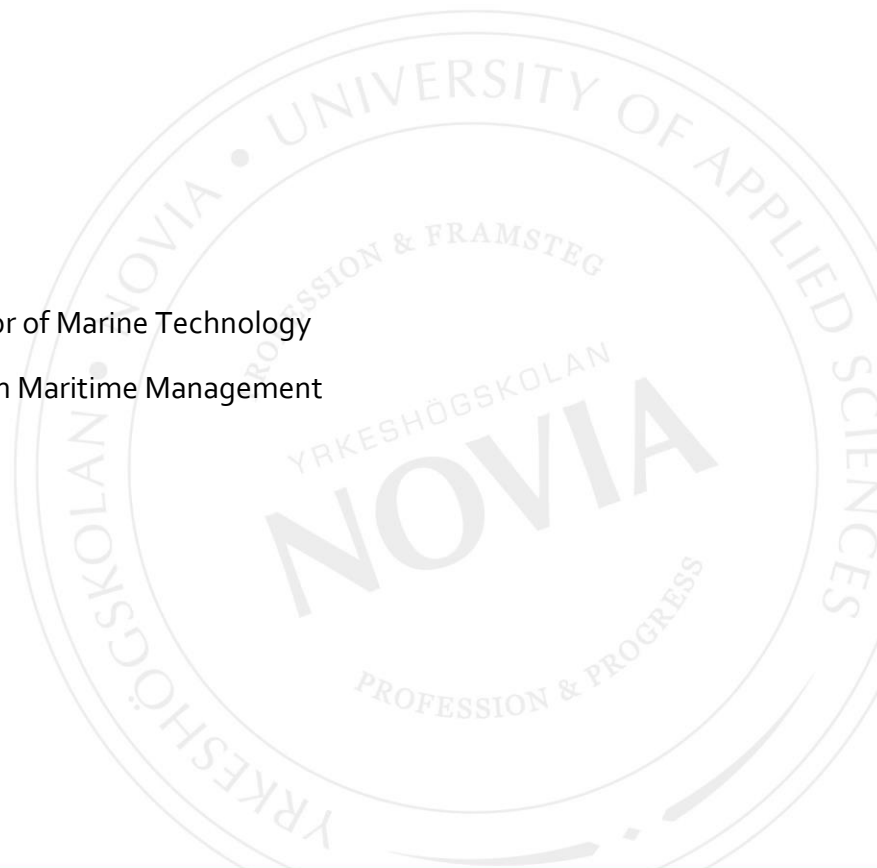


Safe Operation of Ship's Rescue Boat

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Abstract

This thesis is a study about merchant ship's rescue boat operations. More specifically it studies current regulations concerning the operation of a rescue boat including active merchant deck officer's experiences and opinions of rescue boat operations. The study is based on guidelines created by IMO's Maritime Safety Committee and on responses to a questionnaire made for merchant deck officers.

This thesis includes information of SOLAS, LSA-code and MSC Circulars concerning ship's rescue boat operation. The purpose of this thesis is to focus on safety and find out how to perform a safe rescue boat operation taking into consideration regulations and deck officer's opinions. Deck officer's opinions are gathered from the questionnaire.

Language: English Key words: Safety, Rescue boat, Fast rescue boat

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Vocabulary

Used terms, abbreviations and vocabularies

SOLAS - International Convention for the Safety of Life at Sea

LSA - Life Saving Appliances

LSA-code – International Lifesaving Appliance Code

MAIB - Maritime Accident Investigation Branch

MSC - Maritime Safety Committee

IMO - International Maritime Organization

GISIS - Global Integrated Shipping Information System

GARD - Assuranceforeningen Gard

OLRRS - On-load Release and Retrieval Systems

1 Introduction

Regular rescue boat launching drills are mandatory on merchant vessels. Even though the purpose of drills is to improve safety, it has been seen that accidents usually happen during mandatory drills. Drill safety relies on seafarer's knowledge and competence.

Regulations regarding rescue boats have changed during past years and sometimes crewmembers are not up to date with the existing regulations. Safety is always a concern and human error can have fatal consequences. Sharing the existing knowhow is important.

To be able to completely understand SOLAS regulations regarding rescue boat drills, it is important to be also familiar with IMO guidelines. Interpretation of these regulations is not always easy.

1.1 Objective and Research questions

Objective is to study current regulations and guidelines regarding safety of ship's rescue boat operation.

- What are the rescue boat requirements?
- How to perform a safe rescue boat drill?
- What are the main risk factors for a rescue boat drill?
- What are the maximum wind speed and wave height for a safe rescue boat drill?

Since the rescue boat drills are mandatory and regulated, I want to study how rescue boat drills are performed onboard merchant ships and to find out deck officer's experiences of onboard drills.

1.2 Delimitation

This thesis will focus only on ship's rescue boats including fast rescue boats. Lifeboats are not included in the study because rescue boat operation differs significantly from lifeboat operation. This study is focused only on qualified deck officers who have work experience at sea.

2 Rescue boat arrangements

Rescue boat arrangements consist of the boat and its davit system. Rescue boats general purpose is to be used in man over board retrieval and in liferaft marshalling performance. In compliance with the SOLAS and LSA-code performance requirements, ships are often equipped with small and slow rescue boat models. (Wärtsilä, w.y.)

Rescue boat requirements onboard ships are:

- Passenger ships of less than 500 gross tonnage must be equipped with at least one rescue boat
- Passenger ships of 500 gross tonnage and over must be equipped with at least one rescue boat on each side of the ship.
- At least one of the rescue boats on a RoRo passenger ship has to be a fast rescue boat.
- Cargo ships must be equipped with at least one rescue boat
- On both cargo and passenger ships a lifeboat may be accepted as rescue boat if it complies with rescue boat requirements

Rescue boat has to be stowed so that is all the time ready for launching in maximum five minutes. Rescue boats have to be capable of launching when the ship is making head way in a calm water with a maximum speed of five knots. The recovery time in moderate sea conditions has to be not more than five minutes when loaded with its full complement of persons and equipment. Lifeboat used as a rescue boat must have not more than five minutes recovery time when it is loaded with at least six persons and lifeboat equipment. (IMO, 2014)

Rescue boats may be rigid constructed, inflated or combination of both. Capacity should be at least six persons when five persons are seated, one is lying on a stretcher and all of them are wearing both lifejackets and immersion suits. Engine may be inboard or outboard type. (IMO, 2017a)



Picture 1 - Palfinger rescue boat and davit system (Palfinger Marine, w.y., a)

2.1 Rescue boat

The length of a rescue boat should be not less than 3.8 meters and not more than 8.5 meters. Rescue boat has to be capable of making six knots manoeuvring speed for at least four hours when it is loaded by its full complement of persons and equipment. Rescue boat also has to be capable of towing the largest liferaft carried onboard the ship with a speed of at least two knots. (IMO, 2017a)

2.2 Fast rescue boat

Fast rescue boat is designed for launching and retrieving in adverse weather and sea conditions. The length of a fast rescue boat has to be not less than 6 meters and not more than 8.5 meters. Fast rescue boat has to be able to manoeuvre at a speed of at least 20 knots for at least four hours with three persons onboard. When boarded by its full complement of persons and equipment, fast rescue boat has to be capable of manoeuvring with a speed of at least eight knots for at least four hours. Fast rescue boat has to be capable of towing the largest liferaft carried onboard the ship with a speed of at least two knots. (IMO, 2017a)



Picture 2 - Palfinger fast rescue boat (Palfinger Marine, w.y., b)

2.3 Release hook

In 2001 MAIB published a study of accidents involving lifeboat launching systems. Accidents considered in the study were reported to MAIB or investigated by MAIB on behalf of another administration. Study found out that merchant vessel crew often have poor knowledge of how to operate release hooks. This can often be explained by lack of training but it is not the only reason. Difficult operating instructions, poor labelling and complex mechanism were also found to be contributing factors. Failure of the on-load release hook was found to be the most common cause of fatal accidents. Seven people were killed and nine injured in 11 release hook accidents, reported in over 10-year period. (MAIB, 2001)

From 1992 to year 2004 GARD has recorded 32 cases of accidental release of on-load release gear. Only five of these cases did not lead to injury but the others caused 12 deaths and injury to 74 people. Injuries in these cases include several serious head and spine injury possibly leading to death at later stage. (GARD, 2006)

On-load release hooks became mandatory in conventional lifeboats in 1986. Since then it became usual to install on-load release hooks also to rescue boats. In 2013 new requirements for the design of on-load release hook entered into force to avoid accidental release. LSA-

code requires lifeboats to have release hooks with both off-load and on-load release capabilities. This includes also lifeboats used as rescue boats. For single fall and hook systems these requirements do not apply. As most of the rescue boats that are used solely for rescue purposes have a single fall and hook system, only off-load release possibility is mandatory. An overview of compliant hooks is listed by IMO to Global Integrated Shipping Information System, GISIS. (GARD, 2016)

2.3.1 Off-load release hook

Off-load release hook can be used in rescue boats and lifeboats where a single fall and hook system is used for launching the boat. Off-load hook is capable of release only when the rescue boat or lifeboat is fully waterborne. (IMO, 2017a)



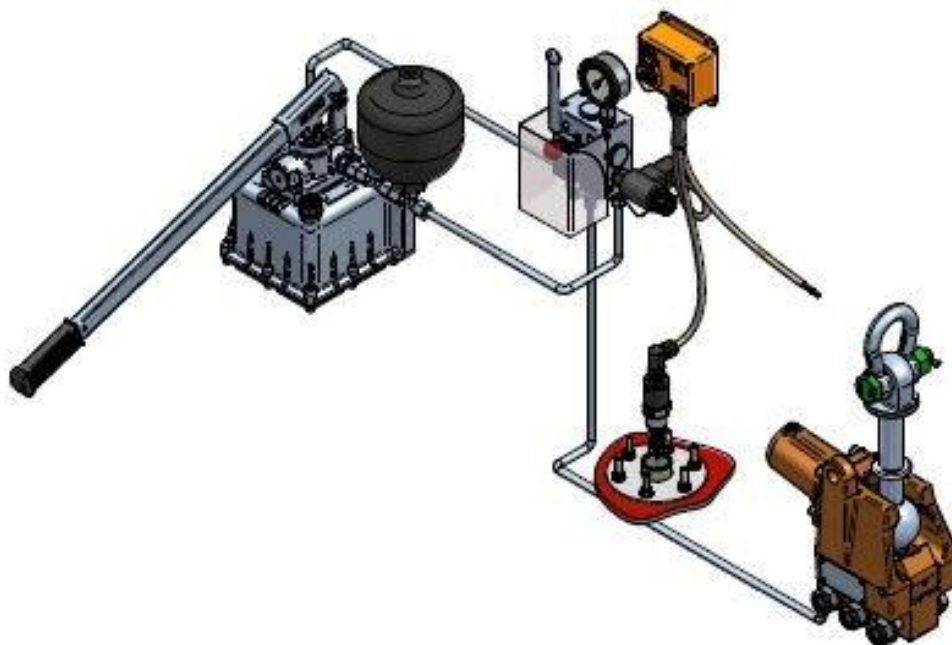
Picture 3 - Hatecke Simplex 2.0 off-load release hook is listed as compliant in GISIS (Valtteri Rantala, 2020)

2.3.2 On-load release hook

Rescue boats and lifeboats with two fall launching system must be equipped with two release capabilities: off-load and on-load release mechanism. The mechanism must function so that every release hook is released simultaneously, only when the boat is fully waterborne or when boat is not waterborne with multiple actions by the operator, including bypassing or removal of safety interlocks.

