

## ANALYSIS OF THE CAUSES AND CIRCUMSTANCES OF THE COLLISION BETWEEN TWO SHIPS IN CONSTANTA PORT

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### ABSTRACT

The prevention of collisions at sea is a very important aspect of maritime transport. Despite the fact that the International Regulations for Preventing Collisions at Sea are studied and learned by every Master, deck officer and pilot, the incidents in respect of collisions between ships still continue to occur. The present paper presents the analysis of the causes and circumstances of a real collision case, between two ships, occurred in Constanta Port. The analysis was made based on the VDRs recordings provided from the two ships. The main objective of the analysis presented in this paper is to reveal the important aspects that can lead to such a dangerous situation in order to prevent future accidents of this kind through the assessment of its causes and circumstances. The case study presented highlights the importance of knowing the responsibilities and duties of Master, Officer on Watch and Pilot during ship maneuvering in port. Moreover, it brings into attention the importance of an efficient bridge team management and the connection with pilots.

**Keywords:** *ship, collision, pilot, regulations.*

### 1. INTRODUCTION

Regardless if they occur in open sea, straits or ports, collisions between ships remain a topic widely debated by de International Maritime Organization, Maritime Safety Agencies, Maritime Training Centers or Maritime Universities.

Understanding and knowing the physics of collision between ships as well as the rules that govern this aspect are two major milestones in the carrier of every Master, Deck Officer or Pilot. Moreover, the use of electronic equipment for navigation is widely considered both necessary and useful [1].

Apart from that, the bridge team management during ship maneuvering in ports, especially with pilot on board, must be very well understood and applied without any retention or misconduct by all the participants [9].

This paper presents a real collision case occurred in Constanta Port, between a container ship and a chemical tanker ship during maneuvering with pilots on board.

The goal is to analyze the causes and circumstances that led to an incident with serious consequences. The motivation came from the fact that every case of collision is a matter of safety concern and has to be very well analyzed and solving solutions to be identified.

The analysis of causes and circumstances of the collision presented in this paper is based on reliable sources of documentation, such as VDRs recordings from the ships. The facts from the time of the incident are correlated with internal and international regulations that are governing the collision between ships as well as the responsibilities of Masters, Officers on Watch and Pilots.

The subject analyzed here revealed the importance of understanding and knowing the responsibilities of those who participate in ship maneuvering in ports. The results of the analysis can be used as guidelines for all those involved in ship operations.

### 2. NARATION OF EVENTS

The narration of events is based on the VDRs recordings perused from both ships [11].

On 31<sup>st</sup> October 2015, at 23:18 hrs., the pilot of the container vessel reported to VTS Constanta that vessel is ready to commence unberthing maneuver, whilst at the same date at 23:26 the pilot of the chemical tanker ship reported to VTS Constanta that vessel is underway to port entrance and intention for berthing at a nominated berth.

The maneuvers of both ships, i.e. unberthing of container ship and berthing of chemical tanker ship, were accepted and confirmed by the operator of VTS Constanta.

After the container ship cast-off the berth and executed the turning maneuver inside the port basin, a tug boat was made fast in forward portside and the vessel proceeded to exit at a speed of about 3 knots in a true course of 106 degrees.

Between 23:53 hrs. and 23:56 hrs., the pilot of the chemical tanker ship tried to contact in VHF the pilot of the container ship but no reply was received.

At 00:00:40 hrs., the container ship had a course of 115 degrees and a speed of 7 knots, this course being a cross course with the course of chemical tanker ship of 356 degrees and a speed of about 2 knots (fig.1).

In this moment, the pilot of the chemical tanker ship contacted through VHF the pilot of the container ship and proposed him that the vessels pass "green to green". The pilot of the container ship confirmed and accepted the manoeuver proposed by the pilot of the chemical tanker ship.

