THE CASE STUDIES-BASED ANALYSIS OF COLLISION PREVENTION

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Abstract. *The aim of the research is to offer the results of analysis related with the aspects and causing reasons of vessels collisions and to propose probable methods of their avoidance. The conducted research is backed by the appropriate database of the International Maritime Organization. In order to reach the stated objective, the first part of the paper presents the analysis of the real cases of collision of different types of vessels. Accordingly, the second part of the paper offers the analysis-based proposal of vessels' collision prevention.*

Key words: *analysis, collision, prevention, simulator, training, research*

1.Introduction.

Provision of safe navigation is the major task of the people and organizations involved in shipping. Accordingly, the importance of collision prevention is especially underlined by the IMO-developed COLREG, which covers the all possible risks related with collision prevention such as ship's speed, traffic in narrow channels, Traffic Separation Schemes, overtaking, crossing situation, conduct of vessels in restricted visibility, towing, pushing and head-on situation. But, despite of such important rules and the set of appropriate international obligatory conventions and rules, developed by the International Maritime Organization, notorious chain of marine accidents shows, that over the period 2011-2015, half of the casualties were of a navigational nature, such as contacts, groundings/strandings or collisions, which caused 43 cases of lost ships, fatalities occurred during collisions consist 15%, collisions represent 27% of the events involving cargo ships and are the main casualty event across all the service ship types. [1]

[1] Annual Overview of Marine Casualties and Incidents, 2016

Thus, the aim of my paper is to present the results of analysis dealing with the factors and causing reasons of ship collisions and to offer possible ways of their prevention.

The conducted research is based on the appropriate data of the International Maritime Organization – Lessons Learned (developed in order to increase awareness of seafarers to accidents for prevention purposes).

2. Collision Causing Reasons – Frequency Distribution Analysis

The following classification, focused on the essence of researched real cases, provides the background to detect the most frequent reasons of the vessels collision. There is no possibility to present the whole set of the studied cases (44 in total), that is why we provide only the limited number of them but keeping the same scale of their frequency and volume.

2.1 Collisions, caused by gaps in effective bridge management

- There was a lack of understanding of how to act in restricted visibility.
- No risk assessment or consideration of potential consequences was undertaken prior to opening up and ordering entry into the breached ballast tank with the ship at sea and proceeding at near full speed.
- The master of the cargo vessel was the only person on the bridge without a dedicated lookout while departing from a very busy port at night even though the vessel was properly manned and procedures were in place as to how the bridge should be staffed upon departure.
- There was no additional watchman on the bridge from 1300 until the time of the collision.
- When the main engine was operated in engine-room control mode, the only system protections to warn the crew of "wrong way" running of the engine were the bridge and engine control room console-mounted flashing light indicators
- The port operator had not undertaken a risk assessment, or developed contingency plans for specific ship handling manoeuvre in the port. Consequently, the pilot had no guidance regarding what actions to take if the berthing manoeuvre did not progress as he had planned.[2]

2.2 Collisions, caused by Insufficient or Missing Look-out:

- The OOW was distracted from keeping a proper lookout and was not using navigation equipment, such as radar, to perform adequate watchkeeping.
- There was no proper lookout in poor visibility and the ships were proceeding at too high a speed, given the prevailing visibility.

[2] The IMO Lessons Learned - Consolidated version contact, collision, http://www.imo.org/en/OurWork/MSAS/Casualties/Documents/Consolidated%20version%20of%20Lessons%20Learned/Consolidated%20version%20contact%20collision.pdf

- The skipper of the sport fishing vessel decided to release the deckhand from his task of lookout despite visibility being restricted to 300 m. The skipper of the sport fishing vessel was using a radar, but did not detect the pleasure craft.
- Another contributory cause to the collision was the lack of a lookout on the pleasure craft which was anchored in a shipping lane at night.
- The VTS operators were distracted by other duties and did not survey the radar screens.[2]

2.3 Collisions, caused by Misunderstanding of Oral and Non-verbal Information

- The communication between all parties involved was unclear and prone to misunderstanding and use of standard marine phrases was not practiced.
- The watchkeeper on board vessel 2 assumed that the other ship would take avoiding action so did nothing despite the fact that the two ships were approaching each other on an almost reciprocal heading so as to involve a risk of collision.
- Both ships transmitted their compulsory reports to VTS. But when the ships made their reports, there were a number of misunderstandings and reporting mistakes. In some reports the calling vessels' name was not mentioned. In others, it was not clear to whom the message was addressed to. So the ships did not perceive the messages accordingly.
- The CPP failure alarm was heard on the bridge, but the bridge team could not identify which alarm was sounding.[2]

2.4 Collisions, caused by Radar Failure:

- The radar on the trawler was not working and there was only one person on watch, who was navigating visually. Neither vessel made their intentions known in a timely manner.
- The tanker had her radar turned off. She was unable to detect the big ship in advance. Also the container ship did not use radar for evaluation of the situation.
- Watchkeeping personnel on both ships did not observe several COLREG '72 rules applicable to lookouts, use of anchor lights, appropriate use of the radar, and communication between vessels.
- The tanker's officer on watch relied on radar information to conclude that the bulk carrier would safely pass from starboard side.[2]

2.5 Collisions, caused by Poor Visibility

- In poor visibility and the ships were proceeding at too high a speed, given the prevailing visibility VTS took a passive approach. It only acknowledged messages but did not warn either vessel of the other's intention, despite the very poor visibility and the position of the dry cargo ship which had drifted southwards in way of the outbound traffic lane. The conditions of restricted visibility aggravated an already stressful situation for the bridge teams.[2]

2.6 Collision, caused by ignorance of appropriate warning signals producing

- The passenger vessel did not make the appropriate warning signals with her whistle or light and the evasive action taken was not early enough to avoid the collision.[2]

3. The Analysis-based proposal of the vessels collision avoidance.

Thus, the research development detects the factors, mainly causing collisions at sea, such as:

- Gaps in effective bridge management;
- Insufficient or Missing Look-out;
- Misunderstanding of Oral and Non-verbal Information;
- Radar Failure;
- Poor Visibility;
- Ignorance of appropriate warning signals producing.

As the investigation of the listed above cases shows, the majority of collisions happen because of simple but life-threatening mistakes in use of navigational equipment and understanding of the existed information (direct or indirect human factor/mistake).

Conclusion.

Thus, in order to provide safety of navigation, the master and OOWs shall prevent possible collisions on the planning and implementation stages developing situational awareness by:

- constant provision of effective bridge procedures to provide best practices in bridge management;
- paying special attention to ensure watchkeeping standards (look-out)
- using appropriate IMO Standard Marine Communication Phrases and paying special attention to appropriate understanding and adequate interpretation of non-verbal information;
- regular check of radar performance and appropriate interpretation of its information.
- tracking rapidly changeable weather conditions.
- strict adherence to COLREGs in using of the appropriate signals.

At the same time, one of the best ways to train the future seafarers and develop their safety culture and to raise safety awareness is to simulate the collision situation using the appropriate simulators, providing training in actions to be carried out in case of collision.

References:

1. Annual Overview of Marine Casualties and Incidents, 2016, http://www.emsa.europa.eu/

2. The IMO Lessons Learned - Consolidated version contact, collision, http://www.imo.org/en/OurWork/MSAS/Casualties/Documents/Consolidated%20version%20of%20Lessons%20Learned/Consolidated%20version%20contact%20collision.pdf
3. Bridge Procedures Guide, International Chamber of Shipping, London, 2016