On-load release mechanism will release the boat when there is load on the hooks. This mechanism must be equipped with hydrostatic interlock to make sure that the boat is fully waterborne before releasing hooks. Hydrostatic interlock has override capability to allow emergency release in case of failure or when the boat is not waterborne. This override capability must have protection against accidental release. Protection includes breaking a protection glass or translucent cover. Use of on-load mechanism must require multiple actions by the operator. (IMO, 2017a)

Viking Life-Saving Equipment is offering on-load release and retrieval systems, OLRRS, also for single fall launching systems. (Viking Life-Saving Equipment, w.y.)



Picture 4 - Viking Nadiro DROP-IN-BALL™32 single hook OLRRS (Viking Life-Saving Equipment, w.y.)

3 Rescue boat inspections

Weekly and monthly onboard inspections of rescue boat and its davit system can be carried out by shipboard personnel under the direction of a senior ship's officer in accordance with the maintenance manual. Annual and five-year thorough examinations must be carried out only by the manufacturer or an authorized service provider. (GARD, 2019)

3.1 Weekly and monthly inspections

SOLAS regulation III/20.6 requires that ship's rescue boat must be inspected weekly and the report of the inspections must be entered into the ship's logbook. Weekly inspection includes:

- visual inspection of rescue boat
- condition of hooks and their attachment to the rescue boat
- on-load release gear (if fitted) being properly and completely reset
- running of all engines for at least 3 minutes, if the ambient temperature is above the minimum requirement for starting the engine
- demonstrating that the gearbox and gearbox train are engaging

According SOLAS regulation III/20.7 the boat must be turned out of its stowed position monthly without any persons onboard. Monthly inspection also includes inspection of rescue boat's equipment by using a checklist to make sure that the equipment is in good order and working condition. (IMO, 2014)

4 Aids to rescue boat operation

4.1 Training manual

SOLAS regulation III/35 requires every ship to carry a training manual that must be provided in each crew messroom and recreation room or in each cabin. The training manual must contain easily understandable information and instructions for the LSA equipment onboard the ship. Wherever possible the instructions and information should be illustrated. (IMO, 2014)

4.2 Plans and procedures for recovery of persons from the water

SOLAS regulation III/17-1 requires every ship to have specific plans and procedures for recovery of persons from the water. These ship specific plans and procedures should be formed by taking into account MSC.1/Circ.1447, guidelines for the development of plans and procedures for recovery of persons from the water, published by the IMO.

Plans and procedures for recovery of persons from the water must include measures to be taken to minimize the risk to crew members participating in the recovery operations. Plans and procedures must also identify equipment to be used in recovery operations. (IMO, 2014)

5 Rescue boat drills

Every crew member must be familiar with the LSA equipment onboard. Frequent onboard training is necessary for ensuring that everyone has the knowledge for safe operations. Crew members must be familiarized so that they have confidence for the operation of vessels LSA equipment. Onboard drills objectives are:

- familiarization
- competence
- effective and safe operations.

Time limits do not play a key role in onboard drills even though SOLAS has set out time limits for rescue boat operations. Competence training is more important than time limits. (Guidelines on safety during abandoning ship drills using lifeboats, MSC.1/Circ.1578)

It has been seen that the accidents usually happen during mandatory drills. This is why IMO regulations no longer require rescue boats and lifeboats to be manned during launching and recovery. If possible, the boat should be manned after launching. (GARD, 2008)

5.1 Rescue boat drill frequency

It is important to have frequent drills to gain experience and confidence in use of LSA equipment. Frequent drills will also make sure that the equipment is effective and in working condition. Drill scheduling is important because of frequent crew changes. Scheduling of drills ensures that every crewmember will get familiar with the LSA equipment. (IMO, 2017b)

Ships rescue boat should be launched and driven by its assigned crew once a month as far as it is reasonable. In every case rescue boat should be launched and driven at least once every three months. (IMO, 2014)

5.2 Drill safety

In MSC.1/Circ.1578 IMO published Guidelines on Safety During Abandon Ship Drills Using Lifeboats. These guidelines give a good perspective on how to arrange a safe drill and what is the purpose of the drill.

5.2.1 Planning

All the recognized risks should be avoided and minimized by planning the drill in accordance with shipboard requirements of occupational safety. Part of the planning is to make sure that the LSA equipment is in good working condition according to the maintenance manuals and documentation. Officers responsible for the drill should review the manufacturer's instruction manual and make sure that all persons operating LSA equipment are familiar to the instruction manual. Result of the drill should be documented and included in the planning of the next drill. (IMO, 2017b)

5.2.2 Drill as an actual emergency

When preparing and conducting a rescue boat drill it is mandatory to perform every task by "safety first" thinking. SOLAS regulation III/19.3.1 says: "Drills shall, as far as practicable, be conducted as if there were an actual emergency." SOLAS regulation III/14.1 says that rescue boat needs to be stowed: "in a state of continuous readiness for launching in not more than 5 min..." It is important to understand that these regulations should not be kept as a priority objective in drill performance.

SOLAS regulation III/19.3.1 means that drill safety may require some elements of an actual emergency to be excluded from the drill because those elements may cause unnecessary risk for the safety of the ship and the crew. Time limits of SOLAS regulation III/14.1 should not be kept as an objective in rescue boat drill. The main objective of the drill is to gain crew competence. (IMO, 2017b)

5.2.3 Launching and recovery

SOLAS regulation III/19.3.3.6 say: “As far as is reasonable and practicable, rescue boats other than lifeboats which are also rescue boats, shall be launched each month with their assigned crew aboard and manoeuvred in the water.” This regulation can be easily misunderstood. The regulation does not require the rescue boat to be manned during launching or recovery. The regulation only requires the rescue boat to be driven by its assigned crew in the water.

Launching the rescue boat with its full complement onboard may cause unnecessary risk for the safety of the crew. Rescue boat launching with crew onboard should only be conducted if special precautions are observed. It is recommended that the rescue boat is launched and recovered without any persons onboard if possible. If the arrangements require persons to be onboard the boat during launching and recovery, it is recommended that the launching and recovery system will be tested first without any persons onboard to make sure that the system is functioning correctly. (IMO, 2017b)



Picture 5 - Testing of launching and recovery without any persons onboard (Valtteri Rantala, 2020)

5.2.4 Launching with the ship making headway

In SOLAS there is no regulation that the ships rescue boat should be launched with the ship making headway. Even though rescue boats are required to be capable of such launching it is completely master's decision to perform such a drill. SOLAS regulation III/17.3 says: "...all rescue boats shall be capable of being launched, where necessary utilizing painters, with the ship making headway at speeds up to 5 knots in calm water." The regulation concerns the speed only as a rescue boat performance requirement. There are no SOLAS or LSA-code requirements for the ships speed when recovering the boat. According to SOLAS regulation III/19.3.3.7 if rescue boat launching drill, when ship is making headway, is carried out, it should be performed only in calm weather and sheltered waters.

6 Emergency situations

When a vessel takes part in search and rescue operations certain characteristics should be considered. Master should take into consideration:

- ship's manoeuvrability
- ship's freeboard
- points on the ship where casualties may be recovered
- characteristics and limitations of equipment to be used for operation
- available crew and personal protective equipment
- wind force, direction and spray
- significant wave height
- period of waves
- swell
- safety of navigation

Initiation and continuation of recovery operations should always be master's decision taking into account above mentioned characteristics. (IMO, 2012)

6.1 Unconventional ways

When recovering persons from the water also other than LSA equipment may be used. Recovery of persons from the water should be done without causing undue hazard to the ship and ship's crew. LSA and other equipment may be used in unconventional ways due to the nature of the situation and ship's characteristics. (IMO, 2012)

7 Emergency situations

Accidents have been reported yearly to GARD. Studies show that accidents are usually caused by four reasons:

- human error
- mechanical failure or faulty design
- lack of maintenance
- improper use

The cause of the accident does not necessarily need to be only one of above listed reasons. A combination of causes has been found to be fairly common. (GARD, 1997)

