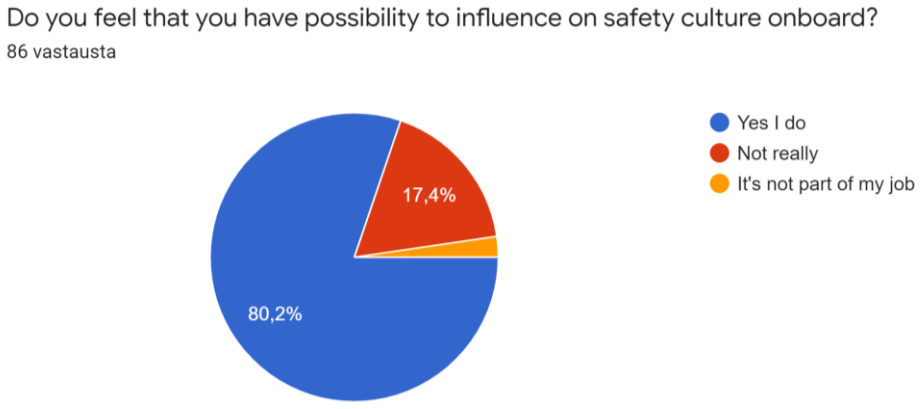

Figure 12. Belief in the possibility of influence

6.8 Satisfaction with implementation of safety management

Satisfaction with safety management was asked from the respondents, and 50 persons thought that safety management is implemented well onboard their vessel. 33 respondents answered that there is room for improvement, and three could not say.

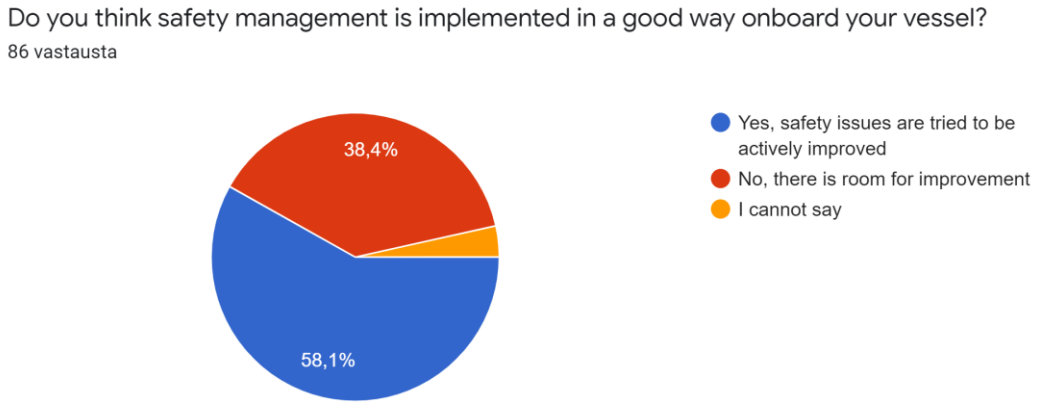

Figure 13. Satisfaction with implementation of safety management

6.9 Receival of familiarization

When asking, have the respondents received necessary familiarization, 62 persons said they have received familiarization when needed, whereas 22 persons answered that familiarization is not usually available. Two persons thought that it is not necessary.

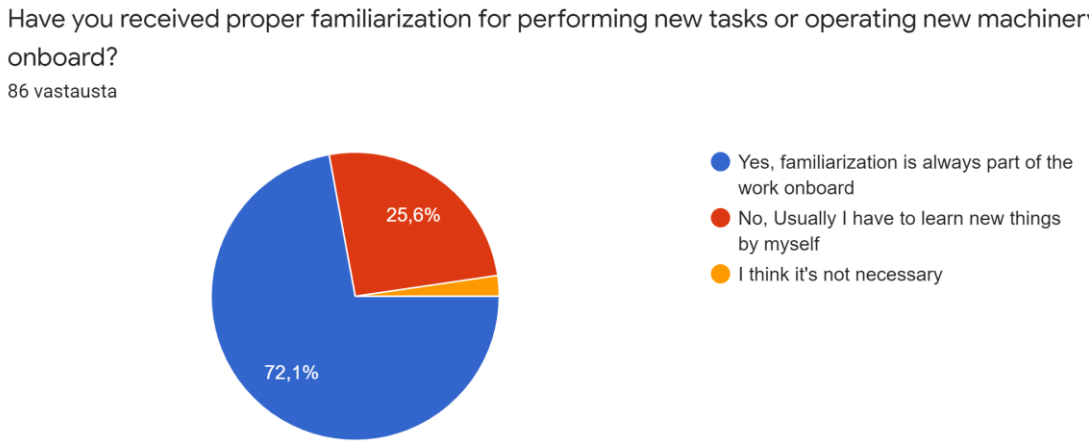

Figure 14. Receival of familiarization

6.10 Availability of PPE and correct tools

Personal protective equipment and correct tools are essential for performing tasks safely onboard. 59 respondents didn't see problem on this area, but 27 persons answered that they sometimes need to work with poor equipment.

