

# Drills and Training on board Ship in Maritime Transport

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## Abstract

*In maritime transport, drills are methods of practicing how a team or individuals should behave in case of an emergency on board ship (fire, explosion, pirates' attacks, ship sinking, ship grounding, capsizing etc.). Most commonly acknowledged in the shipping domain, drills are synonyms to training exercises. Drills are extremely important for the safety of ship, crew and passengers and are mandatory to be performed in any sea voyage. In this paper is made an overview on regulatory framework and strategic role of efficient maritime drills and training.*

**Key words:** safety, security, safety management manual, SOLAS, STCW

**J.E.L. classification:** J24, J28, L91, O15

## 1. Introduction

Traditionally, the purpose of training and development has been to ensure that seafarers can accomplish their jobs efficiently. Current trends emphasize the importance of training and intellectual capital, a critical factor for competitive advantage. When strategically applied, continuous learning fosters knowledge and skills acquisition to help the maritime companies achieve their goals. The role of Human resources and training department is to establish and implement a high-level roadmap for strategic training and development. The starting point is an in-depth understanding of the IMO regulations, business environment, knowledge of the organization's goal and insight regarding training and development options (Surugiu *et al.*, 2010).

Since 1989, in the operation of the bulk power supply system, a similar domain full of risks, many of them different than the risks met by sea, but with a similar approach in planning and establishing managerial procedures, (Ackerman *et al.*, 1989) presented reports in disaster planning.

(Mao *et al.*, 2014) proposed a set of appraisal procedure and index system to assess the holistic drilling effectiveness of shipborne Command and Control system. Their work present the basic principles and rules to be followed in the assessment process, the hierarchy structure of evaluation, criteria and computing method of each index and the calculation method of index. Their research was applied to warship training procedures.

(De Miguel and Diez, 2015) established a conceptual design model that informs the development of socio-technical systems to support community involvement in emergency drills.

## 2. Regulatory framework for performing drills and training

The International Conference of the Safety of Life at Sea (SOLAS) Convention in its successive forms is generally regarded as the most important of all international treaties concerning the safety of merchant ships. It requires that signatory flag states (comprising in March 2016 a number of 162 contracting states representing approximately 99% world merchant fleet) ensure that ships comply with minimum safety standards in construction, equipment and operation.

The Convention was established, adopted and several times amended by the International Maritime Organisation (IMO). The first version was adopted in 1914, in response to the Titanic disaster. In 1960, at the fourth version of SOLAS were taken institutional measures for ensuring maritime training conditions in respect for safety navigation. was stated that “Contracting Governments should take all practicable steps (...) to ensure that the education and training of the masters, officers and seamen in the use of aids to navigation, of life-saving appliances and of authorized devices designed for the prevention, detection and extinction of fires or for prevention or alleviating casualties at sea is sufficiently comprehensive, and also (...) education and training is kept up to date and in step with modern technological developments” (SOLAS, 1960, Recommendation 39).

The 1974 version of International Convention for the Safety of Life at Sea (SOLAS,1974) required specific mandatory drills to be performed by a vessel in order to enhance the safety and security of the voyage.

Since 1985, the institutional perspective on training became holistic and included all the interested entities. At the seventh session of the Joint IMO/ ILO Committee on Training was adopted a *Document for guidance – An international maritime training guide*, acknowledging that, to comply with SOLAS recommendations, “adequate facilities should be provided for the training (...). There should be exchanges of information on modern methods and technological advances between all concerned in the shipping industry. In the establishment and review of training schemes, shipowners’ and seafarers’ organizations should be fully consulted. The satisfactory completion of appropriate training courses should be among the qualifications required for the grant of appropriate certificates” (IMO/ILO, 1985, p.1, art. 2).

Current drills regulation, in force since 1 January 2015, as described in SOLAS latest amendments, are presented in Table 1 below.

*Table no 1. SOLAS onboard drill requirements (with MSC 92 amendments to regulation III/19, entered into force on 1 January 2015)*

SOLAS Chapter.	Chapter Title	Regulation no. (paragraphs)	Regulation title	Regulation description
II-1	Construction –structure, stability, installations	24 (2.1; 2.2)	Marking, periodical operation and inspection of watertight doors, etc., in passenger ships	<ul style="list-style-type: none"> <li>• weekly drills for the operating of watertight doors</li> <li>• drills <i>held before leaving port</i> in ships in which the voyage exceeds one week</li> </ul>
II-2	Construction – fire protection, detection, extinction	15 (2.2, 3.1)	Instructions, on-board training and drills	<ul style="list-style-type: none"> <li>• On-board training in the use of the ship’s fire-extinguishing systems</li> <li>• Fire drills</li> </ul>
III	Life-saving appliances and arrangements	19 (2.2; 22.3; 3.2; 3.3; 4.1; 4.3)	Emergency training and drills	<ul style="list-style-type: none"> <li>• Musters of newly embarked passengers <i>prior to or immediately upon departure</i> on a voyage for more than 24 h,</li> <li>• Passenger safety briefing whenever new passengers embark</li> <li>• Every crew member shall participate in <i>at least one abandon ship drill and one fire drill every month.</i></li> <li>• The drills of the crew shall take place <i>within 24 h of the ship leaving a port if more than 25% of the crew have not participated</i> in abandon ship and fire drills on board that particular ship in the previous month.</li> <li>• each lifeboat launched during an abandon ship</li> </ul>

