

Safety, Security and Reliability Issues in Shipping Industry

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Abstract: Today, safety is a very important factor that affects all elements of Shipping Industry. However, safety management and its implementation in the Maritime Industry are more important than ever. Ship security measures are often the first and only measures preventing criminal act at sea. Ship security management is today prescribed to be risk-based which has two objectives: to effectively reduce the security risk to acceptable levels, and to create a security culture in the organization that supports effective ship operation on an everyday basis. A floating ship has to be reliable in transportation and Automation in order to gain profit and increase the customers.

Keywords: *Safety, Security of Cargo and Crew, Reliability, Transportation, Security Taxonomy*

Main text

Safety

Maritime safety is one of the imperatives of the maritime industry. Sea accidents occur under a set of circumstances in an area where each of the factors affecting these circumstances may, at a moment of time, alter its initial state and turn into another state that can be more or less predictable. A danger is a state of imminent distress, whereas a risk is a danger that can be predicted, but only to a certain extent. It should be borne in mind that the risk always implies the probability that an undesirable event may occur and that the only thing a man can do is to assess it. Risks in maritime shipping are mostly related to accidents at sea that can be, according to their causes, be divided as follows –

- Accidents caused by unintentional human error,
- Accidents caused intentionally by man,
- Accidents due to technical failures,
- Accidents due to poor weather (wind, waves, lightning, etc.).

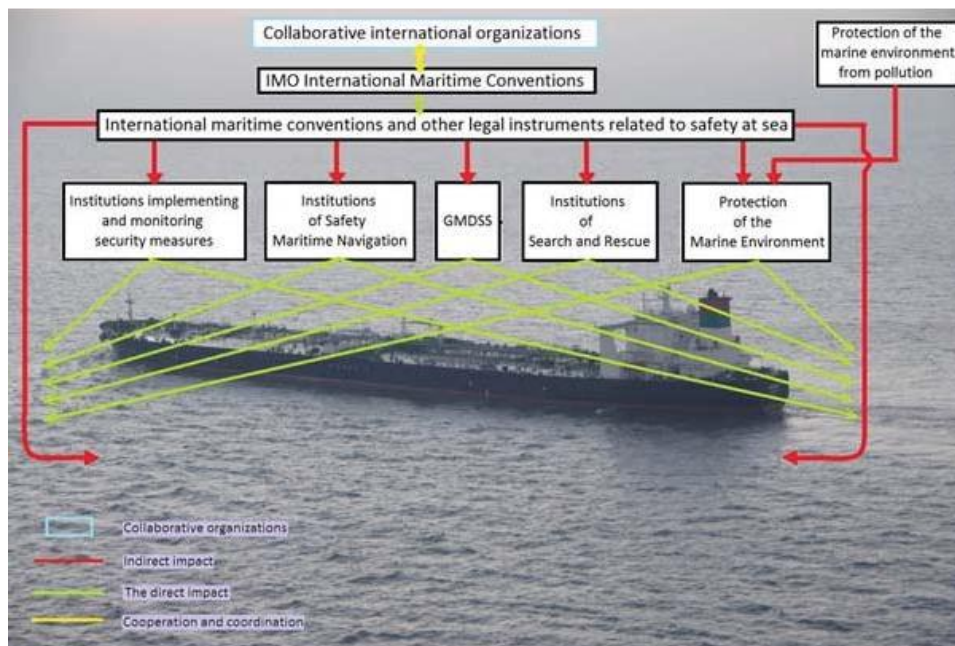
In the context of safety of traffic in maritime shipping, it may be assumed that a system or its sub-system is likely to function properly within the set limits. Hence the goal is to reduce or to eliminate the causes of adverse events that threaten the safety of navigation with the purpose of achieving absolute reliability in maritime transportation. In a wider sense, the safety of maritime transportation may be defined as a set of measures that are taken to protect human life, but also as a set of measures that are taken to protect material and non-material assets that are directly or indirectly related to maritime transportation. There are a large number of factors affecting the safety at sea, including shippers, ports and port authorities, coastal countries, international community, etc.