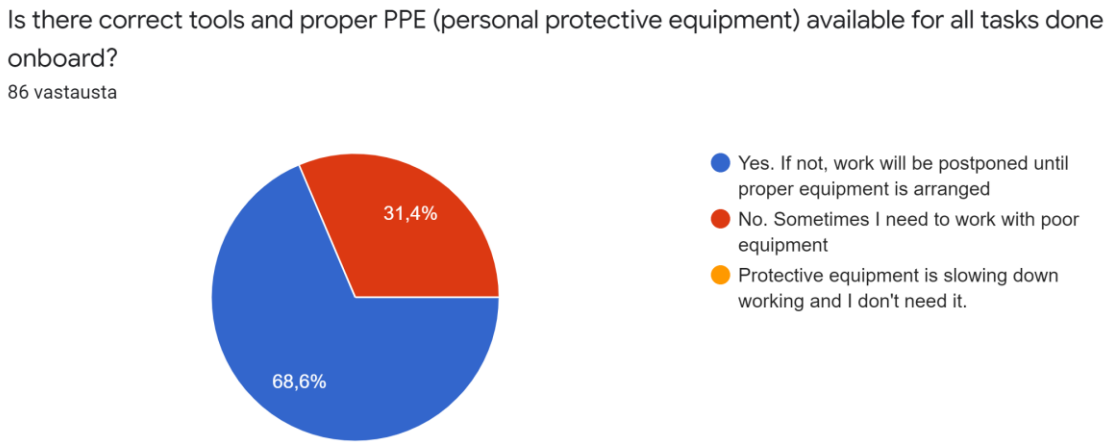

Figure 15. Availability of PPE and correct tools

6.11 Safe operating condition of machinery

According to 66 respondents, all machinery and equipment onboard are in good working order, whereas 20 persons said that there is several hazardous equipment that are not fixed, and the use of equipment is not safe.

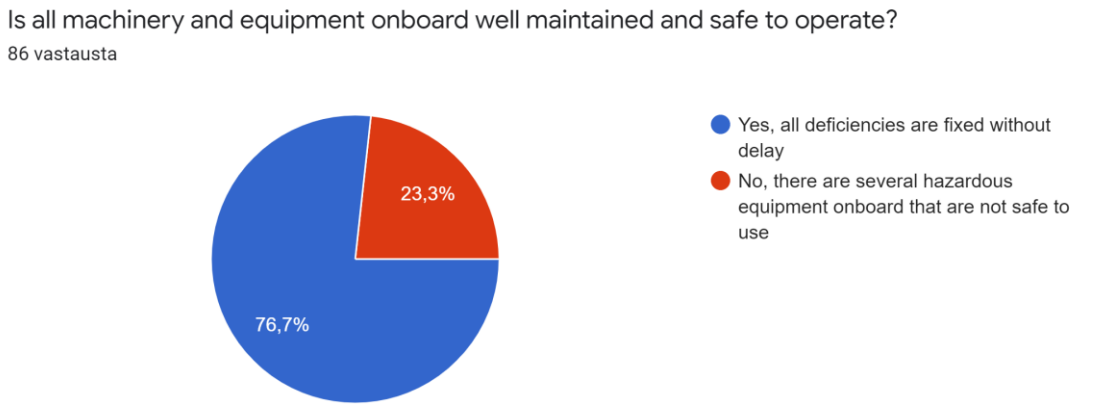

Figure 16. Safe operating condition of machinery

6.12 Prevalence of unsafe tasks

Major part of the sample group had experienced situations where they had to perform tasks they didn't feel safe to do. 60 persons said this has happened sometimes and three said this is the case quite often. 23 respondents answered that they have never been on such situation.

