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THE EFFECT OF VESSEL TRAFFIC SERVICE ON MINIMIZING COLLISIONS

A CASE STUDY: COLLISION BETWEEN RICKMERS DUBAI AND WALCON WIZARD

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ABSTRACT

The current paper aims to analyse the main reasons of the likelihood of collision accidents appearing nowadays. Accordingly, a full investigation of collision between Rickmers Dubai and Walcon Wizard accident is reported to verify the main causes of such accidents. One of the main causes found is the drawbacks found in Vessel Traffic Services (VTS). This means a serious problem in the quality of the service provided that may be due to shortages in the trainings introduced.

KEYWORDS: Marine, Marine Safety, Marine Accidents, Safety Settings, Vessel Traffic Services, Marine Training, Sapphire Stone, Karen

INTRODUCTION

Marine accidents mean one or more than one marine undesired incident which results in personal injury, damage or loss. Accidents include loss of life or major injury to any person on board, the actual or presumed loss of a ship, her abandonment or material damage to her, collision or grounding, disablement, and also material damage caused by a ship. It is the duty of every master or skipper to examine any accident occurring to, or onboard, his ship [1].

Accidents may result from several reasons; one of which is a shortage in vessel traffic service provided which may lead to collisions.

A vessel traffic service (VTS) is a marine traffic monitoring system established by harbour or port authorities, similar to air traffic control for aircraft. Typical VTS systems use radar, closed-circuit television (CCTV), VHF radiotelephony and automatic identification system to keep track of vessel movements and provide navigational safety in a limited geographical area [2].

VTS is designed to improve the safety and efficiency of navigation, safety of life at sea and the protection of the marine environment. VTS is governed by SOLAS Chapter V Regulation 12 together with the Guidelines for Vessel Traffic Services [IMO Resolution A.857(20)] adopted by the International Maritime Organization on 27 November 1997 [3].

Merchant Shipping Notice (MSN) 1796 issued by the MCA in April 2006, designated vessel traffic service (VTS) stations in the UK in accordance with the Merchant Shipping (VTS Reporting Requirements) Regulations 2004. This notice defined the level of service available to shipping operating in designated VTS areas. Annex (A) of MSN 1796 designated the CNIS as an ‘information service’ which it defined as:

‘A service to ensure that essential information becomes available in time for on-board navigational decision making’ [3]

In areas that are covered with VTS, there are certain procedures for vessels to follow such as Area Procedures, Sector Areas, Arrival and Departure Reports, Approach Procedures, Pilotage Procedures and many more. Each of the above procedures is named with respect to the area that they serve. For example in Norway, Oslofjord the Area Procedures are called "OSL1" and "OSL3" and in Netherlands, Rotterdam, Maas Approach and Maas Entrance are called "RTM2" and "RTM6" respectively.

A VTS should always have a comprehensive traffic image, which means that all factors influencing the traffic as well as information about all participating vessels and their intentions should be readily available. By means of the traffic image, situations that are developing can be evaluated and responded upon. The data evaluation depends to a great extent on the quality of the data that is collected and the ability of the operator to combine this with an actual or developing situation. The data dissemination process exists of conveying the conclusions of the operator. Four forms of data dissemination are possible: [2]

VTS Personnel

The VTS guidelines require that the VTS authority should be provided with sufficient staff, appropriately qualified, suitably trained and capable of performing the tasks required, taking into consideration the type and level of services to be provided in conformity with the current IMO guidelines on the subject.

IALA Recommendation V-103 is the Recommendation on Standards for Training and Certification of VTS Personnel. There are four associated model courses V103/1 to V-103/4 which are approved by IMO and should be used when training VTS personnel for the VTS qualifications.

Information Service

An information service is a service to ensure that essential information becomes available in time for on-board navigational decision-making.

The information service is provided by broadcasting information at fixed times and intervals or when deemed necessary by the VTS or at the request of a vessel, and may include for example reports on the position, identity and intentions of other traffic; waterway conditions; weather; hazards; or any other factors that may influence the vessel's transit.

Traffic Organization Service

A traffic organization service is a service to prevent the development of dangerous maritime traffic situations and to provide for the safe and efficient movement of vessel traffic within the VTS area.

The traffic organization service concerns the operational management of traffic and the forward planning of vessel movements to prevent congestion and dangerous situations, and is particularly relevant in times of high traffic density or when the movement of special transports may affect the flow of other traffic. The service may also include establishing and operating a system of traffic clearances or VTS sailing plans or both in relation to priority of movements, allocation of space, mandatory reporting of movements in the VTS area, routes to be followed, speed limits to be observed or other appropriate measures which are considered necessary by the VTS authority.