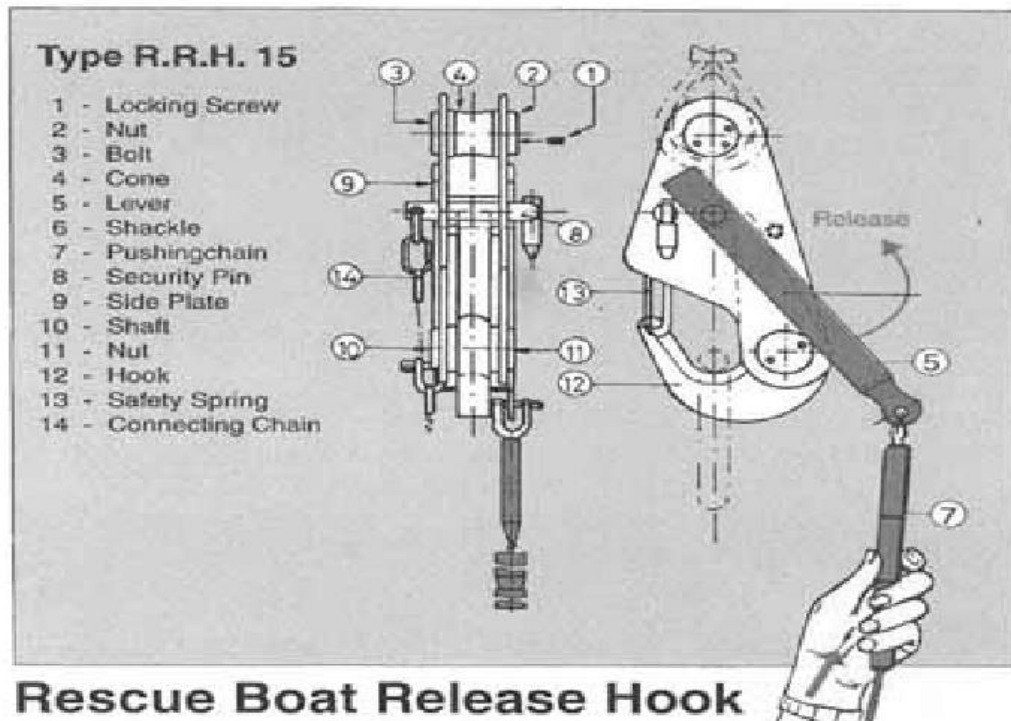
In fifteen year period from 1992 to 2007 GARD registered 37 accidents where 13 people lost their lives and 87 people were injured. It is recognized that there have also been accidents that did not lead to injuries and therefore those did not result a notification to GARD. In 2007 two accidents resulting injuries and one death were registered by GARD. (GARD, 2008)

7.1 M/S Superfast VIII rescue boat accident

In 9th of November 2004, M/S Superfast VIII had a rescue boat drill in Hanko West Port that lead to accidental launching of the ship's rescue boat from the height of 20 meters. Three crewmembers operating the boat were all injured.

After the rescue boat was turned out by the boat's davit, one of the operating crewmembers disconnected rescue boat's battery charging cable. The battery cable got stuck to the releasing lever of boats launching hook which resulted the opening of the hook. Later in the accident investigation it was found that the hook's safety pin, which should have been preventing accidental launching of the hook, was either removed before the drill or had not been in place at all.

The rescue boats launching hook was Schat-Harding RRH 15. Operation of the hook was possible in both off-load and on-load situations. It should have been operated by pulling of the safety pin and pushing the releasing lever when the boat is waterborne or near to the water surface. Absence of the safety pin made it possible to launch the hook accidentally in height of 20 meters. (Onnettomuustutkintakeskus, 2004a)



Picture 6 - Schat-Harding RRH 15 on-load release hook (Onnettomuustutkintakeskus, 2004b)

8 Research method

In this study I was using quantitative research method. The questionnaire was made anonymous. No personal names or ship names were collected to make sure that the deck officers taking part in the questionnaire would feel comfortable to give honest answers. Questions were made simple and easy to answer considering the possible outcome of collecting and analysing the results.

8.1 The questionnaire

The questionnaire was created by using Google Forms. Google Forms was chosen because it is easy platform for planning and also easy for collecting the results. Google Forms creates automatically statistics from the answers which helps to create overall picture of the questionnaire result.

I made several rough drafts of the questionnaire to create short and easily understandable questions. After I was satisfied with the questionnaire, I tested it with a few colleagues. With minor changes to the written language, the common opinion was that the questionnaire serves its purpose. The final questionnaire sent forward included 17 questions.

8.2 Target group

Target group for this questionnaire was deck officers or higher rank deck department officers. I wanted to delimit the target group to people who have been working as officers to ensure the quality of the answers.

This questionnaire was sent only to persons who had been working as deck officers on merchant ships. I personally send the questionnaire using WhatsApp and Facebook Messenger to 36 qualified and experienced deck officers that included watch officers, chief officers and masters. In the messages I made it literally clear that the questionnaire is only for persons who have been working as deck officers onboard merchant vessels. I asked persons that I had personally sent the questionnaire to share it with their deck officer colleagues.

8.3 Amount of respondents

The questionnaire was open to respondents for 24 hours only. Every single one of the 36 persons that I had sent the questionnaire, responded to it. Everyone of them personally sent me a WhatsApp or Facebook Messenger message confirming that they had answered the questionnaire.

In 24 hours, the questionnaire had collected 50 responses. This means that some of respondents were kind enough to share it with other deck officers. After reaching 50 responses I closed the questionnaire. I was satisfied with 50 responses because of the quality of answers as all of the respondents were qualified deck officers with work experience.

9 Analysis of the questionnaire results

The questionnaire results are presented using Microsoft Word's figures and tables which form a clear picture of the responds. Each question will be analysed one by one showing the statistics.

9.1 Experience at sea

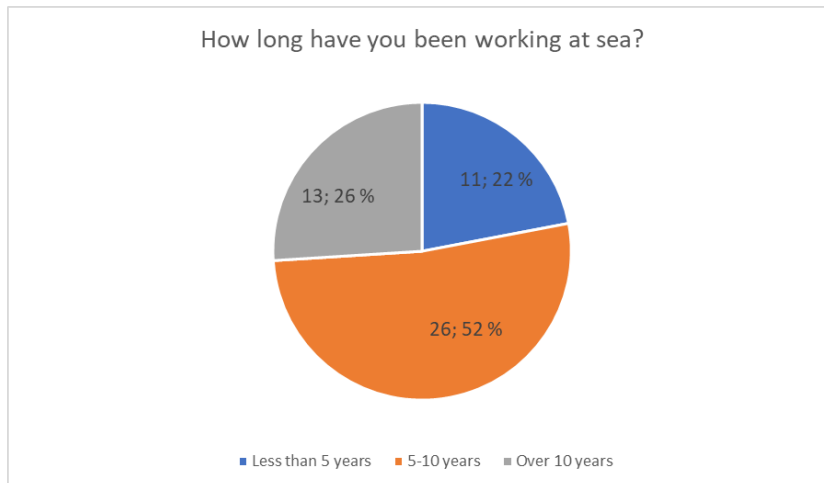


Figure 1 – How long have you been working at sea?

The most responds were given by seafarers with 5-10 years working experience. This question was answered by all of the 50 respondents who took part in the questionnaire. 26 respondents, which is 52 percent of the whole respondents, had been working at sea from 5 to 10 years. 26 respondents, which is 26 percent, had been working over 10 years. Only 11 respondents had been working less than five years at sea. This means that 78 percent of the respondents had been working over 5 years at sea. As a result, it means that the majority of the respondents were experienced seafarers.

9.2 Onboard safety introduction for rescue boat

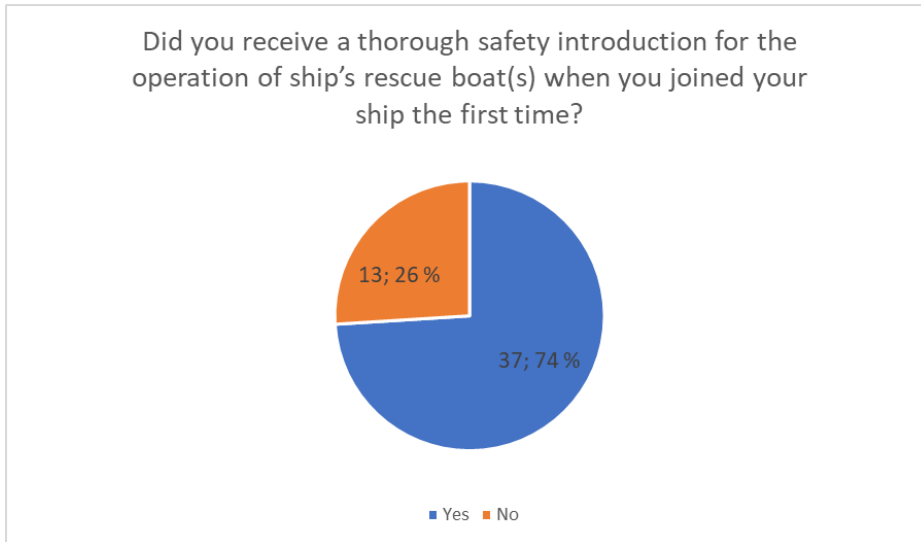


Figure 2 – Did you receive a thorough safety introduction for the operation of ship's rescue boat(s) when you joined your ship the first time?

The majority, 74 percent, of the respondents had received a thorough safety introduction for the use of ship's rescue boat when they joined their ship the first time. 13 of 50 respondents, which is 26 percent, had not received a thorough safety introduction for the rescue boat.

SOLAS Regulation III/19.2.1 says: "Every crew member with assigned emergency duties shall be familiar with these duties before the voyage begins." Because 26 percent of the respondents had not received thorough safety introduction, it can be seen that above mentioned SOLAS regulation has not been fulfilled completely. All in all, 74 percent had received safety introduction and it is a good result considering onboard safety.