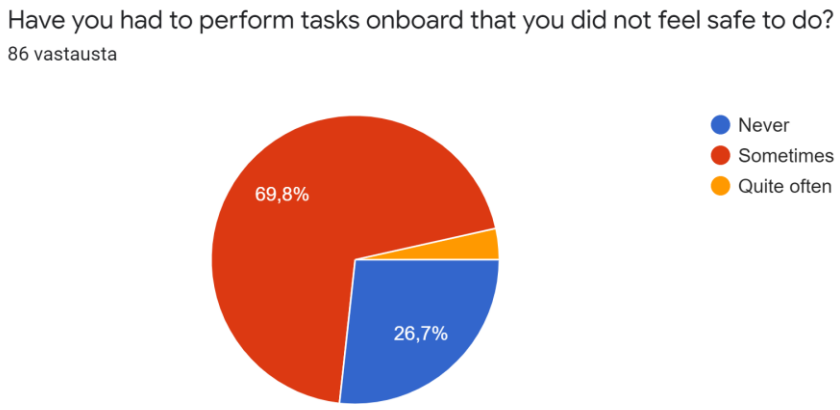

Figure 17. Prevalence of unsafe tasks

6.13 Endangering of health due to career choice

In the thirteenth question respondents were asked if they feel that they are risking their health due to their career choice. 38 respondents felt that they are risking their health. and 48 persons answered that they don't feel this way.

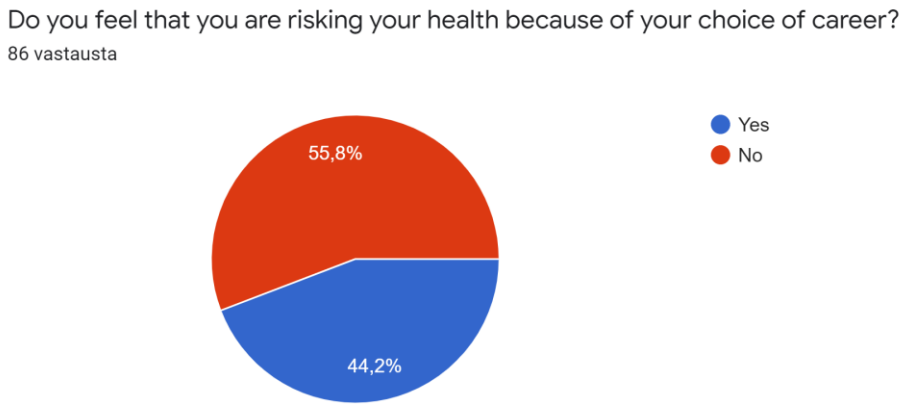

Figure 18. Endangering of health due to career choice

6.14 Thoughts about dangerousness of seafaring

Total number of 61 respondents felt that seafaring is more dangerous than other profession. Only 25 persons didn't feel this way.

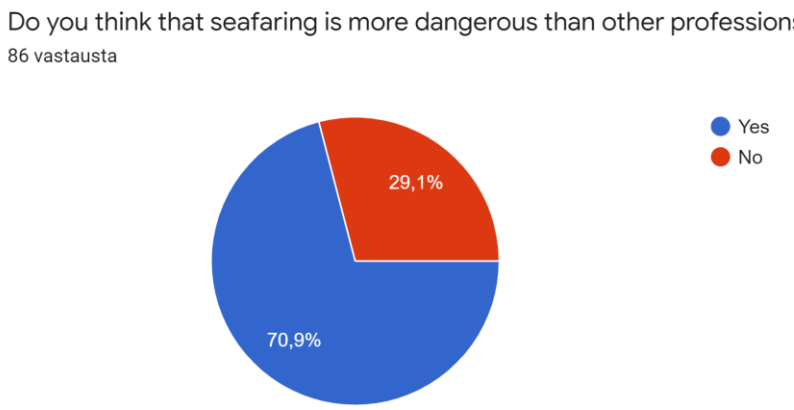

Figure 19. Thoughts about dangerousness of seafaring

6.15 Career change considerations

Respondents were asked if they have considered career change because of safety related problems onboard. 58 respondents had not been considering career, whereas 22 persons had been thinking it sometimes and 6 persons answered that they think about it often.

