IMPORTANCE OF THE ON BOARD CREW TRAININGS AND DRILLS FOR THE IMPROVEMENT OF THE VESSELS’ SAFETY

According to STCW 78/95 Convention every seafarer is obliged to have certified knowledge about safety precautions applied on board of the vessels. Besides, SOLAS 74/78 Convention indicates time intervals and content of drills that has to be conducted on board. The purpose of this paper is to present how different drills scenarios and conducting training alarms are affecting the crew and how they improve the process of preparing muster lists and muster station equipment and procedures. The paper is based on deck cadets onboard experience and training.

INTRODUCTION

In spite of technological development the number of accidents at sea is not decreasing. Majority of the incidents have their origins in human errors, which might have been caused by bad communication, lack of knowledge or experience, poor training, remissness, wrong management system and many others. Understanding the role of the human element within the system is essential for safety improvement. One of the ways of finding out about the dangers, which can occur onboard because of the human factor, is to check crew skills in practice and improve them with onboard training and drills (E. Barsan et al. 2012).

Drills and trainings on boards of the ships are the essential part of seafarers’ professions. There are many regulations which describe the way and frequency of drill conducting. Regulations 25 and 26 from Chapter III Safety of Life at Sea 74 Convention specify muster lists and drills practice on board of passenger and cargo vessels. The most important and requiring much attention are: abandon ship drill, firefighting drill and general emergency alarm drill. What is more, every ship has a contingency plan concerning a procedure practice for a variety of situations that may occur on board of this vessel.

Preparation of the muster lists is an obligation of a ship master. It might be handed over to the designated deck officer; however, the lists have to be later approved by the captain. Muster lists have to be posted in easily accessible places such as main halls, mess rooms, engine room and bridge. Every crew member has to be acquainted with their duties, the alarm signals and procedures. For every
conducted alarm or drill there has to be an entry to the alarm log book, which is required on board by Regulation 26a of Chapter III of SOLAS 74/78 Convention. If the drill was not conducted, the circumstances have to be given.

According to the SOLAS Convention drills on cargo ships with permanent crew have to be conducted at least once a month and on passenger ships at least once a week. The person in charge of planning and conducting of the alarms is a master of a ship. It is up to master’s decision when, how and what kind of the alarm is going to be performed. The information about a drill might be given to the crew earlier or may be previously unannounced. In case of an unannounced drill it should be clearly stated that there is no real emergency, only a drill.

Chapter III of SOLAS 74 Convention does not have to be the only regulation concerning drills and trainings on board. Ship owners can introduce their own company requirements concerning the conduct of the alarms on the assumption that they will not be less restrictive that the SOLAS regulations.

1. IMPORTANCE OF THE ON BOARD CREW TRAINING

According to the STCW 78/95 Convention every person working on board of the vessel has to have a Basic Safety Training Certificate issued by the authorized Authority. This certificate followed by a familiarization on board for some crew members is the sufficient level of knowledge. Crew members should realize that, although they went through the training on land, every vessel is different and equipped in various ways. During the familiarization the most important pieces of information are given, but only personal training will provide the crew member with the necessary skills. Drills and their different scenarios are a perfect opportunity of gaining and improving the knowledge and give the ability of finding the best solution in case of real emergency.

It must be also recognized that not every country, which is a signatory of the STCW 78/95 Convention, is able to control and maintain required level of on land training. The European Parliament and the Council of the European Union adopted amending Directive 2003/103/EC on the minimum level of training of seafarers. It states, that countries should be inspected to verify if Convention’s requirements are fulfilled. European Maritime Safety Agency is responsible for states verification but the results and decisions have an application only on European flag vessels and waters. According to that every ship master should take into account that certified seafarer may not have required knowledge. Conducting drills and providing on board training may supplement deficiencies in on shore education.

2. ALARMING METHODS OF CONDUCTING DRILLS ON BOARDS

Despite the importance of training in case of emergency, drills on some vessels are not being taken seriously enough. In many cases drills are conducted on board just to fulfill the company and conventions requirements. For some crew
members drill is just another duty, which has to be done, often during their free time. This kind of attitude is often a reason for simplifying the alarms to the bare minimum. Drills are sometimes being limited just to gathering at the muster station and recitation of allotted duties. Although requirements are being fulfilled, this kind of drills does not prepare the crew for any real emergency situation and does not give the confidence to act properly in danger and under stress and panic conditions.

One of the reasons for this kind of attitude among crew members is a routine. Some seafarers, especially the older and more experienced ones, do not understand the matter of repeating the same actions every week or every month. They are convinced that they know perfectly what their duties and responsibilities in case of emergency are. In many cases this statement is false.

3. DIFFERENT ATTITUDES TOWARDS DRILLS

To improve the quality of training on board of the ship it is important to change the seafarers’ views on drills and alarms. The crew has to understand that conducted drills are not just their duty but the means to ensure their safety and increase the efficiency of the vessel’s operation.