9.3 Rescue boat drills

9.3.1 Drill frequency

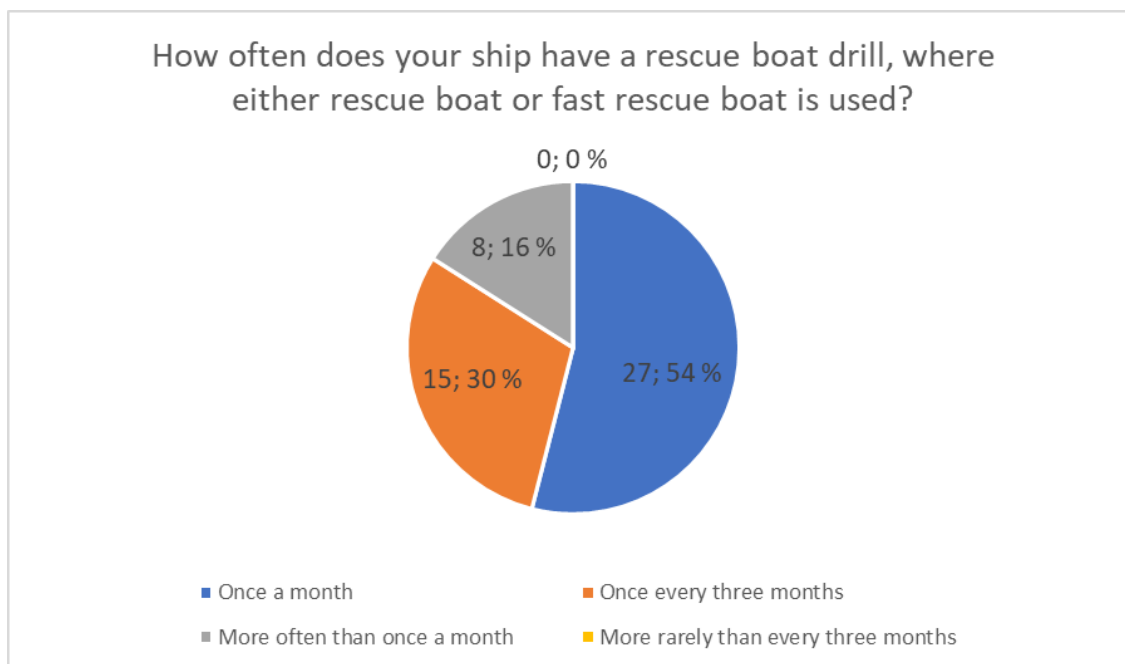


Figure 3 – How often does your ship have a rescue boat drill, where either rescue boat or fast rescue boat is used?

The most of the respondents, 54 percent, have a rescue boat drill once a month. 15 respondents, which is 30 percent, have a rescue boat drill once every three months. Eight respondents, which is 16 percent, have a rescue boat drill more often than once a month. None of the respondents have rescue boat drills more rarely than every three months.

According to SOLAS, rescue boat should be launched once a month as far as it is practicable but at least once every three months. This means that all of the respondent's ships have fulfilled the regulation.

Regular drills are important for the crew competence. As all of the respondents have experienced regular drills, the result is very good. Of all respondents, 54 percent have a drill once a month and 16 percent more often than once a month, that makes a total of 70 percent who have a regular drill at least once a month. Taking into account possible factors, it is understandable that 30 percent have a drill once every three months, as launching can be affected by several different factors, such as port or starboard berth.

9.3.2 Drill scheduling

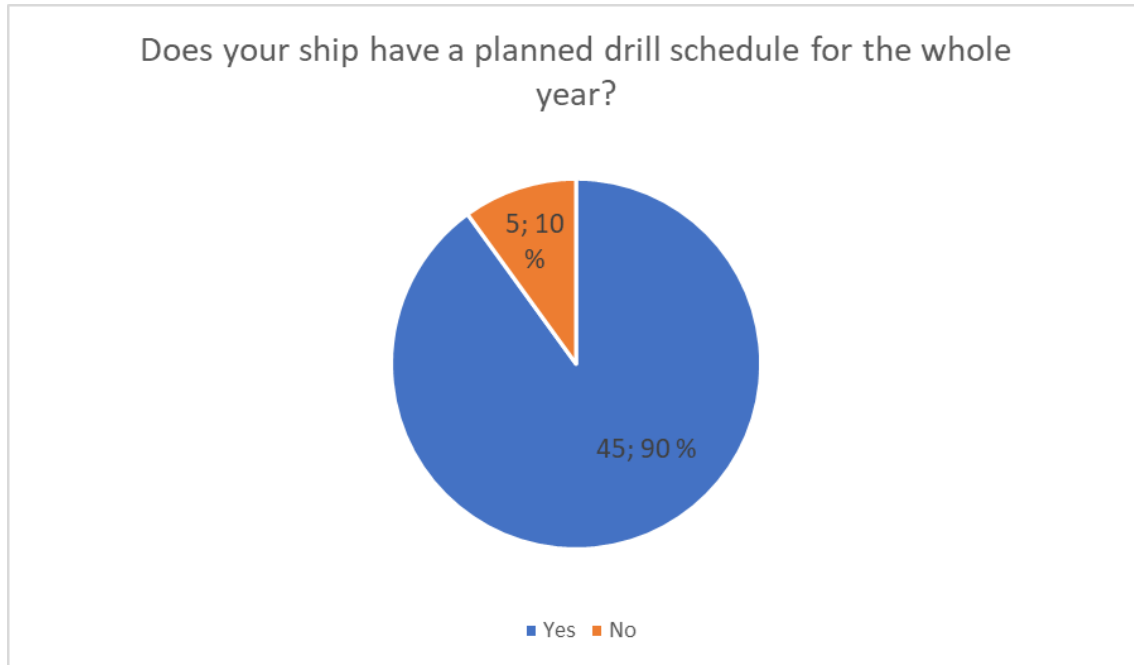


Figure 4 – Does your ship have a planned drill schedule for the whole year?

The majority of the respondents have a planned drill schedule for the whole year onboard their ship. The majority, 45 respondents, which is 90 percent answered “Yes”. Only 5 respondents, which is 10 percent, answered “No”.

Drill scheduling is important to ensure that crewmembers will receive thorough training that improves onboard safety. Following the planned schedule ensures that crew members can take part in drills despite of crew changes. As 90 percent of the respondents have a planned drill schedule, the result is very good.

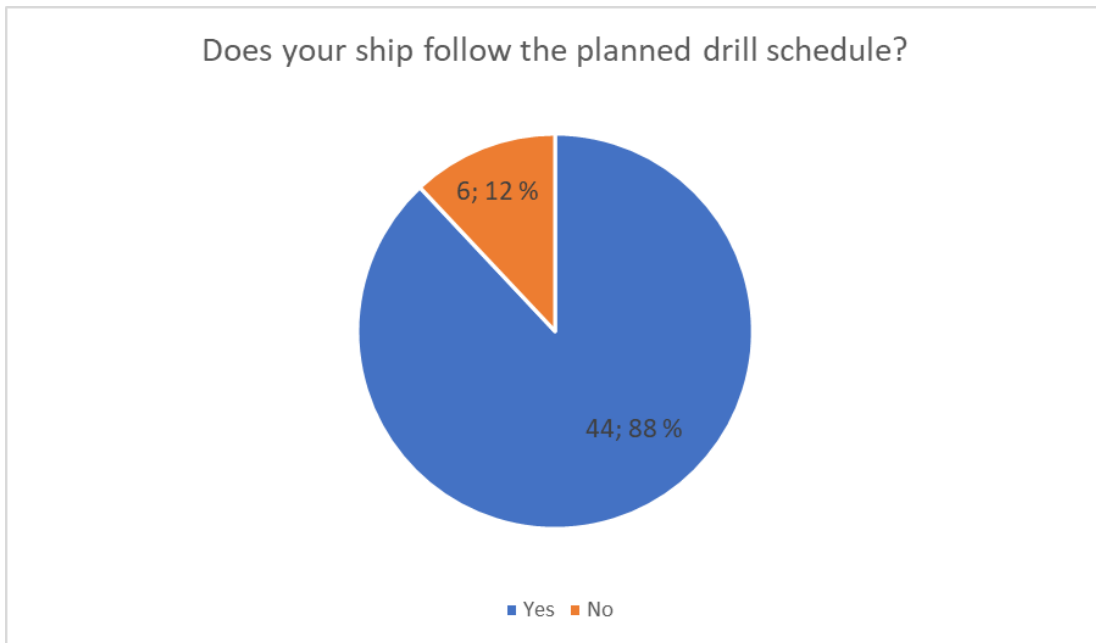


Figure 5 – Does your ship follow the planned drill schedule?

Despite of the existence of drill scheduling it is possible to overlap some drills and unintentionally skip over some drills due to crew changes. Following the drill schedule is important. Of all respondents, 44, which is 88 percent, follow the planned drill schedule onboard their ship. Only six respondents, which is 12 percent, do not follow the schedule. Well planned drill schedule is constructed so that it is easy to follow. As 88 percent of the respondents are following the schedule, the result is very good, which means that most of the ships are rehearsing their shipboard equipment equally.

9.3.3 Risk factors experienced during drills

These risk factors asked, were based on the studies made by GARD. This question was answered by all of the 50 respondents, which means that all of them had experienced some risk factors during rescue boat drills. The respondents were given a chance to choose one or more of the risk factors.

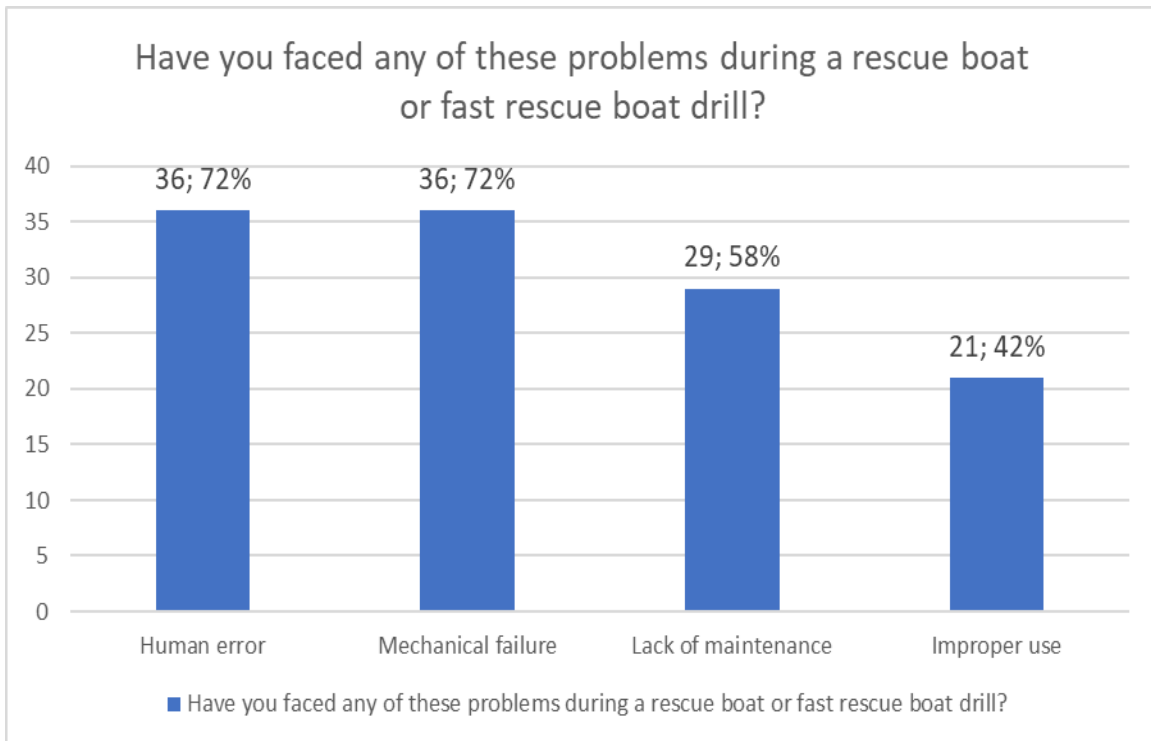


Figure 6 – Have you faced any of these problems during a rescue boat or fast rescue boat drill?