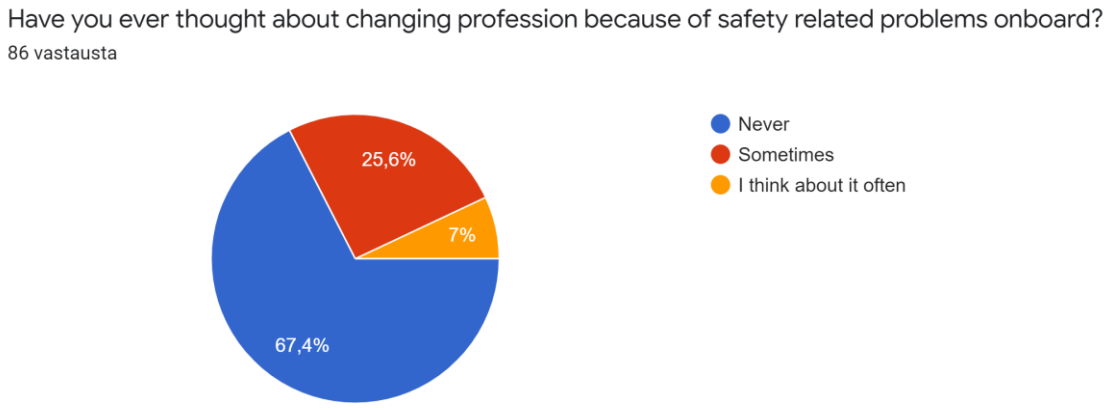

Figure 20. Career change considerations

6.16 Biggest threat for seafarers' health onboard

The final question of the survey was an open-ended question to let the respondents give their own opinion about the biggest threat for seafarers' health onboard. Out of 86 persons sample group, 63 respondents answered also to this question. A variety of threats from different sources were mentioned, but when sorting these answers into groups according to their source, some certain trends could be seen.

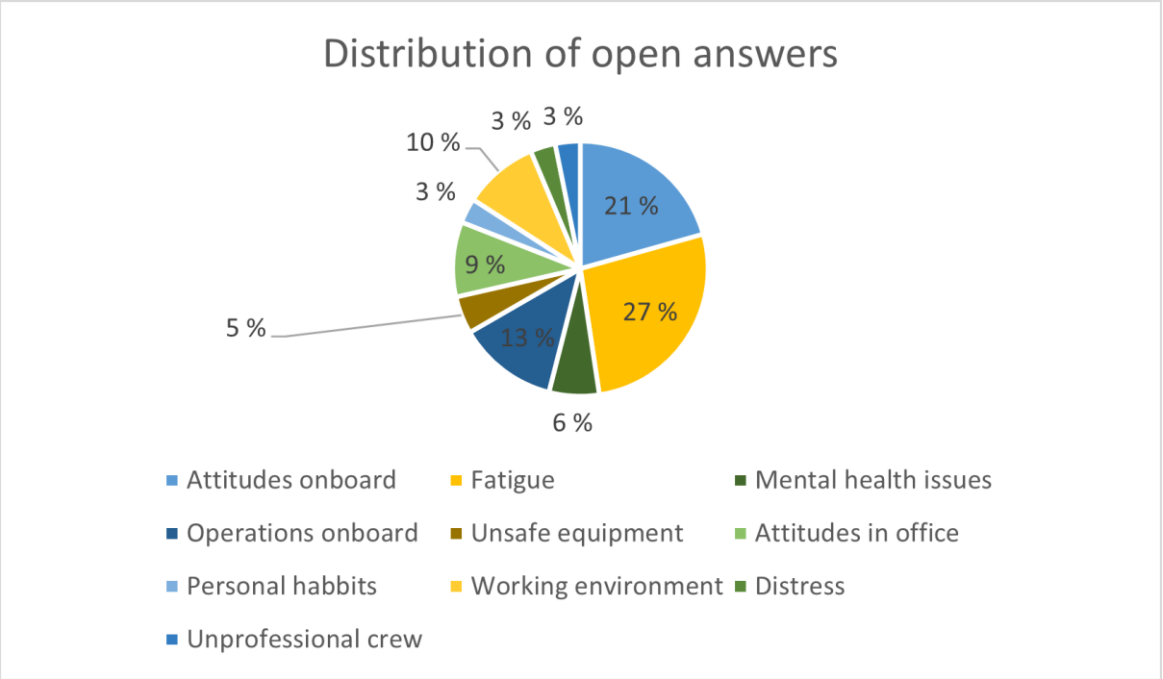

Figure 21. Distribution of open answers

By far the most mentioned problems were fatigue, mentioned 17 times, and attitudes onboard which was mentioned by 13 respondents. Third most popular was operations onboard, mentioned by eight respondents, six of which mentioned cargo operations. Other operations experienced dangerous were mooring operations and lifeboat drills. Six respondents mentioned poor attitudes or lack of interest towards safety from office personnel. Also, by six respondents was mentioned that working environment onboard is the biggest risk. Four persons mentioned mental health issues among crew. The least times mentioned subjects were personal habits, unprofessional crew and distress onboard, all of which were mentioned by two respondents.

Some of the answers are connected together, mental health issues can result from isolation or other issues related to working environment, it can be also connected to fatigue. Fatigue was the most repeatedly mentioned risk for seafarers and as reasons for

it were mentioned irregular working hours, rest-hour violations and bad quality of sleep. Increasing workload and small crews were also mentioned as reasons for fatigue.

