



Risk assessment for subcontractor's path from port to the ship: company X

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The purpose of this thesis was to recognize, identify and assess risks occur from an European shipping company X using subcontractors. Such risk assessment is beneficial since it helps the case company to develop their overall security and safety on board. Risk assessment is crucial, since existing risks must be identified and assessed before measures to mitigate or manage risks.

The research method of this thesis was qualitative research, since the number of interviewees were only eight. Needed information regarding this research was so detailed, that qualitative research was the only rational method to guarantee such specific results.

As a result, there were nine (9) risks assessed in total. Risks were related to either the security check process or occupational safety. Recommendations provided detailed risk treatment methods for certain risks, and the PDCA-model was suggested in order to ensure a continuous and comprehensive risk management process.

This thesis provides tools for the risk assessment, but it covers only risks related to the subcontractors. It doesn't apply for the overall security and safety on board but can be used by the case company if desired.

For the further development, the writer recommends the case company to construct a continuous risk management process, where both internal and external risks are managed in the continually changing environment.

Keywords: Risk, risk assessment, outsourcing, subcontractor, shipping

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1 Introduction

1.1 Background of the research

During the first meeting with representatives of the case company, the discussion focused on the external workers: subcontractors and visitors. The original idea was to take into account only the path of subcontractors and visitors from the port to the ship, and research what the path is like at the moment, and how it should be. During the discussion it turned out that there are some flaws in the process, such as lack of proper identity verification, so it was clear that the topic needed a research. During the research, the subject took a shape as a risk assessment, so it would cover also the work of external workers.

1.2 Need for the research

A large part of maritime accidents are caused by human errors, according to the Chartered Institute of Ergonomics & Human Factors (2013). On the ship, the crew is in the key position for avoiding accidents. The crew of the ship must be aware of the situation at sea in order to guarantee a safe voyage for each person on board. This also applies for subcontractors, since the case company has safety as the priority number one aboard. For the case company this topic is important and current, so that their reputation as well as safety and security aboard can be maintained.

Safety and security on passenger ships is crucial, since ships can nowadays carry more than 5000 passengers at a time, so security and safety onboard have an effect on large amount of people (IMO. International Maritime Organization. 2018). Due to the legal requirements, increased threat of violent attacks, large amount of passengers and a desire to improve the overall security and safety on board, there is a concrete need to assess the risks that exist when the case company is using subcontractors.

Serious maritime accidents happen rarely, but those accidents have had significant consequences. One of the most well-known passenger ship disasters in Europe is the sinking of m/s Estonia in the Baltic Sea 1994. Other well-known cases are Costo Concordia grounding and partial sinking in Italy 2012, and the sinking of Titanic in the North Atlantic 1912 (Maritime Insight 2018). However, these disasters are not necessarily related to outsourcing and subcontractors, but those events show that serious accidents are not impossible. According to Center for International Maritime Security, ISPS (International Ship and Port Security code) came into force after 9/11 attacks (Lars H. Bergqvist, CIMSEC). The purpose of ISPS is to “is to ensure that the applicable ocean-going ships and port facilities of IMO Member States are implementing the highest possible standards of security” (IMO. International Maritime Organization. 2018). Therefore, terror attacks have also had an effect on shipping. Because of these events

and challenges the shipping industry is facing, the overall security and safety on board should be considered carefully in order to guarantee not only safe working conditions for crew, but also safe voyage for passengers.

When considering the topic “maritime security”, researches and literature refers mostly to piracy that a merchant vessel may face. Ricard Marí and Álvaro Librán consider security issues in their publication “Safety and Security on passenger ships” (2009,17-18) as illegal acts - piracy, terrorism, extortion, vandalism, fighting, affray, sabotage and such. A possibility of a terroristic attack can't be excluded, since Europe has experienced many terror attacks recently, for instance Paris attacks 2015 and Nice truck attack 2016.

Passenger ships can be defined as “a ship carrying more than 12 passengers” (IMO. International Maritime Organization. 2018). Ships are required to comply with a large amount of different requirements, that cover every aspect of ship construction and operation, including security and safety on board. (IMO. International Maritime Organization. 2018).

According to Ricard Marí and Álvaro Librán in Safety and Security on passenger ships, especially passenger ships are vulnerable for incidents made on purpose by human beings. Writers think that possible crisis situations can be brought under control by preventative measures and well-practiced procedures.

John Ridley and John Channing have defined risk management as “the eradication or minimisation of the adverse of the pure risks to which an organisation is exposed” in their book “Risk Management (1999, 2.6)”. By applying this approach to the subcontractor process the existing risks can be identified since the risk assessment has not been done for the use of subcontractors.

1.3 Research aim and question

The aim of this research is to find out what kind of risks occur when the case company is using subcontractors. Risks taken into consideration can be crew, people, premises or information related, or in other words, risk that can have an effect on board. The research covers risks that can exist during the subcontractor's concrete path from port to the ship. Thus, the research question is:

“What risks occur from company X using subcontractors?”.

1.4 Confidentiality

Any information regarding the identity of the case company will not be published due to the request of the company. The anonymity will be guaranteed, since it is not the wish of the company or Thesis writer to publish such information which could be used for wrong purposes.

2 Theoretical background

2.1 Outsourcing

Business process outsourcing, known also as BPO, is defined as “contractual service of transferring one or more business processes to a third-party provider, where the latter takes the management, ongoing support and infrastructure of the entire applications of processes” (Alphes, B. Patel., Hemendra, A 2005, 7). Nowadays common reasons to outsource services are the desire to increase the effectiveness of use of time and reduce expenses and risks. Typical outsourced services are for instance accounting and bookkeeping services, customer service, tax related services, payroll processing and different kind of web services, e.g. social media marketing (Outsourcing insight, 2018). According to Mark Franklin, reasons why to outsource in the shipping industry are quite similar: reducing the costs incurred by labour and increase the profit. In this research, outsourced services, which are under review, are the services which take place physically on the ship.