During my internship on board I had taken part in three types of drills:

- drill with meeting at muster station;
- drill with a roll call and some practical training;
- drill proceeded by a theoretical training and followed by the discussion on the performance.

The first type of the drill was the simplest one. After the alarm signal the crew was gathering at muster station. After roll call and duties recitation the drill was over. This kind of alarm was the shortest and least demanding.

The second type of the drill was connected with some kind of performance. This could be for example, depending on the drill, lowering the lifeboat, putting on firefighter outfits or using the firefighter equipment. This kind of the drill was also conducted to satisfy the requirements, but required much more involvement from the crew members.

Among these three types the drill with theoretical basis and with final conclusions was the one I found the most valuable. This kind of the drill had to be prepared in advance. Proceeded by a theoretical training performed by the captain or designated officer, the drill was supposed to be conducted with as many actual details as possible. Afterwards the crew was gathering together again to discuss their actions, positive reactions and mistakes they had made with the captain. In such a discussion many decisions on improving the further actions were made.
4. PREPARING A DRILL SCENARIO

Except the most common and important drills such as abandon ship or firefighting drill, there is a variety of other dangers which may be encountered onboard and have to be practiced. Other drills can include collision, grounding, flooding, oil spill, piracy attack and many others.

For conducting a drill with educational value for the crew a theoretical training should be performed first. Crew members have to understand main hazards connected with each kind of emergency. The instructions may often sound obvious, e.g. for the situation like fire onboard, but not necessarily for the situation of imposing of the higher level of security according to ISPS Code. During the theoretical training the officer in charge should also discuss and explain the procedures used during the chosen case of emergency. Crew members should also know what the duties of other people on board are to understand the commands they are being given.

The way of communicating during the drill should also be set beforehand. The command chain should be established and phrases used clear. This can occur as an issue especially in a multilingual environment. Good communication during the emergency is essential.

The other issue that should be discussed and checked before the performance of the planned drill is the equipment, which is going to be used. The crew should be aware of the places where the equipment is being kept and of the ways of using it. The emergency equipment, depending on its purpose, can be stored in different, designated places. In case of outfits, their condition and sizes should be checked and well-marked. Expiry dates should be checked on some appliances and the effectiveness of operation inspected on the others.

When crew members are acquainted with the risks and purposes of conducting the drill, its scenario should be presented. As many information on the circumstances as it is required should be given, but the crew should also be aware of the fact, that the situation is dynamic and can change.

The master, who is in charge of the drill being performed, should monitor the crew’s actions. If it is impossible, another person should be designated to do that. A few drills conducted during my work on board were filmed, so it was easier to discuss them afterwards.

When the drill was finished the crew would gather again and master would give the account of the issues which had arisen during the drill. The most common problems encountered during the alarm practices were:

- too long period of emergency response;
- mistakes in communication;
- lack of equipment or equipment unusable;
- taking actions which could be dangerous in case of real danger;
- other, unexpected problems.

During the discussion each of these problems was analyzed. Their reasons were found and possible solutions suggested.
Most common solutions to the problems which occurred were:

- to shorten the time of response;
- to improve a command chain;
- to improve communication patterns;
- to adjust the duties of the crew members;
- to order, repair or replace the necessary equipment;
- to reduce the time of response in case of unexpected event.

As the additional task, deck cadets were supposed to describe all the actions taken and situations which arose during the drill and discuss them with the captain later.

5. EXAMPLES OF CONDUCTED DRILLS

In this chapter two descriptions of drills will be presented and solutions of the encountered problems specified.

5.1. Abandon ship drill

Abandon ship drill was announced by the abandon ship signal (one long sound) followed by captain’s explanation. Muster station for abandon ship alarm depended on captain’s indication. Port side or starboard side, next to the lifeboats station could be designated. The crew members were supposed to gather at the indicated muster station equipped with life jackets and immersion suits. After a roll call a lifeboat was lowered to the water level. According to the safety requirements the lifeboat was lowered unmanned.

This kind of drill was conducted very often and all the crew members were aware of their duties and procedures of launching of a lifeboat. But the performance of lowering of this life saving appliance showed a problems which could cause a dangerous situation for the crew in case of emergency.

The first issue concerned unfastening of lifeboat painters. Painters were new, just fixed to the lifeboat. In case of emergency unfastening of the tightly tied painters would be impossible. Painters would have to be cut and in the effect the crew would lose the control over the boat. Another thing which could be a problem was the distance from the main deck to the lowered lifeboat. There was a possibility of tightening the lifeboat closer to the ship’s side using the painters but in bad weather conditions this action would be extremely difficult to take. The last concern referred to the crew outfits while entering the lifeboat because of restricted movement possibilities after putting on the immersion suits. All of these problems were discussed after the drill and following solutions were obtained.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painters tied to tightly. Quick unfastening under the stress condition</td>
<td>Use another knots for fastening the painters; they have to be easy to untie</td>
</tr>
<tr>
<td>practically impossible</td>
<td></td>
</tr>
<tr>
<td>Lifeboat too far from the ship’s side at the level of main deck</td>
<td>Lifeboat embarkation station will be placed at the level of boat deck to avoid difficulties during the entering</td>
</tr>
<tr>
<td>Immersion suits restricting and slowing down the process of lifeboat</td>
<td>Crew will embark the lifeboat wearing life jackets and will put on immersion suits after the entering</td>
</tr>
<tr>
<td>embarkation</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own elaboration based on on board experience.