At the time when the avoidance manoeuver was confirmed by both pilots, the distance between the two vessels was about 3 cables, the chemical tanker ship being in a position exactly at the port entrance, a distance of 0.3 cables abeam from the red lighthouse (fig.1).

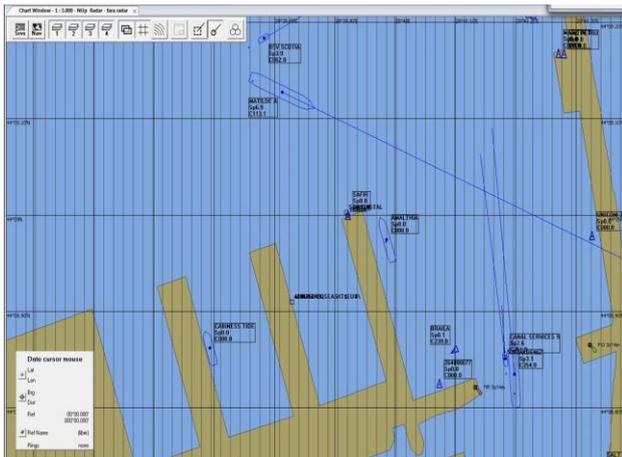


Figure 1 Position of ships prior commencement of avoidance manoeuver (capture from VDR) [11]

From this time the following maneuvers were executed by the pilots of both ships:

- At 00:00 52 hrs. the pilot of the container ship gave the command “rudder midship”.
- At 00:01:00 hrs. the pilot of the container ship ordered “rudder 20 degrees to Port” whilst the engine was full ahead with a speed of 8 knots and course of 113 degrees.
- At 00:01:26 hrs. the pilot of the chemical tanker ship ordered “stop engine”.
- At 00:01:28 hrs., whilst the pilot of the container ship noted that the chemical tanker ship is keeping her initial course of about 356 degrees, without no any change to portside according to the agreement between the pilots, decided to start the manoeuver for stopping the ship by ordering “stop engine” (fig.2).

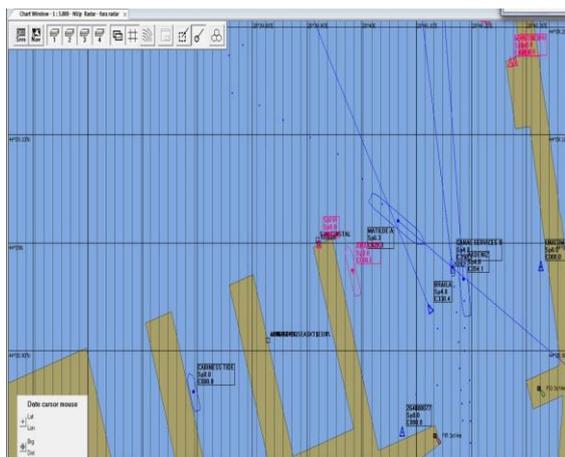


Figure 2 Position of ships prior collision (Capture from VDR) [11]

- At 00:01:34 hrs, the pilot of the chemical tanker ship order “rudder hard to port”.
- At 00:01:37 hrs, when the container ship was with engine stopped but still proceeding with forward speed and the pilot noted that the chemical tanker ship has no any

intention for avoiding the cross courses situation, he ordered dropping the port anchor.

- At 00:01:42 hrs, the pilot of the chemical tanker ship ordered “full astern”.
- At 00:02:10 hrs, the two vessels collided, inside the port basin, at a distance of about 2 cables from the entrance. The chemical tanker came into collision with her bow to the starboard side of the container ship, near to aft part of cargo hold no.1 (fig 3).