2.1.1 Subcontractors

The performer of outsourced activity is called a subcontractor. The subcontractor and the company conclude an agreement, and to perform a comprehensive outsourcing process, following aspect should be considered: When making the decision to outsource, the company must be aware of what activities and on which scale it is profitable to outsource and the subcontractor’s ability to fulfil the commitment. The commitment must be functional and flexible, and it must define the rights and responsibilities adequately. The commitment must also include proper protective clauses to ensure the status of the company. During the partnership both parties must be able to work in cooperation with each other’s and adjust to the changing external circumstances (Kiiha, J 2002, 3, 74-75). According to Kiiha (2002), outsourcing is a partnership of two parties: the outsourcing company and the subcontractor. The responsibilities and rights should be clearly defined in the commitment, not only due to work-related rights and responsibilities, but also from a legal point of view.

According to J. Vuorenmaa & T. Välimaa (2015, 9), answers of their study presents four most important qualities required from the subcontractors: adherence of the schedules, reliability, quality of the work and competence of the workers. It is important that both parties, the subcontractor and the company, are striving for same quality standards and keep up with the schedules, since that is how the quality of the work is built. Both parties should also openly discuss possible challenges and problems in order to build trust with each other.

When outsourcing services in a company, it is important to define roles and responsibilities to perform comprehensive outsourcing process. Subcontractors have their duty to perform the work as ordered and defined in a given timeline. Possible delays and cancellations would be undesired, since they can be harmful for the business of both parties.

2.1.2 The concept of risk

Literature offers many definitions regarding risks. According to Leppänen (2006), “risk refers to the danger of loss or accident, to the possible loss in the future. The risk doesn’t apply to the incident itself, but to the consequences caused by incident”. When considering Leppänen’s statement, a risk is not actually a risk without the consequences. Without consequences, the incident is just an ordinary event. Hopkin (2017), states that risk is “an unplanned event with unexpected consequences”. Hopkin and Leppänen share the same point of view regarding risks: a risk comes with the consequences. Pinto et al. (2015) has the same point of view as well: “...event with undesirable consequences without specific regard to intent. Includes accidents”. (Pinto, Magpili, & Jaradat R 2015, 6). According to Leppänen, Hopkin and Pinto et al., the term “risk” involves two factors: the event and the consequence caused by that event. For instance, in the everyday life, a risk could be to step on icy road. A possible consequence is to slip, fall down and break a bone. An example on a larger scale could be that the captain in command does not have a proper education for that type of ship. As a consequence, in an emergency the captain is not able to propel the ship, which can lead to a maritime accident.

Merna and Al-Thani (2011, 11) describes that risk is a result of four factors: probability of occurrence, severity of impact, susceptibility to change and degree of interdependency with other factors of risks. If none of these factors appears, the occurrence can not be considered as a risk. In this thesis the focus will be on the probability of occurrence and the severity of impact since these factors are measurable by the thesis writer and the case company. The susceptibility to change and the degree of interdependency with other factors of risks are independent of a risk assessment of a specific risk, and therefore not considered in this thesis. It is often also described that risk can be negative or positive or that a risk can have negative or positive impact. The definition varies depending on the writer, and it is commonly stated in the business-related literature that a risk should be considered as a positive event; risks should be taken in order to make great trades and profit. However, in this context, risks are considered as a negative incident, since the risks which can have a negative impact on the safety and security on board, are under review.

Based on the sources, the concept of a risk is a summary of different factors. A common factor of each definition is that a risk has consequences. In this context, those consequences are negative as well as the risks. The severity of impact is measured through a risk matrix, which is presented later in this thesis.

2.1.3 Risks of outsourcing

Kiiha (2002) states that a company can prepare for risks caused by subcontractors which can be partly managed by proper terms of contract. These kinds of risks can be delays or mistakes

made by subcontractor, which can lead to interruptions not only in the subcontractor's, but also company's operations. Also, mistakes or delays can cause financial losses. Besides that, same risks exist among subcontractors than regular employees. These are more like operational risks or risk of accident: operational risks can be personal risks (health and life-related), information security risks, production-related risks or project-related risks. Accidents that cause risks can be interruption, fire, crime or environmental-related (Suomen riskienhallintayhdistys 2018).

In the article "Managing Outsourcing Risks at the Early Stages" (2014) it's stated that poorly managed risks of outsourcing can have an impact to organizations financial performance, operating model integrity and reputation. Outsourced services may fail to meet expectations - due to risks occurring but not managed at the early stage.

Due to the possible risks occurring in the outsourced services, it is important for the case company to assess the risks.

2.2 Risk management

Risk management is a widely considered topic. According to the literature, definitions of the risk management can vary depending on the writer, but the main idea is the same regardless of the author. Ridley & Channing (1999, 2.6) describes the risk management as follow: "risk management may be defined as the eradication or minimisation of the adverse effects of the pure risks to which an organisation is exposed. The role of risk management in industry and commerce is to consider the impact of certain risky events on the performance of the organisation, devise alternative strategies for controlling these risks and/or their impact on the organisation and relate these alternative strategies to the general decision framework used by the organisation".

Leppänen and Merna & Al-Thani consider the risk management as a process. "Risk management is a process, which aim is to manage identified risks. Risk management is an entirety, which is involved in every activity and decision-making" (Leppänen, J 2006,119). Merna & Al-Thani states that "the art of risk management is to identify risks specific to an organization and to respond to them in an appropriate way. Risk management is a formal process that enables the identification, assessment planning and management of risks". (Merna & Al-Thani 2011, 2).

Ridley and Channing (1999) and Merna and Al-Thani (2011) demonstrate that a comprehensive risk management process includes three elements: identification/impact of the risk, planning to control or mitigate risks and finally the actual management of risks/connecting the risk management strategy into the decision-making process of an organisation. Leppänen (1999)

states that risk management process should not be a separate process, but it should be included in every activity or process.

In this research I'm using the first two steps demonstrated by Ridley and Channing (1999) and Merna and Al-Thani (2011); identification of the risk and planning to control or mitigate the risk. The actual management of possible risks is the responsibility of the company. Also, due to time and resource limitations, it's not possible to take into account the risk management of the entire organization, so the focus will be only on the subcontractors who are working on the ship.