				<p>drill <i>at least once every three months</i></p> <ul style="list-style-type: none"> <li>• lifeboats be lowered <i>at least once every three months and launched at least annually.</i></li> <li>• rescue boats launched <i>each month</i> with their assigned crew aboard and maneuvered in the water.</li> <li>• crew members with enclosed-space entry or rescue responsibilities to participate in an enclosed-space entry and rescue drill <i>at least once every two months</i></li> <li>• ship's life-saving appliances on-board training <i>as soon as possible but not later than two weeks after a crew member joins the ship.</i></li> <li>• training in the use of davit-launched liferafts shall take place at intervals of <i>not more than four months</i></li> </ul>
		26 (3.3)	Additional requirements for ro-ro passenger ships	<ul style="list-style-type: none"> <li>• At least two crews of each fast rescue boat shall be trained and drilled regularly</li> </ul>
		30 (1;2)	Drills	<ul style="list-style-type: none"> <li>• On passenger ships, an abandon ship drill and fire drill shall take place <i>weekly</i>. The entire crew need not be involved in every drill, but each crew member must participate in an abandon ship drill and a fire drill <i>each month</i> as required in regulation 19.3.2. Passengers shall be strongly encouraged to attend these drills.</li> </ul>
<b>V</b>	<b>Safety of navigation</b>	26 (1; 3.2; 4;5)		<ul style="list-style-type: none"> <li>• Within 12 hours before departure, the ship's steering gear shall be checked and tested by the ship's crew.</li> <li>• Emergency steering drills shall take place <i>at least once every three months</i> in order to practice emergency steering procedures. These drills shall include direct control within the steering gear compartment, the communications procedure with the navigation bridge and, where applicable, the operation of alternative power supplies.</li> </ul>

Source: (SOLAS, 2015)

### 3. Strategic role of maritime training and drills

In maritime transport, professional competence is acquired after passing competency courses, simulation training on shore, drills and training exercises on board ship. Enhancement is provided by using advanced simulation training, leadership and teambuilding programs, customized training based on the needs of the team. A constant analysis of productivity is needed to keep up to date results. A training system kept into consideration by a competitive shipping is not only limited to shipboard training. Shore based training implies external courses like STCW (International Convention on *Standards of Training, Certification and Watchkeeping* for Seafarers, 1978) mandatory courses, competence and soft skills enhancement courses. Also, in house shore based courses are related to company's system and policies, safety, productivity and loss control. The objectives of structured shipboard training are acquiring theoretical knowledge, familiarization and drills, mentoring and next rank training (Surugiu *et al.*, 2010, p.61).

Good quality training is a prerequisite for ensuring a vessel maintains a high standard of operation. Training in all its forms adds to the value and safety culture on a vessel. From the legally imposed training certificates of competence to the cadet programs of practice at the board of the ship, it is essential to understand the strategic importance of operating a vessel to the highest levels.

For crew members aspiring to higher ranks, statutory training is carried out as they seek for

promotion, but a good ship operator will have their own in-house training program that will help reinforce the company's culture and safety ((Surugiu *et al.*, 2010, p.62).

A well-trained seafarer is the most valuable asset an owner has on board. Companies must meet the requirements for which they are directly responsible. Having well-trained seafarers is essential to any maritime company who wishes to demonstrate that responsibility, while at the same time be seen by the community as having quality and competitive operation (Barsan *et al.*, 2011, p.91).

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. 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 (Szcześniak, J.A., 2013, p.95).

Drills are procedurally explained in the Safety Management System records. A drill or training on board ship has to be prepared and planned carefully in advance. Planning includes the following chronological actions, presented in Table 2:

Table no. 2. Time-Table for planning drills or training

<b>DAYS TO DRILL</b>	<b>DATE</b>	<b>EVENT</b>	<b>CHECK</b>
D -18	(calendar	Review the Guidelines	
D -18	dates to be	Confirm budget availability for items and/or services to be employed during the drill	
D -18	inserted)	Identify the drill control team	
D -17		Obtain management endorsement if it is required	
D -16		Liaison with the ship designated person	
D -10		Refine or adjust the Master Events List if necessary	
D -1		Brief the participants	
D day		Conduct the drill	
D day		Perform the debrief and record the lessons learnt	
D +		Record the conduct of the drill	
D +		Prepare the written report on the drill	
D +		Report the conduct of the drill to management	

*Source: (APEC Manual of Maritime Security Drills and Exercises for Port Facilities, Appendix 1)*

Lessons learned after drills and training procedures are useful notions of large interest for enhancing crew capabilities and team responsibilities. After conducting drills, the major lesson learnt is the benefit of undergoing that training exercise, as the information and know-how of crew members becomes solidified. And this will help crew strategically improve their work performance.

#### **4. Conclusions**

In maritime transport, performance, safety and competitiveness can be achieved at the early stage of training personnel. A well-trained crew means minimized risks of transport and enhanced safety of service. Therefore, drills and trainings on board ships (or on shore) are essential part of seafarers' working process. A drill is an exercise supervised and conducted by competent authority, preparing crew for possible emergency situations like fire, severe weather conditions, flooding, collision, grounding, injuries abandon ship, person overboard, terrorism or bomb threat etc. Performing drills and training on board ship brings several advantages and benefits, like minimizing responding time in case of real emergency situations, improving the way of taking decisions under pressure and familiarizing crew with the ship's equipments and procedures. Best practices acquired after drills and training procedures are useful solutions for enhancing crew performance.

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