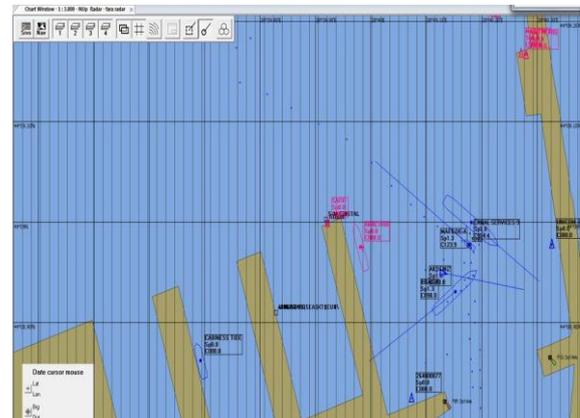


Figure 3 Position of ships at the time of collision (capture from VDR) [11]

- At 00:02:20 hrs., the pilot of the chemical tanker ship ordered “stop engine”.
- At 00:02:27 the pilot of container ship ordered “full astern”.

After the ships were separated, the chemical tanker ship passed through astern of the container ship, proceeded to her nominated berthing place.

In the same time, the pilot of the container ship requested towing assistance and in a short period of time a tug boat came into assistance and made fast at aft part.

Once the anchor was heaved up and the tug boat made fast, the container ship proceeded, with pilot on board, to the inner anchorage area where was safely anchored.

### 3. ANALYSIS OF THE CAUSES AND CIRCUMSTANCES OF COLLISION

The data and information collected from the ships revealed the following causes that led to collision of the ships:

#### 1. Failure to comply with maneuvering plans

According to the art.127 paragraph 4 from the Romanian Port Regulations [8], for the port maneuvers of tanker ships, the pilot is required to present to Master the plan of berthing manoeuver, including all the necessary details like courses, position of buoys, water depths, number of tugboats. A copy of this plan has to be signed and stamped by the Master and retained by the pilot.

Despite the fact that the maneuvering plan was agreed and signed by the Master and pilot on board the container ship, prior commencement of unberthing manoeuver, it was not strictly followed. Thus, the pilot

of the container ship agreed with the pilot of the chemical tanker ship, the manoeuvre of passing the vessels “green to green” that was totally different as was stated in the maneuvering plan signed by the Master.

Having in view that the manoeuvre agreed by the two pilots, to pass the vessel “green to green”, had to be executed in a very small area (in the moment that the pilots agreed to change courses, the vessels were only 3 cables distance from each other, the container ship was only one cable from the nearest pier whilst the chemical tanker ship was 0.3 cables from the lighthouse) both ships were exposed to a major danger, breaching in this way rules no. 8, 9 and 15 from International Regulations for Preventing Collisions at Sea [2], and at the same time a dangerous situations for the other vessels in vicinity was created, as well as for the navigation safety inside the port basin.

Regarding the maneuvering plan of the chemical tanker ship, it has to be mentioned the fact that the pilot who attended the vessel to assist the Master for berthing, did not present to Master such a plan. By this action, the pilot breached the Romanian Port Regulations, art. 127 [8].

2. Lack of communication between the pilots and Masters of the ships.

The maneuvering plan agreed verbally by the pilots (to pass the vessels “green to green”) was established through the VHF in Romanian language, and the Masters of the two vessels have never been informed about the intention of the pilots. This fact was in contradiction with art.5, 6 and annex 2 from the IMO Resolutions A.960 (23) [3] as well as with art.130 (4) from the Romanian Port Regulations [8].

Moreover, during the maneuvering of the two vessels, once the vessels came into a close situation, the pilots did not inform the Masters about the possible risks that could appear as a result of their agreed maneuver (to pass “green to green”). In this way, art.131 (1) from the Romanian Port Regulations [8] was breached.

3. Lack of communication between VTS and the ships.

Based on the information and documents, it was revealed the fact that after the two pilots reported to VTS the commencement of their initial intended manoeuvres (unberthing for container ship and berthing for chemical tanker ship), there was no any other communication between VTS and the ships till the moment of the incident. This fact breached Art.39 (2) and Art.130 (3) from the Romanian Port Regulations [8].