Both human error and mechanical failure have been experienced by 72 percent of the respondents. Lack of maintenance has been experienced by 58 percent of the respondents. Improper use has been experienced by 42 percent of the respondent.

These percentages are not low. This results that the risk factors that might lead to possible accident are very common during rescue boat drills. Human error and mechanical failure have been the most commonly experienced risk factors but all of these risk factors seem to have been very common.

As a result, it can be seen that there is a great need for regular onboard training for the use of ship's rescue boat(s). The equipment should be maintained more carefully and the use of the equipment should be more carefully trained to avoid possible risk factors. These results highly support the studies made by GARD.

9.4 Ship specific plans and procedures

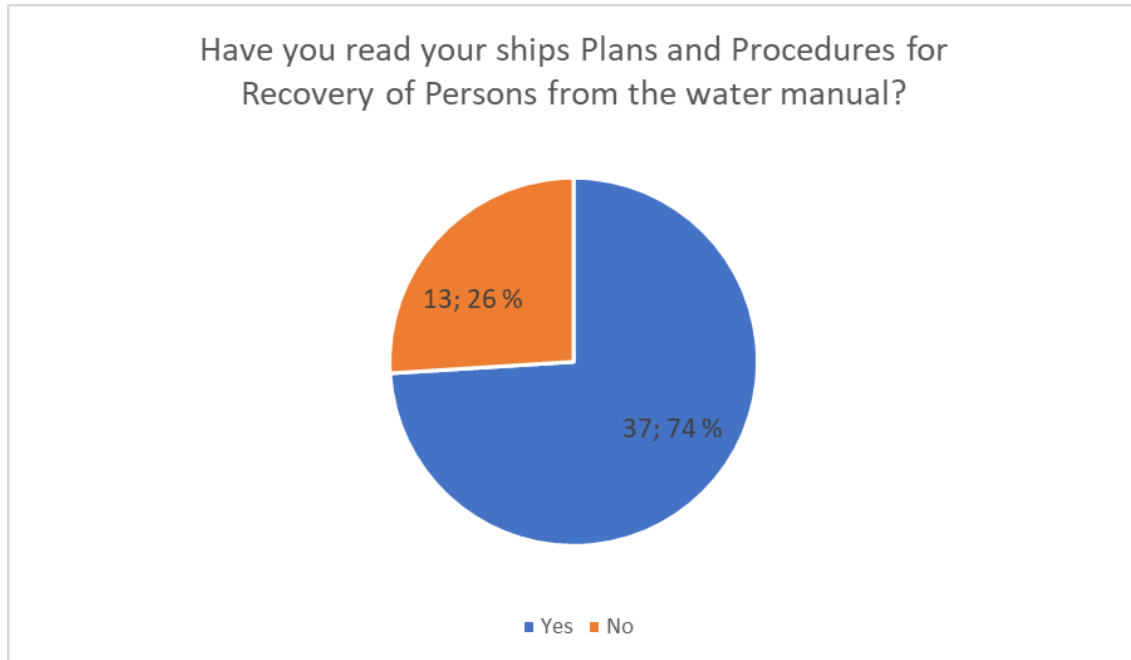


Figure 7 – Have you read your ship’s Plans and Procedures for Recovery of Persons from the water manual?

SOLAS regulation III/17-1 requires every vessel to have ship specific plans and procedures for recovery of persons from the water. These include measures to minimize the risk to crew members participating in the recovery operations. Plans and procedures identify the equipment used in recovery operations. Therefore it is highly important that deck officers responsible in emergency operations are familiar with the ship specific plans and procedures.

The majority of the respondents, 37, which is 74 percent, have read their ships plans and procedures for recovery of persons from the water manual. Thirteen respondents, which is 26 percent, have not read the manual. Because ship specific procedures usually involve other means than using only rescue boat for recovery operations, it is important to be familiar with the possible means of using the equipment. Most of the respondents have familiarized themselves.

9.5 Launching when the ship is making headway

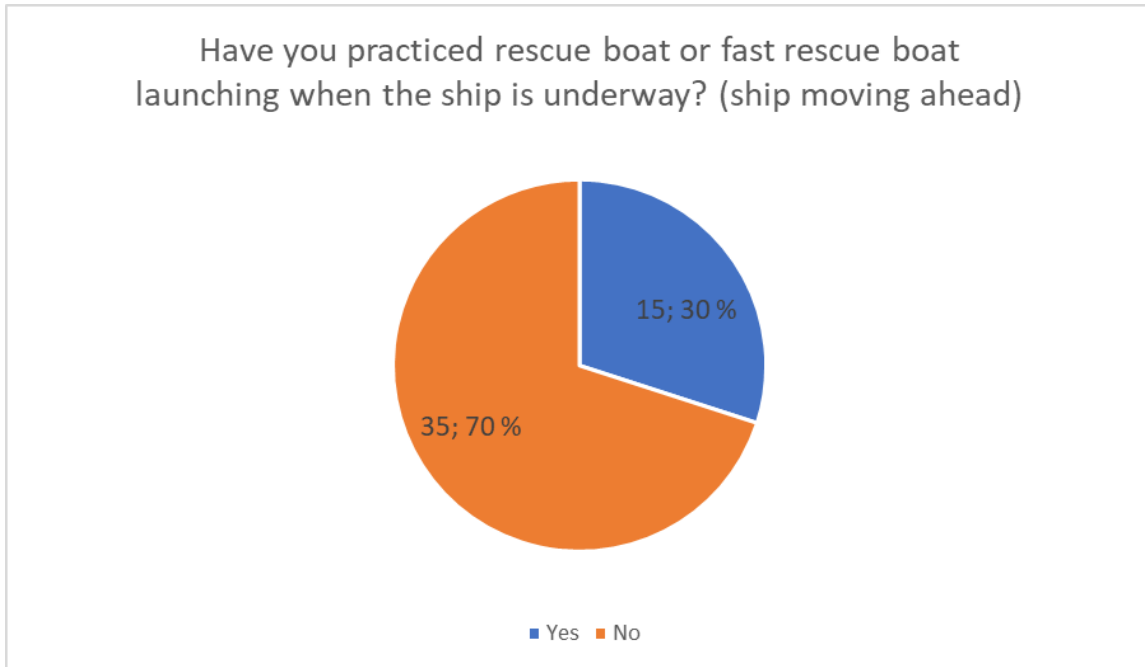


Figure 8 – Have you practiced rescue boat or fast rescue boat launching when the ship is underway?

Rescue boat or fast rescue boat launching drill when the ship is making headway is by no means mandatory. There is no regulation stating that this kind of drill should be performed. This kind of drill should be performed only in calm and sheltered waters by consideration of the master.

The questionnaire results that 35 respondents, which is 70 percent, have not practiced rescue boat or fast rescue boat launching when the ship is making headway. Of all respondents, 15, which is 30 percent, have practiced rescue boat launching when the ship is making headway.

9.5.1 Is rescue boat launching when the ship is making headway safe?

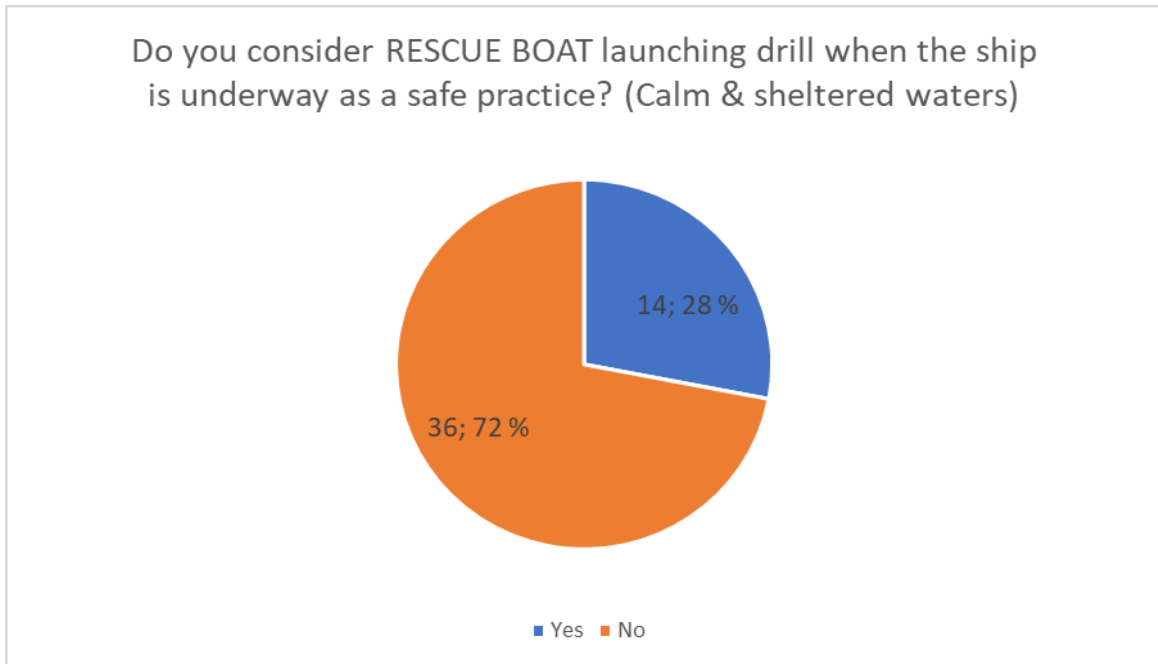


Figure 9 – Do you consider rescue boat launching drill when the ship is underway as a safe practice?