Navigational Assistance Service

A navigational assistance service is a service to assist on-board navigational decision-making and to monitor its effects.

The navigational assistance service is especially important in difficult navigational or meteorological circumstances or in case of defects or deficiencies. This service is normally rendered at the request of a vessel or by the VTS when deemed necessary.

It should be highlighted that VTS regulations have to be applied in the right way, otherwise, accidents will happen. In the current paper, the collision between SAPPHIRE STONE and KAREN accident, happened in 2014, will be analyzed to check the problems or accident events faced by officers, and how they deal with them, as well as a discussion of how vessel traffic service may be able to prevent such events from happening if it happens in the right way.

RESEARCH PROBLEM

Despite the fact that modern technology in merchant ships reach a high standard of information and technology, but still accidents are happening. One of the reasons beyond that may be the limitations in Navigational Aids knowledge, as well as the improper implementation of the known knowledge. It had been noticed that the quality of training introduced is not sufficient to prevent accidents happening nowadays. The trainer carried out his training according to the standard regulations presented and yet accidents are happening. Accordingly, a case study will be analysed to investigate the limitations faced and show how these limitations leads to crisis, as well as the proposed solutions using VTS so as to prevent such accidents.

BACKGROUND

Rickmers is a ship with IMO: 9467134 and MMSI: 249605000. It is a Cargo carrier, built in 2010. On January, 11, 2014, Rickmers Dubai was exposed to a collision with the crane barge Walcon Wizard, being towed by the tug Kingston in the south-west lane of the Dover Strait Traffic Separation Scheme. Walcon Wizard is a piling and construction barges specifically designed for marina construction and maintenance. It is a highly manoeuvrable, twin-engine, self-propelled shallow draft construction barge with many uses [3].

The accident results in badly damage of Walcon Wizard, while Rickmers Dubai's hull was punctured above the waterline. The hydraulic system for the tow winch on board Kingston was also damaged. There were no injuries and there was no pollution. The accident occurred while the cargo ship was overtaking the tug and tow [3].

On January 22, 2014, the fishing vessels Sapphire Stone and Karen collided. At the time of the collision, Sapphire Stone was steering a north-westerly course towards Campbeltown to land its catch, while Karen was towing its nets on a west-north-westerly course. Karen was struck on its port quarter and was severely damaged. Its hull was opened to the sea, which caused the aft crew accommodation and main engine room to flood rapidly, resulting in the vessel foundering within 3 minutes of the collision. Sapphire Stone suffered minor damage to its stem post. Attempts by Karen's skipper to send a DSC2 distress alert were unsuccessful due to the speed with which the vessel foundered. However, Karen's crew were quickly rescued by the crew of Sapphire Stone, and the coastguard was alerted by Karen's EPIRB3, which activated after the vessel sank. The MAIB investigation identified that neither skipper was keeping an effective visual lookout, and that radar contacts were not being systematically observed, or plotted, to ascertain whether a risk of collision existed.

Additionally, Sapphire Stone's skipper had become over-reliant on AIS4 information displayed on his chart plotter. MGN5s 313 (F) and 324 (M+F) issued by the Maritime and Coastguard Agency (MCA) explain the need for maintaining a proper lookout, and warn of the danger of over-reliance on chart plotters and AIS target information. Recommendations have been made to the skippers of both vessels to heed the contents of extant MCA guidance to the fishing industry. The weather conditions at the time of the collision were westerly winds of force 4 -5, slight sea conditions with good visibility [4].

The MAIB investigation into the collision between Lady Hamilton of Helford and Blithe Spirit (MAIB report 8/2008) highlighted a number of factors that impeded Lady Hamilton of Helford skipper's ability to detect Blithe Spirit. One of these was that he was focused on avoiding fishing marks ahead, and was monitoring the chart plotter to ensure his vessel was in the correct position to shoot its nets [5].

The MAIB report into the foundering of fishing vessel Achieve (MAIB report 3/2014) concluded that because the distress message transmitted by VHF radio was incomplete, rescue attempts were delayed by 45 minutes. As a result of its findings, the MAIB published a safety flyer to the fishing industry that emphasised the importance of using DSC to transmit distress alerts.

Collisions while overtaking in the Dover Strait: The following collisions occurred in the Dover Strait TSS and were the subject of MAIB investigation reports.