(Figure no. 1 – Safety at Sea)

In a narrower sense, the safety of maritime transportation implies the measures aiming at performing the carriage of cargo by sea without harmful effects on human life, cargo, vessel and environment. In order to obtain an adequate level of safety, a system of safety has to exist at the international level which will be capable of bringing adequate necessary measures and which will monitor the implementation of these measures by means of various instruments and through various institutions. The maritime system of safety at sea can be divided into the following components –

- Institutions bringing legal regulations (international conferences, International Maritime Organization and its institutions, etc.),
- Institutions in charge of the implementation and monitoring of security measures and standards, International maritime conventions and other legal instruments related to safety at sea, and
- Users at sea.



(Figure no. 2 – The system of Maritime Safety)

Security

Approaches for ship security outlined in the International Ship and Port Security (ISPS) code and Best Management Practices for Protection against Somalia Based Piracy (BMP4) for ship security are risk-based. The results of a risk analysis must always be weighed against risk tolerability levels as well as other operational parameters, such as financial considerations, requested reliability and possible operational gain. Generally, higher risks are tolerable if the possible operational gain is high.

Understanding the crews' role in security efforts

The crew is one of the most important contributory aspects to the causation of safety incidents. Interviews with ship operators show that the most important driver for implementing security measures is the crew's perception of security. It is therefore important to understand the situation onboard and how the perception of security risks affects the crew in terms of health, well-being and performance. However, there are extensive gaps in the literature regarding the effects of security threats such as piracy on the health and performance of the crew.

In order to implement security changes correctly it is vital that both management and crew are well trained and adhere to sound processes. In this context human factors research is essential for understanding these needs.

Hence, in order to analyse and implement ship security management effectively in terms of operator health and performance, ship operators face three major challenges:

- in order to capture the security performance of the organization, the risk analysis must include the state on board with regard to education and training, coping strategies, usability of technical and administrative systems, and systems for providing for both seafarer and family,
- it is crucial for success of implementation of safety and security routines that the implementation includes all levels of the organization, and
- the security management must be committed and sound in respect to human factors on board.

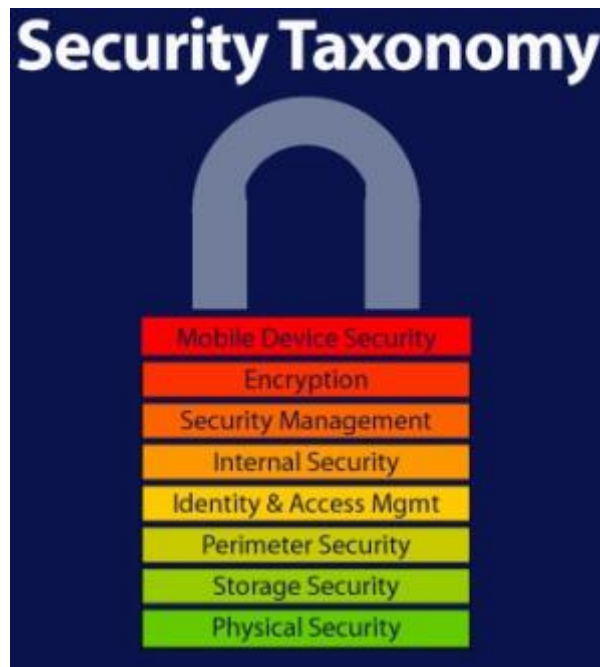


(Figure no. 3 – Security Levels)

Implications for security management

An effective and successful security risk management process poses many challenges to the ship operator. This is a result of the lack of guidance in combination with a complex and diverse situation beyond the control of the ship operator. While the analysis is prescribed to be risk-based, the process of the analysis itself is ungoverned. There is a lack of explicit discussion on how the ship operator could:

- estimate how different threats (and other external aspects) interact with the crew's risk perception (and resulting effectiveness) in order to assess the utility of different control options, and
- estimate and validate probability approximations, especially given the tight coupling between the threat's intent, the crew's preparedness and the chosen controls.