The majority of the respondents share the opinion that rescue boat launching drill when the ship is making headway is not safe. 36 respondents, which is 72 percent, considers rescue boat launching drill when the ship is making headway unsafe. Only 28 percent of the respondents consider this kind of activity safe.

9.5.2 Is fast rescue boat launching when the ship is making headway safe?

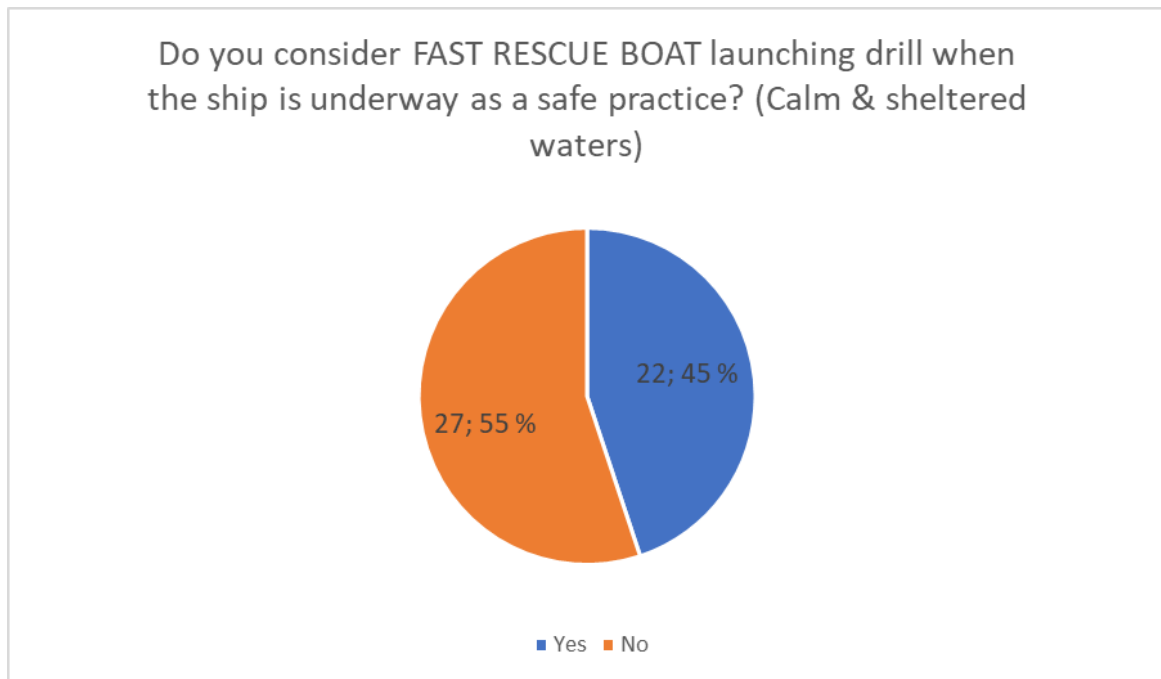


Figure 10 – Do you consider fast rescue boat launching drill when the ship is underway as a safe practice?

Fast rescue boat launching when the ship is making headway had to be separated from rescue boat due to differences in boats' characteristics. Most of the respondents consider fast rescue boat launching drill when the ship is making headway safe. Of all respondents, 55 percent answered "Yes" and 45 percent answered "No".

9.6 Maximum wind speed for a safe drill

The questionnaire included questions about the maximum wind speed for a safe drill. Because of the characteristic differences, rescue boat and fast rescue boat questions were separated. In both questions the respondents were given four alternative options. These options were light breeze (6 knots or 3,3 m/s), moderate breeze (16 knots or 7,9 m/s), fresh breeze (21 knots or 10,7 m/s) and other. Respondents who chose to answer "other" were asked to describe their answers.

9.6.1 Maximum wind speed for a rescue boat drill

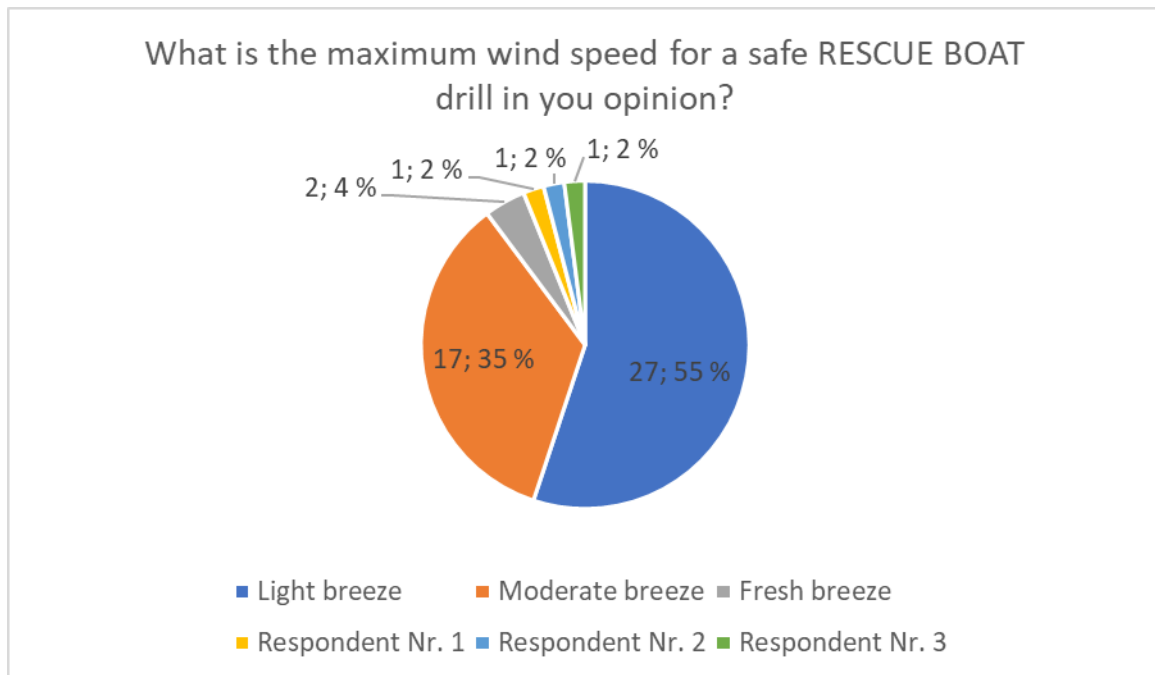


Figure 11 – What is the maximum wind speed for a safe rescue boat drill in your opinion?

The majority of respondents, 55 percent, answered light breeze. Moderate breeze was answered by 35 percent of the respondents. Only four percent, which is 2 respondents, chose to answer fresh breeze. Three respondents chose to answer “other”.

Respondent Nr. 1: “It is never safe enough to do a non-emergency launch - but the boats can take pretty much any weather when manouvered by properly skilled crew.”

Respondent Nr. 2: “Depends so much about boat and launching davit.”

Respondent Nr. 3: “Depends on the wave height, in very sheltered water about 10 m/s.”

9.6.2 Maximum wind speed for a fast rescue boat drill

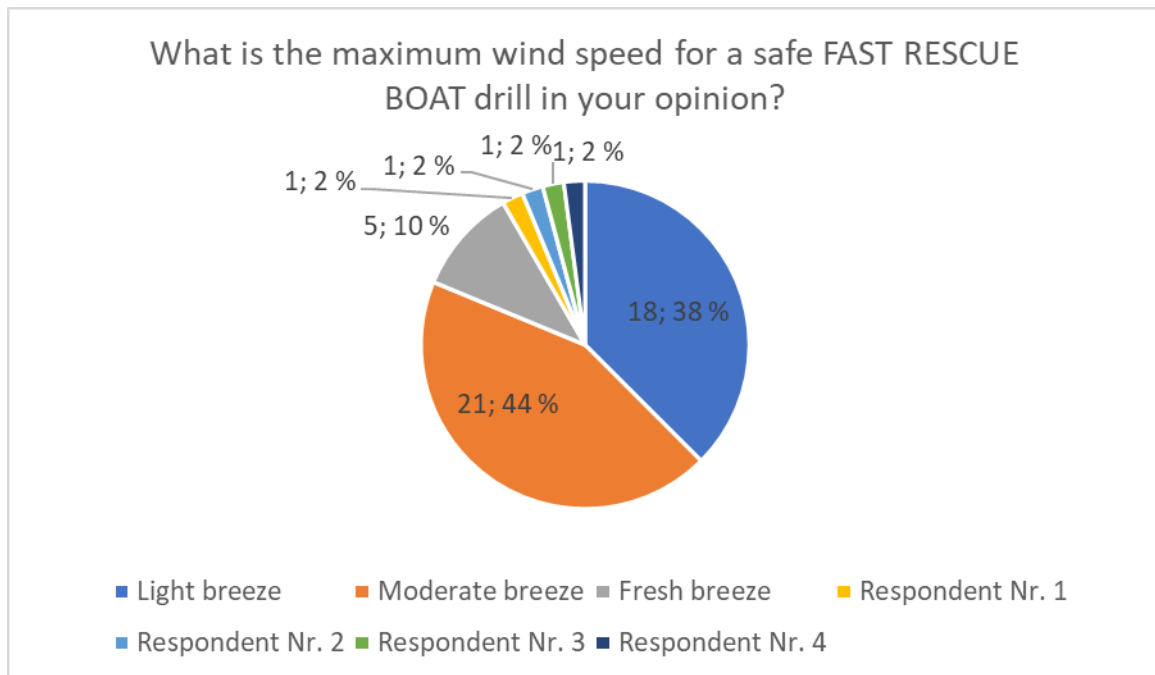


Figure 12 – What is the maximum wind speed for a safe fast rescue boat drill in your opinion?