4. Failure to adjust the speed of the ships to maneuvering conditions.

From the time that the container ship was turned into the port basin up to the time that the two pilots agreed the passing of the ships “green to green”, the speed of the container ship increased from 5 to 7 knots. Moreover, after the pilots agreed the mentioned manoeuvre, the speed of the chemical tanker ship was increased from 2 knots to about 5 knots.

Having in view that at the moment that the pilots agreed to pass “green to green” the vessels were in a

very close situation (only 3 cables to each other, and very close to other vessels in vicinity as well as to piers and breakwater), the speeds of the vessels being quite high, such speeds cannot be considered safe speeds for altering the course manoeuvre. This fact was in contradiction and breached the rules 5 and 6 from the International Regulations for Preventing Collisions at Sea [2].

5. Non-conformity of vessel safety navigation attempts.

Failure to properly fulfil the responsibilities for safe navigation, in terms of proper lookout, both the Masters and watch officers of the ships as well as both pilots, led to the situation of very close proximity of the ships to each other, but also to other nearby berthed vessels, thus creating a dangerous situation that led to the collision of the two ships.

This fact, together with the failure to take into account a possible collision hazard due to close situation of the ships, has led to collision between the two ships, being contrary to Rule 5, Rule 7 (a) and (b) of the International Regulations for Preventing Collisions at Sea [2].

6. Failure to perform the correct avoidance maneuver.

The fact that the two ships have collided was due largely to the decision of the two pilots to make the avoidance maneuver agreed by them (passing “green to green”).

The decision to perform the avoidance manoeuvre was taken in a very short time (especially by the pilot of the container ship which confirmed the manoeuvre immediately after the proposal of the pilot from the chemical tanker ship) without making a factual assessment of the position of the ships, in relation to the nearby moored ships and the port infrastructure, but also with the weather conditions (especially the wind speed that at the time of the collision was force 7 on the Beaufort Scale which could have been a major impediment to the handling of the container ship which has a very large side area due to containers loaded on deck, and can cause a very high wind drift).

In addition, the avoidance manoeuvre was carried out by both ships, with small course alterations, which proved to be a major impediment to the immediate perception of the action taken by the Masters or the pilots of the ships, leading to confusion. Both the decision to perform this manoeuvre as well as the manoeuvre itself, proved to be inconsistent with good seamanship practice, being contrary with Rule 8 (a), (b), (c) and (d) from the International Regulations for Preventing Collisions at Sea [2].

#### **4. THE RESPONSIBILITIES OF MASTERS AND PILOTS DURING MANOUVERING OF SHIPS WITH PILOT ON BOARD**

The responsibilities of the Masters and pilots during maneuvering of ships with pilot on board, are very clear and well established by local as well as

international regulations and/or conventions [2], [3], [7] and [8].

Based on the case study presented in this paper, the following responsibilities in this respect can be mentioned:

#### 1. Responsibilities of Masters and Officers on Watch

- Art. 29, Romanian Port Regulations [8] – Masters of vessels shall ensure and take all necessary measures to be ready to act at any time when dangerous situations occur likely to jeopardize the safety of own ship, port facilities or of other ships in vicinity.

- Art. 130 (4), Romanian Port Regulations [8] – The Master and the pilot shall be required to provide each other with all information for safe maneuvering of ship.

- Art.2, Art 5 and Annex 2, IMO Resolution A.960(23) [3] – Responsibilities with regard to ship safety in port with pilot on board in respect of communication between Master and pilot.

- Rule V/34, SOLAS [4] – Responsibilities in respect of voyage planning (voyage plan and passage plan).

- Part 3 and 3-1, Section A-VIII/2 from STCW Convention [4], and Rule 5 from International Regulations for Preventing Collisions at Sea [2] – Responsibilities to provide an appropriate and proper watch in respect of maintaining a proper lookout for safety of navigation.