(Figure no. 4 – Security Taxonomy)

Changes in safety risks are often a result of changes by the ship operator or in the onboard environment. However, for security risks the situation can change dramatically even though there are no changes in the ship operation. As a result, the ship security management process is highly iterative and depends on situations both on board and beyond the ship operator's control. There are also interdependencies between the processes, the situation on board and the political, economic and social situation in the areas transited and visited. Ship security management is, however, not insurmountable, but in order to make it manageable and effective there has to be a focus on the critical aspects stated below.

In the risk assessment the ship operator must put particular focus on:

- methodological understanding beyond what is described in the guidelines, especially in relation to how to achieve an output that is valid and effective,

- collecting relevant system understanding from a relevant combination of experts with knowledge about the particular external conditions (such as threats and their respective incentives as well as security initiatives) and internal conditions (such as education, training and usability of technical and administrative systems), but also about how the external and internal conditions interact, and
- using well defined and communicated risk acceptance criteria that also include stressors to the crew and are based on a sound understanding on human factors.

In the risk reduction and control the ship operator must put particular focus on:

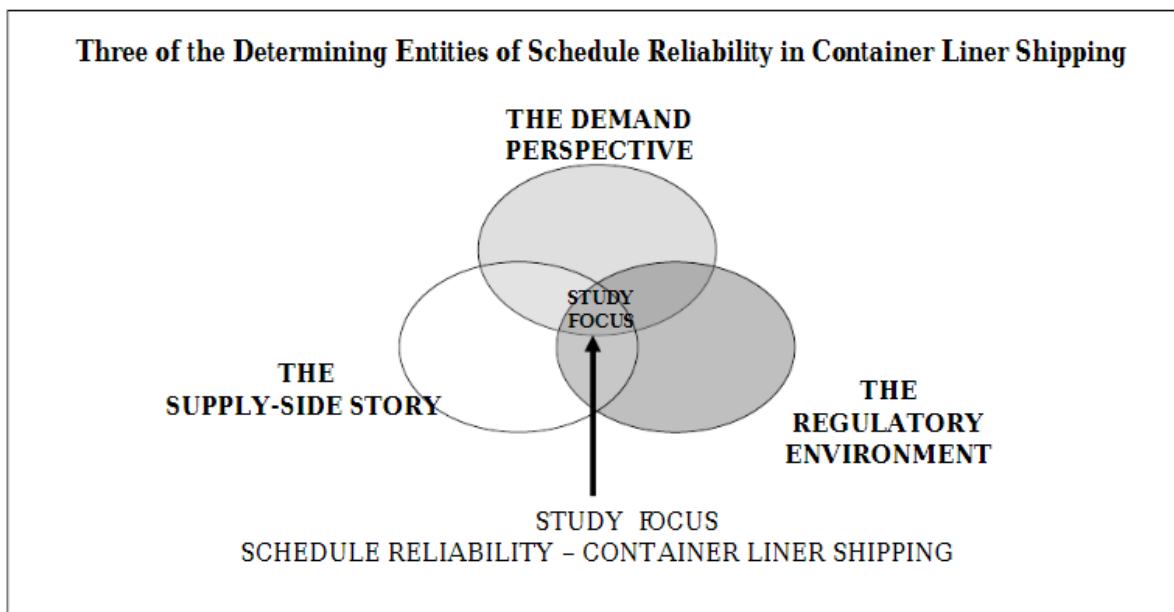
- inclusion of all levels of the organization in the risk reduction implementation based on a human factor understanding,
- continuous and broad awareness when monitoring different activities that can directly or indirectly affect ship security, and
- the necessity to flexibly adapt countermeasures accordingly during the voyage.