The majority of respondents, 44 percent, answered moderate breeze. Light breeze was answered by 38 percent of the respondents. Ten percent, which is 5 respondents, chose to answer fresh breeze. Four respondents chose to answer “other”.

Respondent Nr. 1: “It is never safe enough to do a non-emergency launch - but the boats can take pretty much any weather when manouvered by properly skilled crew.”

Respondent Nr. 2: “Depends so much about boat and launching davit.”

Respondent Nr. 3: “Depends on wave height more than wind speed.”

Respondent Nr. 4: “15.”

9.7 Maximum wave height for a safe drill

The questionnaire included questions about the maximum wave height for a safe drill. Because of the characteristic differences, rescue boat and fast rescue boat questions were separated. In both questions the respondents were given four alternative options. These options were 0 - 0,5 meter, 0,5 - 1 meter, 1 - 2 meter and other. Respondents who chose to answer “other” were asked to describe their answers.

9.7.1 Maximum wave height for a rescue boat drill

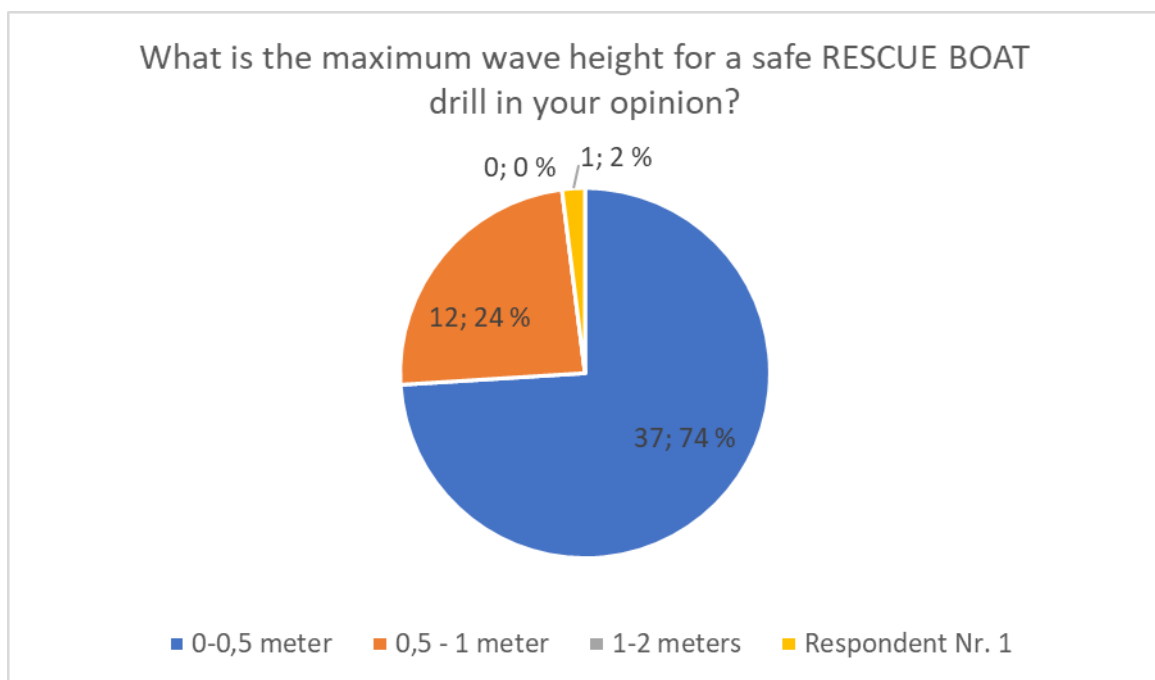


Figure 13 – What is the maximum wave height for a safe rescue boat drill in your opinion?

The majority of respondents, 74 percent, answered 0 - 0,5 meter. Wave height of 0,5 - 1 meter was answered by 24 percent of the respondents. None of the respondents chose to answer 1 – 2 meters. One respondent chose to answer “other”.

Respondent Nr. 1: “It is never safe enough to do a non-emergency launch - but the boats can take pretty much any weather when manouvered by properly skilled crew.”

9.7.2 Maximum wave height for a fast rescue boat drill

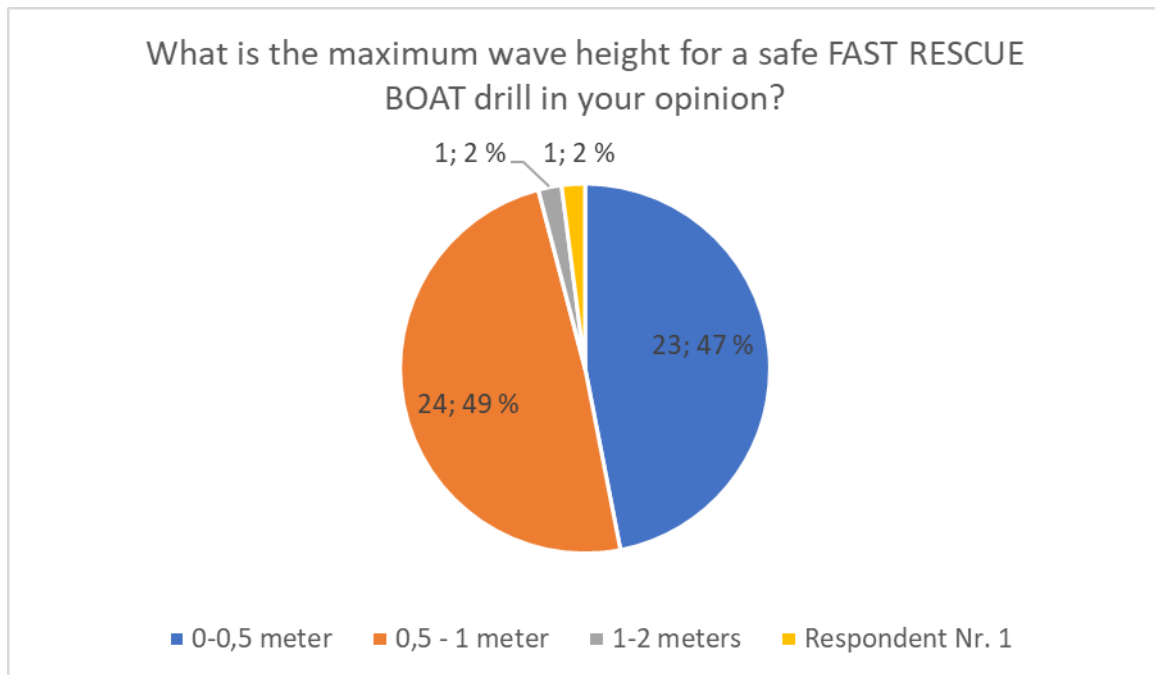


Figure 14 – What is the maximum wave height for a safe fast rescue boat drill in your opinion?

The majority of respondents, 49 percent, answered 0,5 - 1 meter. Wave height of 0 – 0,5 meter was answered by 47 percent of the respondents. Only 1 respondent, which is two percent of the respondents chose to answer 1 – 2 meters. One respondent chose to answer “other”.

Respondent Nr. 1: “It is never safe enough to do a non-emergency launch - but the boats can take pretty much any weather when manouvered by properly skilled crew.”

9.8 Respondents’ evaluation of rescue boat drills

The questionnaire included three questions which purpose were to find out how the respondents had experienced rescue boat drills held onboard their ships. This topic is divided into three; sufficiency, safety and learning and teaching emphasis.

9.8.1 Sufficiency of drills

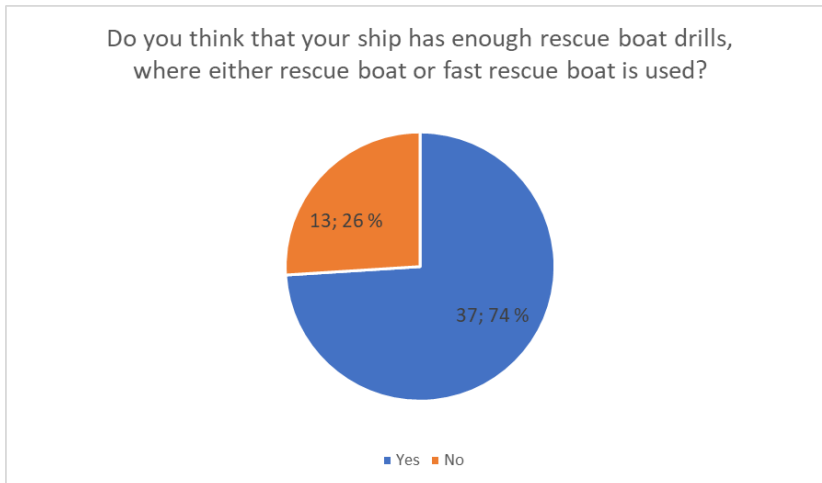


Figure 15 – Do you think that your ship has enough rescue boat drills, where either rescue boat or fast rescue boat is used?

The large majority feels that their ship has enough rescue boat drills. Most of the respondents, 74 percent, answered “Yes”. About quarter, 26 percent, of the respondents chose to answer “No”.

9.8.2 Evaluation of safety

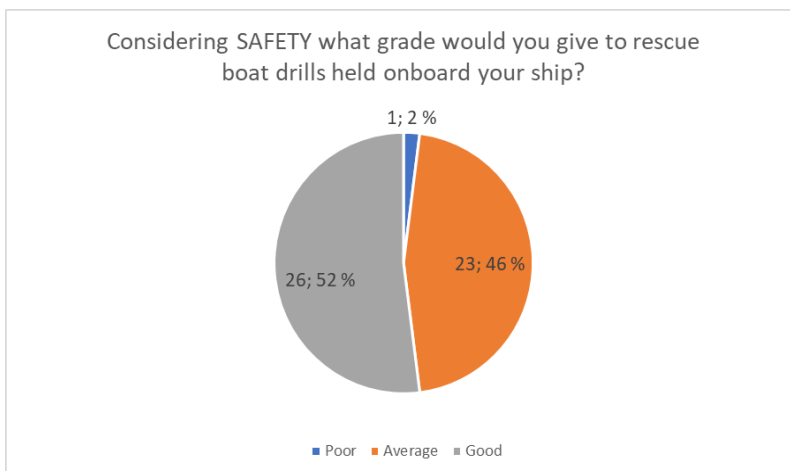


Figure 16 – Considering safety what grade would you give to rescue boat drills held onboard your ship?