#### 2. Responsibilities of pilots.

- Art. 127 (4) from Romanian Port Regulations [8] – For the makeovers of ships carrying oil products, ships carrying bulk dangerous cargoes and for manoeuvres of ships with draught greater than 16.00 meters, the pilot is required to report to Master of the ship the manoeuvre plan, including a sketch, will specify the maneuvering route, the dimensions of the navigable channel, its depths, the positioning of buoys, the number of tugs and their position of action during the manoeuvre.

- Art. 130 (4), Romanian Port Regulations [8] – The Master and the pilot shall be required to provide each other with all information for safe maneuvering of ship.

- Art. 131 (1) from Romanian Port Regulations [8] – The pilot is obliged throughout the manoeuvre to assist the Master of the ship and warn him of the risks that may arise if he finds that the course on which the ship is heading may endanger the port infrastructure, other ships, the environment or could lead to the violation of navigation and safety rules in that area.

- Art. 131 (2) from Romanian Port Regulations [8] – The pilot will immediately notify, by any means, the VTS or the Romanian

Naval Authority, if the Master of the vessel, irrespective of the results of the actions taken, will not follow his indications.

- Art. 131 (3) from Romanian Port Regulations [8] – While the pilot is on board the vessel, the Master continues to be responsible for the maneuvering of his ship and for any damage resulting from the maneuvers that are carried out with his ship. The pilot does not replace the Master during the maneuvering of the ship; he indicated the course and assist Master to perform the necessary maneuvers to follow the indicated course for entering the port, mooring, anchoring or leaving the port.

- Art. 131 (4) from Romanian Port Regulations [8] – The pilot is not responsible for incidents or accidents occurring during the manoeuvre, except where they have occurred as a result of incomplete or incorrect information provided to the Master of the ship.

- Art. 132 (6) from Romanian Port Regulations [8] – In case of occurrence of events during the maneuver, the pilot will submit a written report to the Romanian Naval Authority.

- Art.112 (1) from Ordinance 42/1997 [7] – The pilot is not part of the ship's crew and does not substitute the Master, who has full responsibility for the navigation and maneuvers performed by the ship under his command.

- Art.112 (2) from Ordinance 42/1997 [7] – In the event that the information provided by the pilot has been erroneous or has been knowingly misrepresented, the pilot shall be responsible for the accidents or the event. In this case, the port and/or inland waterway administration, the economic operator or the professional association to which the pilots belongs, shall bear the responsibility for the resulting damage.

- Art.114 from Ordinance 42/1997 [7] – While on board the ship, the pilot is required to provide to Master with all the information relating to the area or port concerned, so that the ship sails and manages the port maneuvers safely.

- Art.2, Art 5 and Annex 2, IMO Resolution A.960(23) [3] – Responsibilities for good communication with ship's Master and Watch Officers as well as in understanding the role in ship's handling in the pilot waters.

### 5. THE MANNER IN WHICH THE MASTERS AND PILOTS HAVE FULFILLED THEIR DUTIES/TASKS/RESPONSIBILITIES DURING SHIP MANEUVERS

Based on the analysis of the VDRs available, the following was revealed:

- The maneuvering plans were not presented by the pilots to Masters at the

beginning, breaching the Romanian Port Regulations.

- Only the pilot of the chemical tanker ship tried to contact the pilot of the container ship. No any attempt for communication from the pilot of the container ship was made.

- All the orders for altering the course, change the speed or drop the anchor on board the container ship were given by the pilot not by the Master. There was no any indication that the pilot assisted the vessel's Master in respect of the intended maneuvers. This action proved to be contrary to local port regulations [7], [8], and [12].

- If each ship had followed its initial course (to port entry for the chemical tanker and to port exit for the container ship), the two ships would never have been in a crossing situation, passing one the other's portside without creating a collision situation or a hazard for the safety of navigation. Once again it was revealed that the manoeuver agreed by the two pilots, respectively to pass "green to green" had no justification. The fact that this maneuver, namely the passage of ships one through the other's portside (i.e. the opposite how the pilots acted) would have been the correct maneuver and compliant with the International Collision Regulations, without jeopardizing the collision of the ships, is was also revealed in communications recorded in the VDR.