While the understanding of safety (hazard-based) risks may come from objective historical accident statistics, the security (threat-based) risks must rely on expert judgements based on knowledge and experience as well as objective data. The process is complicated in that the link between consequences, evaluation criteria, risk control measures and crew preparedness are strong, but not intuitive.

Reliability

Schedule reliability has become an area of topical interest following various initiatives by liner shipping companies recently, notably the new “Daily Maersk” policy by Maersk Line, which focuses on guaranteed punctual departures and arrivals. Shippers have demanded schedule reliability for some time in attempts to reduce uncertainties from their international supply chains. This call has seemingly reached a new level as some powers have apparently shifted to the customers of containerized services as volumes have reduced following the global economic problems seen in recent years. In addition, there have been developments in the Rotterdam Rules legal framework covering liner shipping companies’ operations in connection with schedule integrity (UNCITRAL, 2008) and beyond this in terms of the anti-trust rules on competition introduced on trading to European Union ports from October 2008 (Marlow and Nair, 2008). The paper will assess the principal developments in the container liner shipping sector in relation to schedule integrity, with the purpose of clearly defining what service reliability currently means and establishing the implications and topics for future research in the field.

To undertake this study, after a literature review which attempts to clearly define what schedule reliability means in the context of container liner shipping, a structured methodology to system enquiry will be followed (Kettinger, et. al. 1997). This identifies three of the determining entities identified by Mason and Nair (2012) comprising of demand, supply and regulation in the sector (Figure 5). In this paper, a particular focus has been applied to the main arterial trade routes of inter-regional international container shipping.



(Figure no. 5 - Three of the Determining Entities of Schedule Reliability in the Container Liner Shipping)

Container Liner Shipping – A Vital Cog in Modern Global Commerce

Today, commerce is defined by its international spread and nations have become intertwined in a global network of trade. An important facilitator of this is international seaborne transport which currently provides more than 80 per cent of world trade by volume (UNCTAD, 2011). Within this context container shipping accounts for about 60 percent of the goods by value moved internationally by sea each year (UNCTAD, 2011). Until recent times the container liner shipping sector has been a strong industry to be involved in, with the demand for global seaborne container transport rising annually on average at around +9% since its inception as a significant mode of international cargo movement commenced over the 40 years until 2007 (Mason and Nair, 2012). This is well above world GDP growth rates for virtually every year over that period. However, there are substantial risks involved in providing shipping services, especially because the size of investments in the sector are invariably highly capital intensive. In recent years, following the banking crisis in 2008 and its prolonged impact on the global economy, notably in the west, the landscape has become more turbulent for container liner shipping operators.

The Scheduled Nature of Container Liner Shipping One of the key characterising aspects of the container liner shipping sector is the scheduled basis of their operations (Gardner et al., 2002, Stopford, 2009). For bulk shipping vessels, operators have the choice not to embark on a journey until they have a pay-load to meet the costs involved. However, in container liner shipping, because of the scheduled nature of operations, this is quite different. As a result, the majority of total costs for a service are borne irrespective of how full the vessel is. In this sense there is a substantial disconnect between the costs incurred and the price vessel operators actually can levy, which is in reality a function of the demand and supply situation in the marketplace at any one time (Mason and Nair, 2012). Globally, there are approximately 400 scheduled container liner services, most sailing weekly (Containerisation International, 2012) with the dense routes being the transpacific, the Europe Far East and the transatlantic routes.

Conclusion

This paper is conceived through the lens of three determining entities which have a profound impact on safety, security and Reliability. The safe operation of ships and the safe handling of cargo are core principles for liner shipping companies. In addition to focusing on the safety of their own operations, shipping companies take steps to protect the public health and safety in the countries they transit.

The global shipping industry is vulnerable to a range of hacks, including one that can send multi-million-dollar vessels on a collision course for disaster, according researchers. The key to finding a trustworthy shipping service is identifying the most reputable companies. Since choosing such a company can be a challenge, especially if you've never used a shipping carrier, here are a few key points to consider prior to selecting a vendor.

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