2.2.1 Risk assessment

According to Paul Hopkin (2017, 119), identifying and rating of risks together are the elements of the risk assessment. It helps the organization to determine what risks it is facing, and the purpose of the risk assessment is to recognize specific risks which could impact to the business. He states that the risk assessment should not be the end of the risk management process; it should be seen as the beginning of the process. The risk assessment itself consist of the assessment of likelihood and consequences of identified risks. The simple technique is to divide the likelihood on three levels: 1) unlikely, 2) possible and 3) likely. The gravity of consequences is also divided in same manner: 1) minor, 2) harmful and 3) serious (Leppänen 2006, 122-125). As the risks are assessed as described, the magnitude of risk is the likelihood X consequence. The assessment can be implemented trough a risk matrix in Table 2, which calculates the magnitude. (Leppänen 2006, 126-128).

Likelihood of the incident (3x3 rating)	Consequences of the incident		
	Unlikely	Possible	Likely
Minor	1. Insignificant risk	2. Minor risk	3. Moderate risk
Possible	2. Minor risk	3. Moderate risk	4. Significant risk
Serious	3. Moderate risk	4. Significant risk	5. Intolerable risk

Table 2: Risk matrix. Leppänen (2006).

Risk level in Table 2 can be between 1 and 5, 1 being the lowest and 5 being the highest. Table 3 presents the descriptions of certain risk levels and measures in order to mitigate risks.

After assessing the consequences and likelihood of a risk through presented risk matrix, the risk level and a specific measure for that risk can be reviewed from the risk level table (Table 3). Each risk level defines recommended measures to prevent or mitigate risks. Measures are guiding principles, and it is a decision of the risk owner, are the certain measures adopted to the risk management system.

Level of the risk	Necessary measures to mitigate risk
1 Insignificant risk	<ul style="list-style-type: none"> -The magnitude of the risk is so insignificant, that it doesn't require any measures. -Risks and measures on this level must be reviewed yearly or in separate reviews. -Measures to control risks can be implemented as preventive practices if necessary, to avoid the increase of risk level.
2 Minor risk	<ul style="list-style-type: none"> -The magnitude of the risk is low, specific measures are not necessary but can be implemented if needed. -Risks and controlling measures on this level must be reviewed yearly. -Through preventive measures the risk level can be maintained.
3 Moderate risk	<ul style="list-style-type: none"> -The magnitude of the risk requires measures to reduce the risk level. -Measures must be scheduled and implemented during same year. -The likelihood of harmful risks must investigate carefully. -Risks and measures on this level must be reviewed continuously (monthly).
4 Significant risk	<ul style="list-style-type: none"> -The magnitude of the risk requires immediate measures (daily/weekly). -Risky actions on this level must not be implemented without measures of reducing the risk. -Risks and measures on this level must be reviewed daily/weekly.
5 Intolerable risk	<ul style="list-style-type: none"> -The magnitude of the risk is so high, that operations should not be started or continued before reducing the risk level by immediate measures. -The magnitude and realization of risk are on the level where the realization is immediate. -Risks on this level must be reviewed also after reducing the risk level. -Possible risks arising to this level must be reviewed weekly.

Table 3: Description of risk levels and measures to mitigate risk. Leppänen (2006).

When the risks are assessed and summarized, the result will be the level of risks. This level of risks is the totality of risks what can be realized in the worst scenario (Leppänen 2006). In this Thesis I will use the method presented by Leppänen. Before the actual risk assessment, interviews and brainstorming sessions will be used in order to find out possible risks what occur when the case company is using subcontractors.

2.2.2 PDCA Model

If the company aims to manage or mitigate assessed risks, a PDCA model is recommended in order to ensure a comprehensive risk treatment. PDCA (Plan, Do, Check, Act) Cycle is a planning tool that is divided into four steps, and the purpose of it is to guarantee a continuous improvement in a business (Asq. What is the plan-do-check-act (PDCA) cycle? 2019).

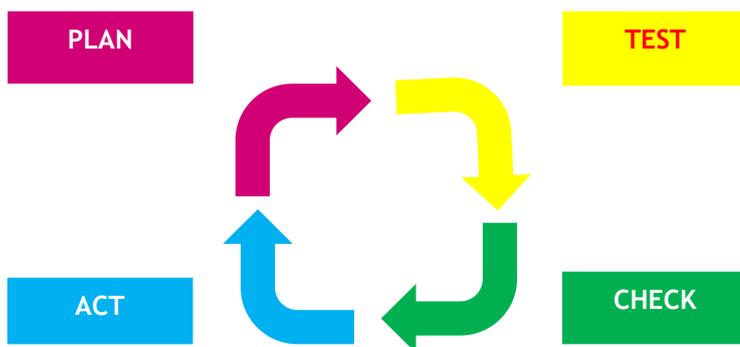


Figure 2: PDCA Cycle

The PDCA Model has four steps. Each of the steps are explained below. Also, recommendations how to integrate it into the case company's business processes are given. This PCDA Model is recommended to the case company, if it feels that risk mitigation should be implemented after risk assessment.

Plan

The first step is to identify desired changes and plan that change. In case of the case company, the risks are already identified and assessed, so it's their decision what risks they'll take into account. The desired level of chosen risks should be defined in order to make a change.

Do

Do-step is the actual action step. In this part, the change is made. Risks of the case company are mitigated or managed in this step appropriately - it is up to case company, how they'll treat the risks.

Check

The results of first two steps are analysed. At this point, the results of a change should be available. In the case company it means that reviews of the risk levels should be implemented in order to recognize has there been any negative or positive changes in the risk levels.

Act

If the change was successfully implemented and desired results were achieved, the PCDA Model has worked as it should. If not, the cycle should be gone through again, but with a different plan. In the case of the shipping company, if the risks are not mitigated as planned in the beginning, a new plan should be created.

2.3 Legislation

Legislation provides many regulations regarding maritime security and safety, aiming to promote safe voyages for every person travelling by ship. In this research, legislation related to the topic is presented in this chapter. Legislation regarding mandatory trainings are presented since it defines trainings required from the crew, but not from the subcontractors.