This example shows that the practical performance of a very common and often conducted drill can bring unexpected difficulties. In case of a real abandon ship alarm some of these problems could create a situation dangerous for the crew. After the conduct of the drill and discussion about the encountered difficulties, the solutions were found and actions taken to improve safety of the crew members.

5.2. Oil spill during unloading cargo

Nowadays, when environmental protection is one of the top priorities for shipping companies, it is essential to raise awareness of this issue among the crew. Trainings concerning the oil spill emergency should motivate the crew to develop their skills and understand the importance of the task.

According to the ship’s master’s decisions the crew was supposed to take part in a drill, the scenario of which was a simulation of an oil spill on board of the vessel during unloading of crude oil cargo in a port.

In this case the drill was preceded by a theoretical training. The officer designated by the captain explained the procedures basing on the Ship Oil Pollution Emergency Plan and additional company regulations. Emphasis was put on safety precautions, especially these concerning volatile carbohydrates poisoning and danger of slipping on the oil covered deck. After checking the crew’s knowledge of their duties, the scenario was presented and the drill started.

Drill was conducted to check the level of crew response to oil spill during the unloading of crude oil in a port. Assumption was set, that the crew is able to control the situation before leakage of the oil to the sea water. The drill was filmed by the captain in order to analyze it afterwards.

During the drill the following difficulties arose and the solutions were obtained in the discussion afterwards.
### Table 2

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
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<tbody>
<tr>
<td>Crew members had to walk through the contaminated area to reach oil spill equipment store</td>
<td>Part of the equipment was moved to the store in superstructure; putting on protective clothing could be done without walking through spill area</td>
</tr>
<tr>
<td>Foam monitor operators were not able to reach their stations in expected time</td>
<td>Additional people were delegated to help to put on firefighters outfit</td>
</tr>
<tr>
<td>Crew gathered on the muster station was exposed to volatile carbohydrates</td>
<td>Muster station in case of oil spill alarm is to be set by captain in a safe place</td>
</tr>
<tr>
<td>Problems with communication</td>
<td>Improved command chain</td>
</tr>
</tbody>
</table>

Source: Own elaboration based on on board experience.

Analyzing the drill by watching the video material was a good way to show the crew their actions. Every crew member could see their actions and draw conclusions on what could be done better or in a different way.

Recording a drill might be also stressful for some crew members. This kind of action enables the master to see the ability of the crew to work under stress conditions. The level of stress during the drill cannot be compared with the case of life threatening emergency but can prepare the crew for the situation of completing their tasks in actual danger.

### 6. IMPACT OF ON BOARD TRAINING ON CADETS

Among many available methods of training for maritime universities students an on board training is the most valuable method of learning and gaining practical experience. The opportunity of taking part in well-planned trainings and drills during seamanship practice will enable future deck officers to learn the proper procedures for emergency situations.

Deck cadets should learn how to perform a good-quality theoretical and practical training for the crew. After obtaining an Officer of the Watch license it will be their responsibility to maintain a well-functioning command chain or to be a team leader in a place of emergency.

Taking part in a theoretical part will teach how to understand dangerous situation and what the safety precautions which have to be maintained are. Careful observation and detailed discussion presents the possible mistakes and ways of avoiding them.

On board training connected with a classroom education should provide a substantial amount of knowledge for future deck officers. In a situation when on board training’s role is diminished just to the obligatory duty there is a danger of teaching and repeating of the bad habits. An educational purpose is reduced to
basic procedures which may not be sufficient in case of real life emergency. Only professional approach of the ship’s master will ensure a good quality of performance of the trainees.

CONCLUSIONS

A properly prepared for the emergency crew is able to significantly improve vessel’s safety. Shore based training is an essential component of crew’s preparation for work on board of the ship but to ensure full understanding of the problem it has to be followed by an onboard familiarization and training. The best way to verify crew’s readiness, response reactions and under stress actions is to provide drill scenarios as similar to real life situations as possible. Scenarios should be carefully prepared and the crew properly instructed. Basing on the theoretical knowledge, it is possible to find the reasons for mistakes and take actions to avoid them during future trainings or in cases of real emergency. A valuable and skills-developing drill should involve every crew member, who must understand the reasons for the actions taken and be aware of the hazards connected with them. Conducting drills and alarms should not be just a duty required by conventions but a chance to improve skills, knowledge and safety of the crew and of the vessel.

BIBLIOGRAPHY