- The decision for the manoeuver of passing "green to green" has been taken solely by the pilots of the vessels without informing the Masters about the intended actions to be taken. However, Masters have not taken any action to intervene in any moment.

- The fact that the vessels came into a collision situation shows that the Masters and Officers on Watch from both ships did not carry out a proper and continuous lookout (by all means such as Radar, ECDIS, visual, etc.) to observe in due time the movements and manoeuvres of all ships in vicinity or the movements of their own ships (according to the passage plan), breaching the International Regulations for Preventing Collisions at Sea [2].

- All the conversations between the pilots as well as the orders to the tugboats, were made in the Romanian language, without forwarding this information to Masters of the ships. This fact being in contravention with the provision of art 6 from IMO Resolution A.960 (23) [3].

It can be concluded that the Masters of the two ships did not fulfil their following main responsibilities / tasks (according to local and international regulations):

- Ensure the necessary measures to be ready to act at any time in case of an event that can put in danger the safety of its own ship, port facilities or ships in vicinity.

- Obligation to provide the pilot with all the information necessary for a safety maneuvering.

- Responsibility regarding the maneuvering of its own ship while the pilot is on board [6], [10], [12].

- Responsibility in respect of communication between Master and pilot.

- Responsibility regarding the passage plan berth to pilot.

- Responsibility to provide a proper watch on the navigation bridge, for keeping a proper lookout for safety of navigation.

The pilots of the two ships did not fulfil their following responsibilities/obligations (according to local and international regulations):

- The duty to provide the Master with all the information necessary for a safely maneuvering.

- Obligation to assist the Master of the ship throughout the period of maneuvering and warn him of the risks that may arise if he finds that the course on which the ship is moving may endanger the port infrastructure, other vessels in vicinity, the environment, or could lead to breach rules of navigation and safety in that area.

- While the pilot is on board the vessel, the Master of the vessel shall continue to be responsible for the manoeuver of his ship and any damage resulting from the manoeuvres performed by the ship. The pilot does not replace the Master for maneuvering the ship, he indicates the courses and assists the Master in making the necessary manoeuvres to follow the indicated route for entrance or exit to/from the port, berthing, anchoring, etc.

- Responsibilities for good communication with ship's Master and Officers on Watch as well as the understanding of his role in ship's maneuvering and pilot services.

## 6. CONCLUSIONS

This paper presented and analyzed a real case of collision between two ships occurring in Constanta Port, based on the information provided by the VDR recordings from both ships. The analysis presented revealed the causes and the circumstances in which the collision occurred.

The responsibilities of the Masters and the pilots were analyzed based on the facts and decisions taken during the maneuvering of ships and in accordance with provisions of local and international regulations and conventions in this respect.

The aspects presented from the case study revealed the importance of understanding the responsibilities of Masters and pilots during port maneuvering of ships. Moreover, the case study presented emphasized the importance of knowledge and understanding, for the officers on board vessels, the international regulations in respect of collision

regulations and safety of navigation during passage with pilot on board.

The purpose of the analysis presented in this paper was to highlight very important aspects of a collision situation occurred with pilot on board and to identify safety issues in respect of a particular kind of incident.

The analysis revealed the fact that at the root of the incident were reasons that consisted mainly in the lack of communication between all the parties involved, as well as the lack of visual and radar watch of the traffic by the Officers on Watch of the two ships during the manoeuvre. What is worth mentioning is that the occurrence of these causes were due to the fact that pilots, Masters and officers of the two vessels have not complied with rules in force regulating these aspects.

The analysis presented here can be a very useful guidance for those who work on board vessels as well as for the students attending maritime universities.

The case study presented in this paper is not an investigation report and was not analyzed with the purpose of litigation or to share any kind of liability or a presumption of blame to any party involved.

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