2.3.1 The SOLAS Convention

International Convention for the Safety of Life at Sea (SOLAS), 1974, is the base of the safety on passenger ships. All the parties (countries) of the Convention must comply with the provisions. When speaking of safety onboard, provisions apply to construction, fire protection, detection and extinction, life-saving appliances and arrangements, radiocommunications, safety of navigation, carriage of cargoes and dangerous goods, management of the safe operation, special measures to enhance maritime safety, additional safety measures for bulk carriers, verification of compliance and safety measures of ships operating in polar waters (International Maritime Organization. SOLAS 2018). The case company does comply with the SOLAS Convention as being one of the contracting parties.

2.3.2 The ISPS Code

The SOLAS Convention also handles special measures to improve maritime security. It includes the ISPS Code, the International Ship and Port Facilities Security Code, which defines the minimum-security measures for governments, shipping companies, crew and port personnel in order to detect threats and prevent incidents to happen (International Maritime Organization. SOLAS 2018).

According to ISPS Code, maintaining the specific level of security begins from the port, from where passengers, crew, cars and cargo are starting their voyage. As well the subcontractors

start their work by accessing the ship through port facility and therefore are part of the ISPS Code.

2.3.3 The STCW Convention

The STCW Convention (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978) is a convention, which purpose is to “promote safety of life and property at sea and the protection of the marine environment by establishing in common agreement international standards of training, certification and watchkeeping for seafarers (International Maritime Organization 2018)”. The convention came into use on 28th of April 1984, and The Manila Amendments to the STCW Convention and Code are made in June 2010 and adopted in January 2012.

The STCW Code is a part of the Convention, and consists of part A and B. The A part is mandatory to ship’s crew, and it sets basic requirements of training regarding emergency situations, whereas the B part provides guidance, how to implement the Convention properly (International Maritime Organization 2018).

3 Methodology

This chapter presents the methodology used in this research. It shows the research approach and method used, how the data is collected and how the reliability and credibility is proved.

3.1 Qualitative research

Qualitative research refers to research, where the data is non-quantitative in character, and the data consists of textual material, such as interviews. Also, the goal of qualitative research depends on the context and purpose of the project. Outcome is usually description of significant findings from the analytic synthesis of data. The result can include for instance evaluation of effectiveness of procedures or policies (Beretvas, Leavy & Saldana 2011, 3).

According to Beretvas, Leavy and Saldana, qualitative research is a suitable method regarding this research, since when the risk assessment is done, the crucial part are the findings which will stick out from the crowd, and these findings are the risks which the company might face, and which can cause harm if those are not properly assessed and managed.

3.2 Research approach and strategy

As previously stated, this research is qualitative research. For this kind of specific risk assessment, detailed information regarding subcontractors, practices and procedures was needed in

order to be able to assess possible risks. For that reason, the interviews are semi-structured since it allows interviewee share knowledge more freely compared e.g. to questionnaire with multiple choices. Data collection method is explained below.

Strategy was to interview representatives of the case company in order to clarify possible risks regarding subcontractors which could have an effect on security and safety on board. Since the number of interviewees was low, it was easy to pick occurring risks from the answers. All the risks mentioned during interviews will be assessed in the risk assessment tables, but interviewees and their answers are not specified. That ensures that interviewees can't be recognized, and their anonymity is guaranteed.

The risk assessment will be formed as a table, which presents the risk, consequences of it and the risk level. After that the results will analysed in order to make development suggestions for the risk management process.

3.3 Data collection methods

As a data collection method semi-structured interview was chosen. In total, eight interviewees were chosen for the research. Interviews were arranged by the knowledge of the Master and Safety Officer, since they know best what is most beneficial for this research. Questions were open-ended, since there's no simple answers regarding risk management and subcontractors, and the purpose was to interview persons who have knowledge in that field in the company. Also, the topic and research question are very practical, so questionnaires would not tell much about the problem. Open-ended questions gave the interviewees an opportunity to explain their answers, which is beneficial since the answers required clarification and explanation. Interviewing regular employees, such as maintenance personnel, would not have been beneficial since due to their possible lack of knowledge about e.g. external threats or risk management system of the company.

Interviews were done onboard the case company ship during the voyage. Persons, who were selected to the interviews, were working onboard at the same time. There were seven interviewees in total. The aim was to interviewee also one or more representatives of subcontractors, but it turned out to be too complex to arrange, since the schedules when subcontractors are onboard can vary, and it is also impossible to tell when there will be the need for the service of subcontractor. Therefore, when I had to arrange the meetings in advance, none of the representatives were able to confirm if there were subcontractors onboard at the same time.

3.4 Reliability

During the first meeting with the representative of the ship, the whole thesis project was looked through in order to ensure case company's full understanding of the project. In addition to this, preliminary thesis plan was approved by the Master.

According to Saunders, M., Lewis, P. & Thornhill, A. (2016, 202-203), “*reliability* refers to replication and consistency. If a researcher to replicate an earlier design and achieve the same findings, then that research would be seen as being reliable. In essence, *validity* refers to the appropriateness of the measure used, accuracy of the analysis of the results and generalisability of the findings”.

Saunders et al. present four threats to reliability: participant- and research error, and participant- and researcher bias. Participant error was avoided by in advance arranged meetings to guarantee full focus and enough time for interviews. Same practice applied for researcher, since the researcher was the interviewer of the interviewees. Participant bias was avoided by guaranteeing the anonymity of participants, so that the answers won't be distorted. Researcher bias was avoided by reporting only the answers of participants. Also, leading questions and such was not used in the interviews.

4 Results

4.1 The role of subcontractors in company X

According to the interviewed participants of the research, the role of subcontractors is varied in the case company. It's very difficult to name accurately all the work duties for which purpose the subcontractors are used, or which activities are outsourced, since it varies depending on the work. For instance, certain maintenance- or repair services can be needed only once if the need is very rare or uncommon. For the case company, it is more cost-effective to outsource certain work and services. This work can be such as a maintenance work requiring special knowledge and skills to perform that work, because it would cost too much to keep a full-time employee to perform that kind of work. In the Table 4, outsourced workers are sorted by their department.