7 Conclusion

Despite all the work done for making seafaring safer, still majority of seafarers working on Finnish cargo ships feels their profession is dangerous. According to the results from survey, 70% of the seafarers feels that their profession is more dangerous than average and close to same number of respondents stated that they have been in a situation onboard where they felt that working was not safe. Over 40% of the respondents felt that they are risking their health because of their career choice. Change of career due to safety related problems had been considered by over 30% of the respondents.

Some reasons could be found from the responses to other questions. 25% of the respondents were not satisfied with the state of safety culture onboard. Major concerns were about the attitude of colleagues and implementation of safety management. Only 57% of the respondents felt that all their co-workers are interested about safety. The same number of respondents were satisfied with the safety management onboard. 20% felt that their safety is not taken seriously by their foreman or employer. State of safety culture is depending on all of the parties within shipping and these small deficiencies are consuming the foundation of the safety culture. Nevertheless 80% of the respondents felt that they have possibility to influence on safety culture, which is a good sign, although all 100% would be needed.

23% of the respondents stated that onboard their vessel is hazardous machinery that are not safe to use due to deficiencies or lack of maintenance. Having to use broken machinery can be major safety hazard and if these cannot be fixed it will certainly affect on workers trust towards the whole safety culture. Also 31% of the respondents said that sometimes adequate personal protective equipment is not available, or they need to work with tools not suitable for the job. 25% of the respondents stated that they are usually left without familiarization when beginning to work with new tasks or operating new machinery. All of these deficiencies can lead into serious accidents which could be easily avoided.

Interesting trends can be found when comparing the responses of different groups. For the question “are you happy with the safety culture onboard?”, 25% of the total sample answered negatively. When the answers are specified by the years of working experience among the respondents, the trend of negative answers is rising along with working experience, until the group with 11-20 years of experience. Then there is a sudden drop, and among the group with more than twenty years of working experience only 5% answered that they are not happy with the safety culture onboard. Within the group with 11-20 years of experience, 40% of the respondents stated that they are not happy with the safety culture. These two beforementioned groups were also the most represented groups in the survey, so the finding is not depending on coincidence.

Figure 22. Satisfaction with safety culture by working experience

Same kind of trend is related to responses into question about risking health because of the choice of career. Out of the whole sample 44% felt that they are risking their health due to career choice. Among the group with 0-2 years of experience, only 25% felt this way, from where the trend is rising so that among the group with 11-20 years of experience, already 63% felt that they are risking their health. Within the group of over twenty years of experience, again only 25% felt this way. Thence the working experience clearly has an influence on seafarers’ thoughts. Some other reasons might also be behind the sudden change in answers among the group with over twenty years of experience, which could be related to different generations. This kind of deviation is quite alarming as the persons with

more experience usually lead with their example and have often higher rank and more responsibility on safety related matters.