The most of the respondents, 52 percent, evaluate that the safety of the rescue boat drills held onboard their ships has been “Good”. “Average” was chosen by 46 percent of the respondents. Only two percent chose to answer “Poor”. All together 48 percent chose to answer below “Good”.

9.8.3 Evaluation of teaching and learning emphasis

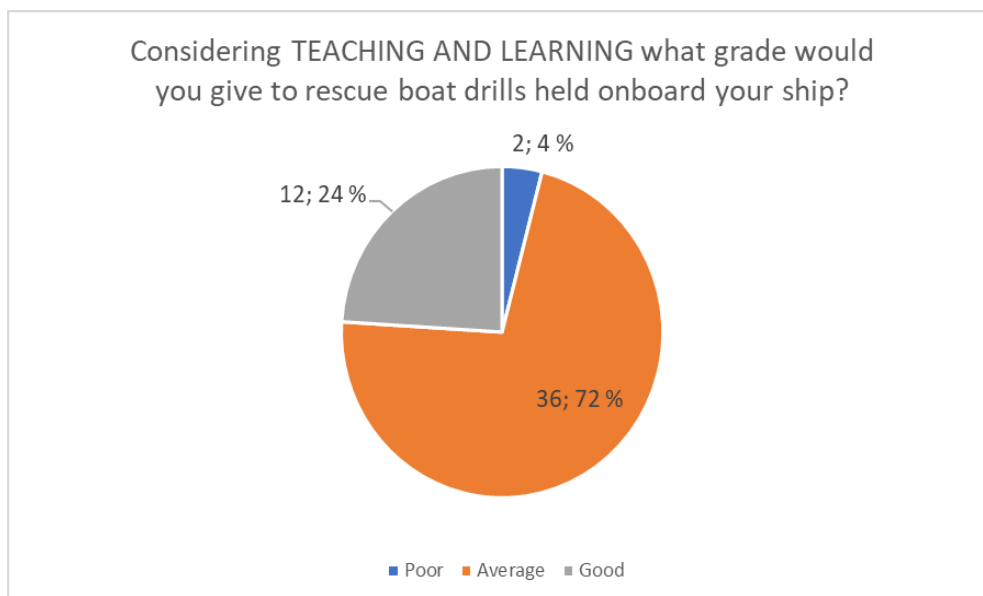


Figure 17 – Considering teaching and learning what grade would you give to rescue boat drills held onboard your ship?

The most of the respondents, 72 percent, evaluate that teaching and learning emphasis of rescue boat drills held onboard their ships has been “Average”. “Good” was chosen by 24 percent of the respondents. Only four percent chose to answer “Poor”. All together 76 percent chose to answer below “Good”.

10 Conclusion

SOLAS and LSA-code set regulations for the use and characteristics of rescue boats. SOLAS often refers to LSA-Code or MSC Circulars. That is why interpretation of these regulations can often be difficult and time demanding. To be able to understand the SOLAS Chapter III regulations and to perform a safe rescue boat drill, getting familiar with MSC Circulars and IMO guidelines is necessary.

There is a need for improvement in safety of onboard rescue boat drills as only a slight majority, 52 percent, of this study’s respondents felt that the safety of their onboard drills have been good. Study shows also the need for a concentration in teaching and learning as 72 percent of the respondents evaluated teaching and learning emphasis has been average. Existence of risk factors is very common during mandatory drills; human error, mechanical failure, lack of maintenance and improper use have been commonly experienced in rescue boat drills.

The majority of the respondents, 70 percent, had not been practicing rescue boat or fast rescue boat launching when the ship is making headway. The majority's opinion was that such an activity is not safe. Large majority, 72 percent, of respondents do not consider rescue boat launching when ship is making headway safe. Slight majority, 55 percent, of respondents do not consider fast rescue boat launching when the ship is making headway safe.

Based on the majority of questionnaire's responses, a guideline of weather restrictions for a safe rescue boat and fast rescue boat drill can be formed. For a rescue boat drill the maximum wind speed is 6 knots or 3,3 m/s and maximum wave height is between 0 and 0,5 meter. For a fast rescue boat drill maximum wind speed is 16 knots or 7,9 m/s and maximum wave height is between 0,5 and 1 meter. Regardless of this questionnaire, these weather restrictions can only be seen as guidance and therefore the initiation of a drill relies on the evaluation of ship's master.

Based on the study results it can be said that deck officers are satisfied with the sufficiency of rescue boat drills and in every response the drill frequency has been according to SOLAS regulations. Approximately nine out of ten have a planned drill schedule and follow it.

The questionnaire succeeded well as it took only 24 hours to collect 50 responses. The use of personal contacts with WhatsApp and Facebook Messenger was a good choice as the responses were received almost immediately. As 78 percent of the respondents had been working at sea for over five years, it can be said that the respondents had a good experience and were suitable for the study.

11 Critical examination & further studies

11.1 Critical examination

Since the base of quantitative research is to collect as much data as possible, the questionnaire could have been sent to even more contacts. Using my personal Facebook Messenger and WhatsApp contacts worked well because I wanted to collect data fast but if the questionnaire would have been open to responses for a longer period of time, this questionnaire could have used also other distribution methods. This questionnaire could have been sent to all of Finnish shipping companies. That way the amount of data could have been a lot higher.

Creating weather restrictions for a safe rescue boat drill is difficult. Weather restrictions for a drill can only be seen as guidance, not as a rule. This study does not consider the characteristic differences of ships. On a large roro ship, the height from rescue boat's davit to the sea surface could be 25 meters. On a small tonnage general cargo ship, the height from rescue boat's davit to the sea surface could be only three meters. This means that the wind is affecting rescue boat operations totally differently on different type of ships.

11.2 Further studies

This study is delimited to deck officers and therefore for only studying deck officer's point of view in rescue boat operations. In the future study concerning the same subject conducting other crewmembers could be performed.

A study comparing deck officer's and other crewmember's opinions in the same subject would give a good perspective to the matter of safety. Does the crew share the same opinion with the officers? A comparison between opinions could develop deck officer's point of view in how to perform a safe drill.

Because this study is also delimited to rescue boats, including fast rescue boats, a future study concerning free fall lifeboats or conventional lifeboats could be carried out. Since operations and regulations regarding lifeboats are different compared to rescue boats, those could not be included in this study.

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Appendices

Rescue boat (man over board boat)

This study is 100% anonymous. No names or ship names will be collected.

Remember that there are no right or wrong answers. If you don't know what to answer, leave it blank.

If you choose to answer "other", please write your answer.

Please notice that some questions are only for rescue boat and some questions only for fast rescue boat.

If you are not currently working on a ship please answer based on your previous ship.

THANK YOU!

1. How long have you been working at sea?

Mark only one oval.

- less than 5 years
- 5 - 10 years
- over 10 years

2. Did you receive a thorough safety introduction for the operation of ship's rescue boat(s) when you joined your ship the first time?

Mark only one oval.

- Yes
- No

3. How often does your ship have a rescue boat drill, where either rescue boat or fast rescue boat is used? (Choose the closest answer)

Mark only one oval.

- Once a month
- Once every three months
- More often than once a month
- More rarely than every three months

4. Do you think that your ship has enough rescue boat drills, where either rescue boat or fast rescue boat is used?

Mark only one oval.

- Yes
- No

5. Does your ship have a planned drill schedule for the whole year?

Mark only one oval.

- Yes
- No

6. Does your ship follow the planned drill schedule?

Mark only one oval.

- Yes
- No

7. Have you read your ships Plans and Procedures for Recovery of Persons from the water manual?

Mark only one oval.

- No
 Yes

8. Have you faced any of these problems during a rescue boat or fast rescue boat drill? (choose as many as you like)

Check all that apply.

- Human error
 Mechanical failure
 Lack of maintenance
 Improper use

9. Have you practiced rescue boat or fast rescue boat launching when the ship is underway? (ship moving ahead)

Mark only one oval.

- Yes
 No

10. Do you consider RESCUE BOAT launching drill when the ship is underway as a safe practice? (Calm & sheltered waters)

Mark only one oval.

- Yes
 No

11. Do you consider FAST RESCUE BOAT launching drill when the ship is underway as a safe practice? (Calm & sheltered waters)

Mark only one oval.

- Yes
 No

12. What is the maximum wind speed for a safe RESCUE BOAT drill in your opinion?

Mark only one oval.

- Light breeze: 6 knots or 3,3 m/s
 Moderate breeze: 16 knots or 7,9 m/s
 Fresh breeze: 21 knots or 10,7 m/s
 Other: _____

13. What is the maximum wind speed for a safe FAST RESCUE BOAT drill in your opinion?

Mark only one oval.

- Light breeze: 6 knots or 3,3 m/s
 Moderate breeze: 16 knots or 7,9 m/s
 Fresh breeze: 21 knots or 10,7 m/s
 Other: _____

14. What is the maximum wave height for a safe RESCUE BOAT drill in your opinion?

Mark only one oval.

- 0 - 0,5 meter
 0,5 - 1,0 meter
 1 - 2 meter
 Other: _____

15. What is the maximum wave height for a safe FAST RESCUE BOAT drill in your opinion?

Mark only one oval.

- 0 - 0,5 meter
- 0,5 - 1,0 meter
- 1 - 2 meter
- Other: _____

16. Considering SAFETY what grade would you give to rescue boat drills held onboard your ship?

Mark only one oval.

1. Poor
2. Average
3. Good

17. Considering TEACHING AND LEARNING what grade would you give to rescue boat drills held onboard your ship?

Mark only one oval.

1. Poor
2. Average
3. Good

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