Deck department	Technical experts, metal workers, hydraulic experts
Navigation bridge and mast	Electronic experts
Restaurants, bars, corridors and other public spaces	Cleaners, music artists, other entertainment artists
Kitchen	Repairers of the kitchen- and restaurant machinery
Car deck	Food and material deliverer

Table 4: The role of subcontractors in company X. 2018.

As presented in Table 4, the duties of subcontractors vary a lot. According to the interviewees, the number of subcontractors varies daily, and there can be anything between 1 and 100 outsourced workers at the same time onboard. The number depends on the needs of the case company.

4.2 Subcontractor's path from port to the ship

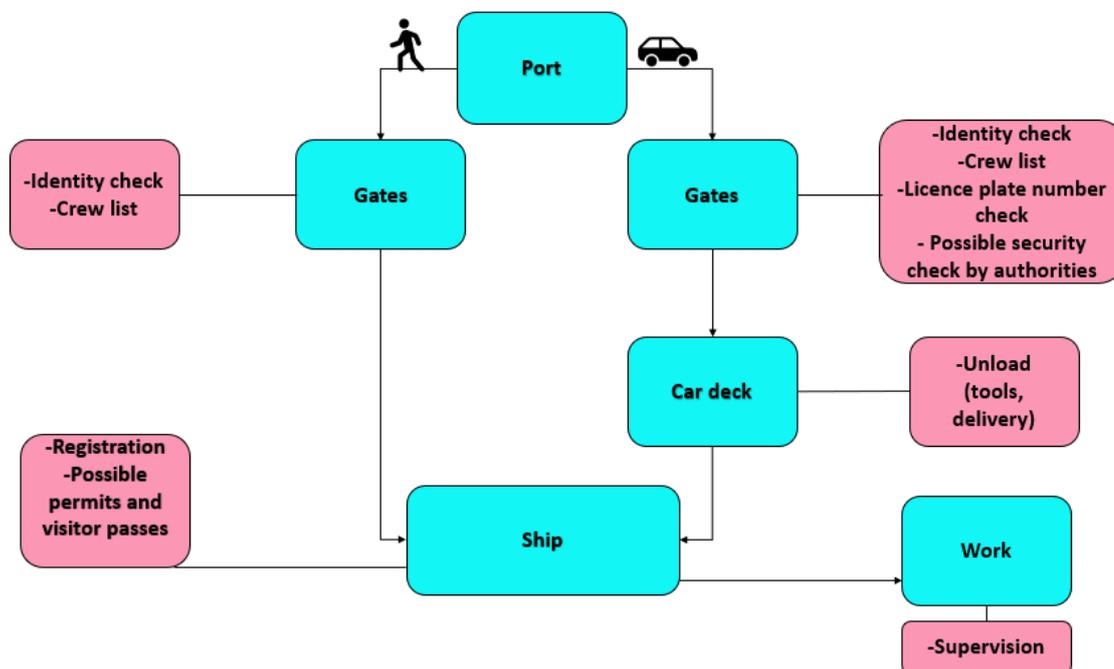


Figure 1: Subcontractor's path from port to the ship (2018)

Figure 3 presents each step of subcontractor when accessing the ship. Figure is formed through data from the interviews. The blue boxes indicate the steps that a subcontractor must pass, while the pink boxes indicate the measures taken in each point. Left side presents the path taken by walking, while right side presents the path by car. Each step and measures are explained below.

Port

The ports are the locations where the ship is accessed by car and walking. Ports have their own procedures and practices, but the measures described in the Figure 2 are taking place at all the ports. The access point varies from the travelling style. If accessed by walking, the access point is inside the terminal in both ports. By car, the traffic signs must be followed in both ports in order to choose right way to the car check in and ship.

Gates

Gate is the point where the identity and travel documents are verified. On the left side, in the gates the officers check if the person is on crew- or visitor list. It depends on their work and position that which list they're on. The decision is made by the orderer of the work. Identity of a person is also verified by passport or identity card. If both of these are in order, the

officer opens the gate for that person. The same practice applies every time a subcontractor or visitor accesses the ship.

On the right side, in the gates the officers check is the person on crew- or visitor list. It depends on their work and position on which list they're on. The decision is made by the orderer of the work. Identity of a person is also verified by passport or identity card. Licence plate number of the car is informed to the shipping company in advance, and the officer verifies that it is correct. If there are more than one person in the car, everyone's identity is verified in the same manner. The driver is responsible for informing shipping company if the car carries any dangerous goods, such as toxic, explosive or flammable substances.

Authorities (Police, Custom or Border Guard) may do security checks for vehicles. Typically, they search predetermined and profiled vehicles and persons, but the shipping company don't have any obligations in this regard.

Car deck

Car deck is the place where vehicles are parked during the voyage. On the right side, depending on the nature and needs of work, the vehicle may include tools and material needed in the work. Unloading of these happens in the car deck, from where it is transported to the actual work station on foot. If the vehicle includes e.g. food deliveries for the kitchen, the deliveries are also unloaded in the car deck. Recipient of the delivery comes to the car deck to receive it.

Ship

The ship of the case company is the place where the work of subcontractors is performed. When accessing the ship, visitors must register in the information point to get a visitor pass. Also, crew working in information point, informs the host of the visitor. If necessary, visitor receives possible permits. Subcontractors must sign up for the supervisor of the department where the work will be performed. Subcontractors also receive possible permits if necessary. They must wear the ID card of their employee. When an employee of a subcontractor arrives onboard at the first time, a crew administrator verifies the identity of the employee when he/she signs up for work.

Work

The actual work always happens under supervisor of the department where work is performed. The only exception are night shifts, when subcontractors are working without supervision. During nights, there's a security guard who is aware of the subcontractors and performs guarding rounds.

4.3 Risk management in the case company

According to the interviews with the representatives of the case company, internal and external risks are managed differently onboard. In this process, the risks are divided as internal and external, since the risks onboard are defined and managed in such way.