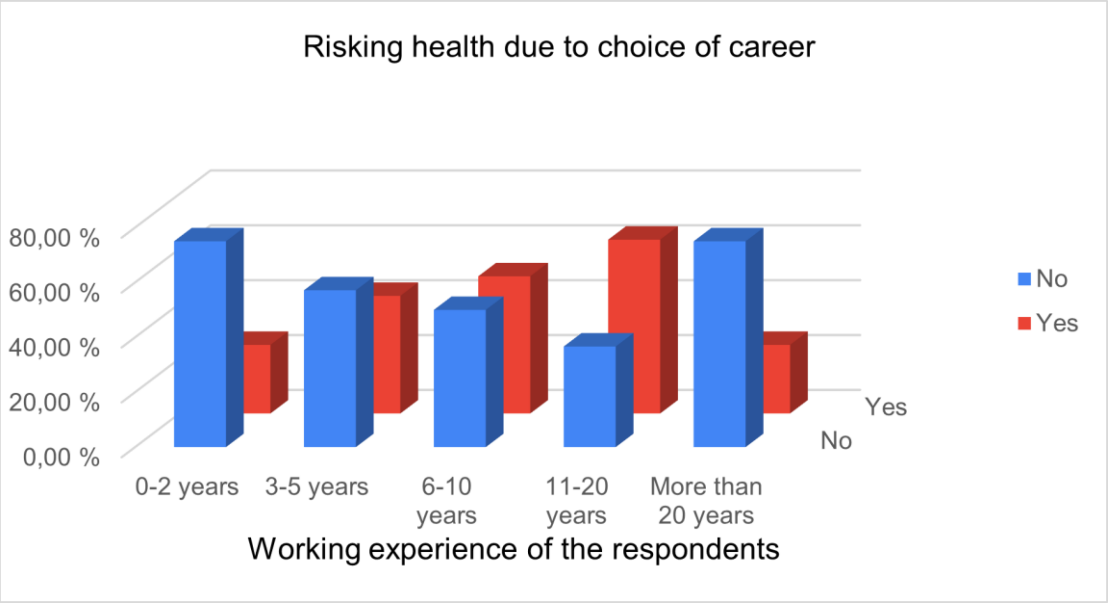

Figure 23. Risking health due to career choice by working experience

According to statistics, seafaring is still more dangerous profession than average, and seafarers seem to agree with that. Considerable part of the respondents had recognised safety related problems in management, attitudes and in working conditions onboard.

8 Critical examination and discussion

This thesis is based on the questionnaire which was aimed for persons working on Finnish cargo vessels. Link for the questionnaire was shared for the respondents via shipping companies, author's social media account and for the students of Novia UAS maritime school. Questionnaire was made fully anonymous so the identities of the respondents cannot be verified, thence the full certainty about the respondents' profession and background is not achieved. However, it can be stated that the motivation for unauthorized persons to participate on the questionnaire is quite minor. The questionnaire was shared for multiple different groups, so the sample group is not focusing on any certain employer nor ship. Responses were received from all departments of the ship, deck officers being the most represented group. Rather small amount of the respondents was from engine department, but this can be seen quite reasoned as especially smaller ships are operated

with only one or two persons manning the engine room. I think that the sample group is both reliable and relevant for this research.

Mainly quantitative method was used for this thesis which gives indicative numbers about the thoughts of the sample group. One part of the questionnaire was open-ended question where respondents could give their opinion of the biggest threat for seafarers' health. By grouping these answers, some stronger trends could be seen. Open-ended questions could have been used more to get more detailed answers. To get more detailed results, further research is needed by focusing on different aspects of the topic. I hope that this study can act as a guidance for someone interested to continue with this topic. A good starting point for further research would be to start analysing trends presented here more thoroughly to fill out the gaps in the results of this study.

In overall, I'm satisfied with the outcome of this thesis. Quite big sample group was obtained with the available resources and an indicative result of the state of safety culture onboard Finnish cargo ships was achieved. Working with this thesis was interesting and it gave me a good lookout of the current situation and a lot of new information to use in the never-ending work for improving safety culture on my part.

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Appendix: Questionnaire

Sense of safety among seafarers

This survey is anonymous and all the answers will be handled confidentially. Any persons identity cannot be identified from the research report. Please give answers according to your own thoughts and feeling.

*Required

1. How long you have been working onboard ships? *

Mark only one oval.

- ◯ 0-2 years
- ◯ 3-5 years
- ◯ 6-10 years
- ◯ 11-20 years
- ◯ More than 20 years

2. What is your current position onboard? *

Mark only one oval.

- ◯ Master
- ◯ Deck Officer
- ◯ Deck crew
- ◯ Engineer
- ◯ Engine crew
- ◯ Catering crew

3. Gender

Mark only one oval.

- ◯ Female
- ◯ Male

4. Are you happy with the safety culture onboard your vessel? *

Mark only one oval.

- ◯ Yes
- ◯ No

5. Do you feel that your colleagues are interested about their own and your health and safety?

Mark only one oval.

- ◯ Yes, Everyone look after each other
- ◯ No, Some of them seems not to be interested
- ◯ It's only the responsible personnel who should take care of the safety matters

6. Do you feel that your safety is taken seriously from the side of your foreman or employer? *

Mark only one oval.

- ◯ Yes
- ◯ No

7. Do you feel that you have possibility to influence on safety culture onboard?

Mark only one oval.

- ◯ Yes I do
- ◯ Not really
- ◯ It's not part of my job

8. Do you think safety management is implemented in a good way onboard your vessel?

Mark only one oval.

- ◯ Yes, safety issues are tried to be actively improved
- ◯ No, there is room for improvement
- ◯ I cannot say

9. Have you received proper familiarization for performing new tasks or operating new machinery onboard?

Mark only one oval.

- ◯ Yes, familiarization is always part of the work onboard
- ◯ No, Usually I have to learn new things by myself
- ◯ I think it's not necessary

10. Is there correct tools and proper PPE (personal protective equipment) available for all tasks done onboard?

Mark only one oval.

- ◯ Yes. If not, work will be postponed until proper equipment is arranged
- ◯ No. Sometimes I need to work with poor equipment
- ◯ Protective equipment is slowing down working and I don't need it.

11. Is all machinery and equipment onboard well maintained and safe to operate?

Mark only one oval.