Internal risks refer mostly to occupational safety risks. These are already managed by risk assessments. Assessments are updated if there occur significant changes in work conditions, or if a new working method or tool is brought into service. Superiors of each department are responsible for the risk assessment of work conditions. Internal risks also include other safety risks caused by crew or subcontractors.

External risks refer to risks caused by external factors. These are risks that can enable illegal acts against the ship, and these risks are mostly managed by authorities. Police, The Border Guard and Custom are the authorities who share the information with the case company if necessary, regarding possible threats or risks. Some of the external risks, such as an aggressive or threatening person, can be managed by the security guards of the ship, and therefore the consultation from authorities is not needed.

Also, ISPS code is taken into account when managing external risks. ISPS - The International Ship and Port Facility Security Code, is a group of measures to guarantee the security of ports and ships. It includes three different security levels, which can be applied according to the current situation (FAQ on ISPS Code and maritime security 2018). For instance, during a specific state visit the security level can be raised to the level 2, if the authorities consider it to be a security risk and want to raise the security level.

4.4 Risk assessment

The risk assessment is divided into two categories: internal and external risks. Internal risks represent risks which can happen on board due to the acts or behaving of crew or subcontractor. External risks are occasions that can enable illegal acts against the shipping company.

The risk assessment table includes four headlines. The left column “Risk” tells what factor can cause a risk, “Description” column describes that risk in order to understand consequences if that risk factor realizes. The last column, “Risk level”, is assessed according to earlier described Leppänen’s method.

All the risks, descriptions and consequences are based on the interviews.

4.4.1 Internal risks

Risk	Description	Consequences	Risk level
Lack of supervision in night shifts	If a subcontractor works during night, there is no continuous supervision.	Possible mis- or disuse of PPE or incorrect working methods can cause an accident	Minor
Rush during loading	During loading, even hundreds of cars are moving in the car deck and at the same time happens loading and unloading.	Possibility to get run over or hit by a car. Personal injury or death	Moderate
Misuse of personal protective equipment (PPE)	Sometimes occurs lack of use of PPE, e.g. during night shifts, when moving on the car deck or in the high-structure work	Personal injury, death	Moderate
Inadequate induction of a subcontractor’s new employee	Non-controlled induction of safety instructions & lack of control of safety form	Lack of knowledge in emergency can complicate ones acting in emergency	Minor

Poorly fastened equipment of music artists	Sometimes weighty loudspeakers and other instruments are not fastened well enough	During stormy weather, when the ship is heeling, weighty instruments can fall from the stage causing accidents	Minor
Non-participation in rescue trainings	Subcontractors do not belong in the safety organization and therefore they don't participate in rescue trainings	Lack of knowledge in emergency can complicate ones acting in emergency	Minor

Table 1: Risk assessment of internal risks of company X 2019.

Lack of supervision during night shifts

Sometimes a subcontractor must work during night. Normally, the orderer of the work or superior of the department supervises the work of subcontractors. During nights, there's no continuous supervision and the subcontractor works mostly alone. When the work begins, supervisor checks that the subcontractor is aware of proper working methods and wears decent personal protective equipment. However, after that the subcontractor is on his/her own. The security guard of the ship takes tours during the night in order to guarantee that everything is as should, but continuous supervision is lacking. This can enable improper use of personal protective equipment or "cutting corners" especially during late night or early morning, which can lead to an accident.

However, according to the interviewees, subcontractors are very familiar, most of them have been working on board for many years and they know the practices and the requirements of work and are willing to comply with rules, so the risk level is assessed as minor.

Rush during loading

Rush during loading takes place on the car deck. During the ship loading, when all the vehicles must be driven to the car deck in a short time period, there are hundreds of cars moving at the same time. This combined with concurrence of unloading of possible working tools or food deliveries and such, the chance for an accident grows.

Unloading of cars is forbidden during the loading of the ship, but it's hard to control each act of subcontractors in such environment. However, there has been recognized unloading during the worst rush. Also, subcontractors should always wear high-visibility vests when walking on the car deck, but there has been noticed lack of use. These factors combined together can cause e.g. runovers. Consequences of possible accidents can be personal injury or death in the worst scenario, but the risk is manageable, so it is rated as moderate risk.

Misuse of personal protective equipment

Related to the night shifts and rush during loading. Also, in the high-structure work, personal protective equipment is vital. Sometimes supervisors must remind the employees to wear PPE. In the worst scenario, e.g. the lack of a safety harness can be deadly if a person falls from the mast. The consequences could be serious, but the probability is low, so the risk level is assessed as moderate.

Inadequate induction of subcontractor's new employee

When a new subcontractor employee starts working, he/she must read through and sign general- and safety instructions of the ship. This is very important, since it educates the employees what to do in emergency situations. In addition, the Safety Officer introduces the premises and practices of the ship for the new employee. However, if a new employee starts to work in the subcontractor company, there are no control measures for a new employee's induction and has he/she signed the safety instruction form. Basically, there's a risk that a new employee has not been orientated at all since the lack of control and person responsible for that. This can be a significant weakness, if the subcontractor doesn't have the knowledge of what to do in different situations, since the form includes safety requirements related to occupational safety and instruction in case of alarm.

The outsourced services does not have a lot of employee turnover, so the risk level is assessed as minor.

Poorly fastened equipment of music artists

Equipment and instruments of music artists are fastened on the stage, and during windy or stormy weather there's a possibility that it'll fall if it's not fastened properly. Falling can cause a risk for accident, if there's a person near. This happens very rarely, and the crew is aware of fastenings and will remark musicians if necessary, so the risk level is assessed as minor.

Non-participation in rescue trainings

Subcontractors are not considered to be a part of the safety organization of the ship. The safety organization in this context means the plan and responsibilities in case of an emergency. It means subcontractors are not involved in the rescue trainings and they don't have any responsibilities in emergency, except leave the ship if necessary.

The question is that does this practice have any effect on safety or successful evacuation of the ship, and there's no right or wrong answer to that, since it's impossible to forecast if the subcontractors have any role if in case the ship must be left. According to the interviewees, subcontractors are not considered as a resource during an emergency. Due to that, the risk level is assessed as minor.

4.4.2 External risks

Risk	Description	Consequences	Risk level
Lack of security check of vehicles	Vehicles going into the ship are security checked very rarely	The vehicle can include nearly anything.	Moderate
Lack of proper identity verification	Sometimes people's identity is not verified in a proper manner	Unauthorized access to the ship	Moderate
Lack of proper security check equipment	There's no proper equipment so that vehicles or people could be security checked completely	Vehicles and people can carry dangerous/forbidden goods	Moderate

Table 2: The risk assessment of external risks in company X. 2019.

Lack of security check of vehicles

Vehicles accessing the ship are very rarely security checked. This is due to a tight schedule, since the ship only stays approximately one hour in the port. During that one hour it is impossible to check the inside of every vehicle. For the most part, authorities perform the security check if they see it as a necessary measure.

Rare security checks enable the vehicles to include nearly anything, such as dangerous or forbidden goods. These can be such goods as toxic, explosive or flammable material, which can be used to harm people and/or the ship very seriously. Unfortunately, the shipping companies don't have resources to implement comprehensive security checks and it's a responsibility of the authorities to consider such threats in order to prevent attacks and other illegal acts. The risk of attack is present, but currently there are no signs of a possible attack, so the risk level is assessed as moderate.

Lack of proper identity verification

Identity of subcontractors and visitors should be verified every time they're accessing the ship, but this practice is not always carried out properly. First time, when a Thesis worker was accessing the ship, the officer only checked that the name of Thesis worker was on the crew list but didn't verify the identity. Besides that, during the same visit the Thesis worker went to the information point to report herself as a present as advised. The employee in the information point didn't verify the identity but gave her a pass which enabled access to the crew premises. So, at this point, she had access to the crew premises even though the identity wasn't verified at all. When the Thesis worker asked about this during the interviews, she was told that identity should be verified each time, but the system is not comprehensive. Also, she should have been given a visitor card to wear it visible during the whole visit, but during the two visits of her onboard not a single visitor card was detected.

These weaknesses in the process enables possible intruders to access the ship by using the identity of another person. Also, if the intruder has access to the crew premises, it enables e.g. leaking of trade secrets, working methods or security and safety practices. Therefore, this risk is assessed as moderate.

Lack of proper security check equipment

It came out during the interviews, that some interviewees wished that the terminals could contain proper security check equipment for vehicles and persons. The problem is that now that even if the vehicle is security checked by a person, it still could include anything fitting in the constructions of the car. There have also been cases, where a truck driver hasn't informed all the persons (typically family members) travelling in the car with him/her. As discussed during interviews, comprehensive security checks won't become a routine before

something serious happens. By this, interviewees meant e.g. a violent incident. Consequences of this risk can be very serious, but at this moment it doesn't seem to be probable. According to these matters, the risk level is assessed as moderate.

4.5 Discussion

When I asked the participants if the subcontractors have caused any problems, accidents or risk, each respondent answered in the negative. Three out of seven respondents mentioned, that "back in the days" there was sometimes problems with intoxicated repair workers, but that problem disappeared after "A1-agreement" came into force. The A1-agreement is signed between with the parties of outsourcing, and the content includes a commitment, which defines that the social status of each company is on acceptable level (e.g. work conditions, policy of zero tolerance).

4 out of 6 internal risks are on the minor level. According to Leppänen's risk level table, these risks don't require specific measures, but should be reviewed yearly. 2 out of 6 internal risks and 3 out of 3 external risks are on the moderate level. According to Leppänen's risk level table, these risks should be reviewed continuously (monthly).

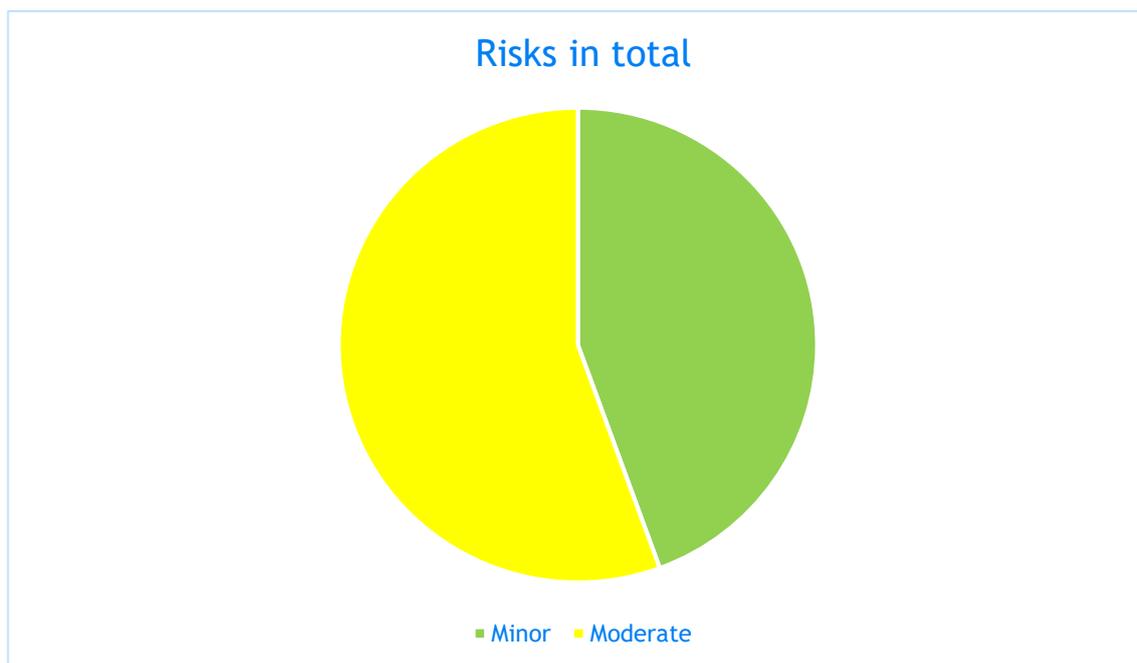


Figure 2: Pie chart of identified risks and risk levels

Figure 3 shows the ratio between minor and moderate risks. The minor-part includes the lack of supervision during night shifts, inadequate induction of a subcontractor's new employee,

poorly fastened equipment of music artists and non-participation in rescue training. The moderate part involves lack of security check of vehicles, misuse of personal protective equipment, lack of proper security check equipment, lack of proper identity verification, lack of proper security check equipment and rush during loading. However, Leppänen states that when managing risks, should the total risk be taken in to consideration, so the yearly or monthly review is not necessarily compulsory. This is a decision of the risk manager. In total, 5 out of 9 detected risks are on moderate level, whereas 4 out of 9 risks are on minor level.