- ◯ Yes, all deficiencies are fixed without delay
- ◯ No, there are several hazardous equipment onboard that are not safe to use

12. Have you had to perform tasks onboard that you did not feel safe to do? *

Mark only one oval.

- ◯ Never
- ◯ Sometimes
- ◯ Quite often

13. Do you feel that you are risking your health because of your choice of career? *

Mark only one oval.

- ◯ Yes
- ◯ No

14. Do you think that seafaring is more dangerous than other professions? *

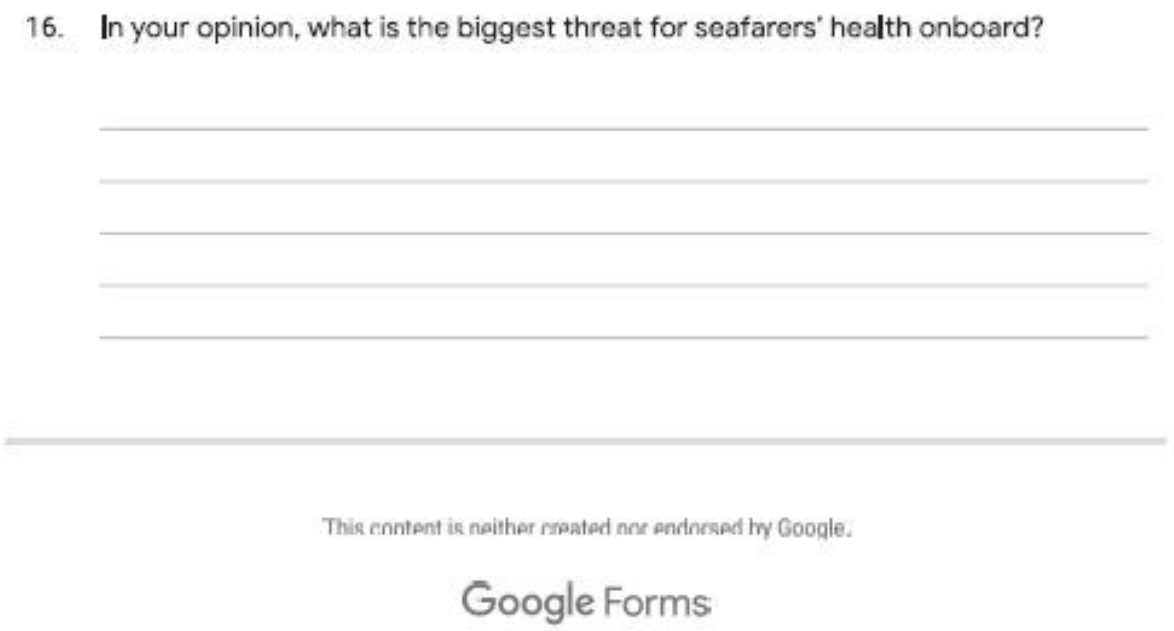
Mark only one oval.

- ◯ Yes
- ◯ No

15. Have you ever thought about changing profession because of safety related problems onboard? *

Mark only one oval.

- ◯ Never
- ◯ Sometimes
- ◯ I think about it often



Appendix: Open answers to the questionnaire

In your opinion, what is the biggest threat for seafarers' health onboard?

- I think that no amount of PPE is enough if the actual safety culture onboard does not follow. One cannot force people to protect their lungs, eyes or ears during hold cleaning or cargo operations. Of course supervisors can and should guide crew to use PPE, but we are talking about grownups and if they don't see it necessary, in my opinion, it is foolish to walk after and guide people like children. When someone has worked onboard long enough they should be able to understand the risks involved. Obviously when having new crew and apprentices they need special guidance. In general, even during my career I have noticed a big change in the safety culture. Working under influence of alcohol is deemed foolish nowadays. It's a lot less the sort of "tough sailors don't need gloves, or oxygen meters" -mentality. Nowadays everyone understands that it's not about being tough, rather than being smart if you perform the job in a safe way.

- Fatigue and accidents related to this. The rest hour regulations are sometimes almost impossible to keep as the crew is too small, and sometimes it will be less resthours just because crew need to sit at the computer for 1h just to be able to get the resthours ok in the company resthours log? Some company complain if there are any breeches in resthours

and blame the Captain for bad planning. There should be increases in minimum safe manning (IMO) to be able to implement the resthours rules.

- Money or time related pressure from shore management. Yes, the safety perspective of the company is quite high, but when it comes to asap issues, money related urgent subjects, all forget safety and try to complete or get rid of the task which need to be resolved. That is the biggest threat for the seafarers on board. Shore management responsibility is to do their responsibility timely and oversee the issues in a proper plan. On board, nothing should be done asap. Safety first!