When thinking about risks occurring during the use of subcontractors, it is recognized that more than a half of those categorized risks can be considered as a medium in the risk scale of 1 to 5. These risks may not have an impact on the activities on board if everything goes well, but in the worst scenario it can prove serious. Therefore, it would be worth considering how to mitigate and manage those risks.

Leppänen says in his book, that the emphasis of a risk management should be on the preventive measures, but the risks can be avoided entirely only if the activity, which involves a certain risk, is finished. This isn't obviously an option to the shipping company, so the alternative option is to manage existing risks. As previously stated, occurring risks can cause a negative impact on an organization's financial performance, operating model integrity and reputation, and each assessed risk can impact these if realized. Especially risks related to the security check process (lack of security check of vehicles, proper security check equipment and lack of proper identity verification) can wreck the previous stated assets of the company if realized. The case company is a company that wants to maintain a good reputation according to their webpages, so it is crucial to ensure it also in the future. Also, such shipping company is dependent on the customers since they bring the majority of business profit.

Chapter 4.6 will provide recommendations in order to manage the risks which are assessed to be on level "moderate". Risks, which are assessed to be on the "minor"-level, are not reviewed in the recommendations, since those don't require specific measures from the case company's point of view.

4.6 Recommendations

Rush during loading

Rush during the ship loading can't be avoided due to the short time period in the port. Also, each movement of subcontractor is impossible to control, but the practices should be developed.

The case company's safety instruction form, which must be signed by each employee of subcontractors and visitors, doesn't include any instructions regarding unloading the vehicle. This

kind of point could be added to the list, clarifying allowed times to unload and load one's vehicle.

Misuse of personal protective equipment

The occupational safety procedures- form includes a mention, which clarifies required that personal protective equipment have to be used when required by the nature of work. However, sometimes there has been noticed lack of use of equipment.

Communication regarding compulsion of personal protective equipment should be strengthened - one option is to make an announcement, which reminds about the use of proper safety equipment, and consequences of disuse if any. The announcement can be also mandatory to sign.

Lack of security checks of vehicles

The fact, that proper security check performed for each vehicle is not possible due to the limited time- and employee resources, can't be changed. The communication between the shipping company and authorities is crucial, since authorities have wider information about e.g. persons or vehicles under surveillance.

A significant mitigation of this risk would require great investments and change of practices. It would require at least more human- and time resources and new information channels to change and share information. Option, which doesn't require so great investments, is to train employees to do random spot checks, which allows to decide the target of the check in the limits of time.

However, based on the interviews, the assumption is that these practices won't be changed before a new maritime accidents or attacks.

Lack of proper identity verification

Flaws in the identity verification process should be eliminated in order to ensure that unauthorized persons can't access the ship. Since the identity should be verified from each sub-contractor and visitor, it is important that persons performing the identity checks are aware of proper methods and practices. Also, sufficient time resources to perform identity verification should be ensured.

As stated previously, the visitor pass should be visible on the visitor during the visit. A visitor pass indicates the role of a visitor on the ship. However, the system is not comprehensive since the practices regarding visitor pass are lacking. I strongly recommend retraining employees in order to perform comprehensive identity verification and visitor pass practice.

If the employees performing identity check must be trained, options are to have a traditional classroom training, written instructions, or more modern option; online course, which is not dependent on time and place.

Lack of proper security check equipment

To be able to perform comprehensive security checks, proper security check equipment should be available. It would enable to scan vehicles and search forbidden hidden things. These investments would also be massive, so as the security checks for vehicles, the equipment can be assumed to take place only if there happens e.g. a maritime attack.

5 Conclusion

This research was conducted to recognize and assess risks that can occur from company X using subcontractors. The results of the research can act as a development tool for overall safety and security of the ship. Well-maintained safety and security on passenger ships is important in order to ensure a safe voyage for the passengers and crew. Previous accidents and recent events show that preventative measures should be taken account in order to ensure a safe voyage. It's also beneficial for the business.

Properly implemented risk management process creates a base for a comprehensive risk assessment. Risk management should be integrated as a part of each business process, and it should not be considered as a separate project.

Leppänen's risk matrix was used to assess presented risks, and according to it, there were five risks on the level "moderate". These risks were related to occupational safety and the security check process. Occupational risks occur on board during the work, and others on the path from the port to the ship. Some of the risks are easily mitigated and managed without great investments, but risks with serious consequences require large investments, and aren't probably dealt with before something serious happens. Recommendations for the risks, which were assessed as "minor", weren't provided. Consequences of those risks can be very harmful, but the likelihood is so insignificant that there was no need for specific risk treatment methods.

Specific recommendations for each "moderate"-risk are provided, and PDCA-model is presented. The case company can freely use the recommendations and the PDCA-model as a risk management tool in case that they want to take action to manage assessed risks.

The writer of this thesis feels that this research presents well risks caused from the use of subcontractors, but it is good to keep in mind that this research doesn't provide risk assessment for the entire security and safety on board. Due to the fact that subcontractors represent just a small part of the amount of crew on board, the overall security and safety can be

completely on different level than this Thesis presents. However, presented tools and assessment are multi-functioning, and can be used by the shipping company if desired. For the writer of this thesis, the research increased the knowledge in the area of shipping, outsourcing and risk management and supported the professional growth and already existing knowledge and skills.

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