- Company's and the ship's safety culture integrity deteorization through oersonnel changes. I'm working for company that promotes good safety culture. However even this positive culture may be effected when personnel change, if the safety culture awareness is lacking for the new person in management or in the team onboard. This is particularly true when change happens in ranking company management positions or in influencing positions onboard.

- Poor safety culture, some things are still done in 70's way onboard. Especially for people working with cargo residues, chipping and painting it's unbelievable that the old way of thinking about safety is so prevalent, such as not needing respirators or safety glasses while working in the hold or doing any chipping without proper PPE. You have only one set of intestines, don't waste them for your employers benefit!

- Long term (at least deck department) i think vapours from paints, especially two component paint, and thinners are often not taken seriously enough, especially for new workers. Same for hearing protection. Highest risk for Injuries or deaths are life boat drills, cargo and mooring operations, work in enclosed spaces.

- Lack of sleep. People are usually too busy or tired to think about safety properly. Also monthly safety drills are done quickly and practical training is often skipped totally. Proper PPE not always available, and new orders arrive very late sometimes.

- Depends on vessel type of course but for exmple on RoRo type vessels cargo decks are most often big threat for all crew memembers involved with cargo ops. Ex. blind spots, loud noise, tugmasters with high speed, poor lighting, no proper PPE etc.

- Fatigue related accidents. There is not enough awareness of fatigue and how it affects peoples performance and cognitive abilities. Organised, systematic fatigue management systems are not common within the maritime industry.

- 1,Cheap equipment from China.2.Poor familiarization to new equipment installed onboard.3.To tight timetable to do the job.4 Small crew and too long time onboard with only a short leave home (6-9 month on / 1-2 month off).

- Eventually money has more "power" than safety issues. Also "oldschool" attitude, "before we could do things w/o safety gear so why shouldn't we now be able to"

- When you meet lack of interest from owner is absolutely most dangerous. Attitudes onboard can be changed, but it’s different story with office people

- Underestimating the possible hazards of poorly maintained and wrong equipment. Usually cost savings and shortcuts are the biggest threats.

- useless surveys send to everyone multiple times a week. But smoking is more dangerous than any other, talking about health, not safety.

- When growñg old you don't have the streght to complete the tasks needed. .also because rhe pure lack of workforce(people).

- Irregular working hours causes fatique and most probably health issues in the long run. Even the rest hours are followed.

- Well biggest threat is seafarer itself, because there is still such people who doesn't use PPE in correct way.

- Mental wellbeing and the fact that crews are becoming smaller and smaller with the work load remaining same.

- Loading and discharging. smoking and alcohol (bad for your health where ever you do it, not just on board)

- Owners don't really care about safety or the environment. Only maximizing profit drives all decisions.

- Changing watch schedules, fatigue and therefore the change in atmosphere and the safety attitude

- Getting crushed by moving equipment during cargo ops. 2. Falls from height. 3. Slipping.

- Fatique. Crews are often so small that rest is not enough. Tired people make bad choises.

- People think of their own and don’t have personal growth and compassion for each other
- Taking stupid shortcuts without thinking and long term exposure to harmful substances
- Negligence of health and safety measures and specifically mooring operations.
- Shift work and not enough rest. On Ro-Ro toxic gases from vehicles
- Epäterveelliset elintavat (tupakka/alkoholi), huono sisäilma
- Depression etc. Sleep and accidents what lack of sleep does
- Nr 1, Lack of sleep due to bad weather and work schedule.
- People who don’t care about safety regulations and rules.
- Long hours,bad sleep,vibration,noise and bad air quality
- Health issues resulting from irregular working hours.
- Fatigue due to vibrations, and rolling/pithing
- Head Office’s constant focus on cutting costs
- Neglected, badly maintained machinery, tools
- Cyber attacks for navigational tools
- Unprofessionel crew and bad weather
- Wrong attitude regarding safety.
- Loading, discharging, mooring
- Workinghours....little sleep
- Taking things for granted.
- Falling, when slippery etc
- Isolation and alcohol..
- Sometimes lack of sleep

- Cargo, cargo operations
- Routine and neglection
- Mental case captains.
- slipperiness, falls.
- Rope and wire work.
- Longtime exposure
- Fire breaking out
- Life boat drills
- Cargo operations
- Lack of sleep
- Working alone
- Dropping down
- mental health
- Lack of rest
- Bad weather
- Non-EU crew
- Careless
- fatique