Spring Bok and Gas Artic

On 24 March 2012, the general refrigerated cargo ship Spring Bok collided with the liquefied petroleum gas tanker Gas Arctic in the south-west traffic lane of the Dover Strait TSS in visibility of less than 2nm. There were no injuries or pollution, but both vessels suffered structural damage. Although both OOWs had detected and identified the other vessel by radar and AIS, neither OOW made a full appraisal of the risk of collision, nor took appropriate action to prevent the collision. Even though both vessels' SMSs required additional safety precautions in visibility less than 3nm, neither posted a lookout nor sounded signals. Cumulative fatigue was also considered a contributory factor in the decision making of the OOW on Spring Bok. (MAIB investigation report 24/2012.) [4]

Ash and Dutch Aquamarine

On 9 October 2001, the chemical tanker Dutch Aquamarine collided with the general cargo vessel Ash in the south-west traffic lane of the Dover Strait TSS. Ash was holed in the collision, listed quickly to starboard, capsized and sank. The master of Ash drowned. Although the weather was fine and the visibility good, the OOW on Dutch Aquamarine did not notice Ash either visually or on radar until it was too late to avoid a collision. Although the OOW on board Ash had seen Dutch Aquamarine approaching from astern he was distracted by a mobile phone call minutes before the collision. Ash had been overtaken at a distance of only 0.1nm previously so the OOW assumed that Dutch Aquamarine might do likewise. (MAIB investigation report 7/2003.) [5]

Eastfern and Kinsale

On 25 September 2000, the bulk carrier Kinsale collided with the general cargo ship Eastfern in the south-west traffic lane of the Dover Strait TSS.

Kinsale was the overtaking vessel and its OOW was preoccupied with other duties. He failed to see Eastfern ahead. The bridge lookout had left the bridge 20 minutes before the collision. (MAIB investigation report 18/2001.) [6]

CASE STUDY

Through this research, a case study of the collision between Rickmers Dubai and Walcon Wizard will be discussed, through which the accident is analysed, errors are reported and solutions are introduced as benefit of how to save such accidents using VTS.

Overview

On January, 11, 2014, Rickmers Dubai was exposed to a collision with the crane barge Walcon Wizard, being towed by the tug Kingston in the south-west lane of the Dover Strait Traffic Separation Scheme.

Accident Actions and Causes

The investigation established that Rickmers Dubai's officer of the watch had not kept a proper lookout. He did not see Walcon Wizard when he altered course to avoid Kingston, which was less than 2 cables ahead. Also, he relied solely on AIS information displayed on the ECDIS as an aid to collision avoidance. He was relatively inactive during his watch and was alone on the bridge, so he did not monitor the radar and the bridge navigational watch alarm system was switched off. In addition, he did not take note of the content of two safety broadcasts issued by Dover Coastguard advising of Kingston and Walcon Wizard's position in the south-west traffic lane [7].

The investigation also identified that neither Kingston nor Walcon Wizard were transmitting on AIS. Also, Kingston's towing and stern lights were probably obscured by a floodlight. The towline was secured to the tow winch on board Kingston and could not be released quickly or from the wheelhouse. The requirements for the release of towlines from towing winches are ambiguous [8].

Errors Faced

The following events were significant leading up to the collision between both ships:

First; Rickmers Dubai's OOW was not keeping a proper lookout and had only seen Kingston just before he altered course towards Walcon Wizard.

Second; Rickmers Dubai's OOW did not see Walcon Wizard or recognise that Kingston was engaged in towing.

Third; it is almost certain that the late detection of Kingston by Rickmers Dubai's OOW and his ignorance of the proximity of Walcon Wizard were due to an over-reliance on AIS information shown on the ECDIS.

Fourth; the radar targets of Kingston and Walcon Wizard were on the X-band radar display on board Rickmers Dubai for almost 1 hour, but the OOW did not use ARPA to determine if a risk of collision existed, or look out of the window to try and correlate the targets with visual sightings. Therefore, it is likely that he was not monitoring the radar display at all.

Fifth; it is likely that Rickmers Dubai's OOW's level of arousal was low. Consequently, he was not proactive in maintaining his situational awareness or reactive to changing circumstances [9].

VTS Benefits in Saving Errors

Some of the events mentioned above could be prevented using VTS in different ways, which was supposed to prevent the accident from being happened.

This could be explained in details in the following points:

The second Error shown above was that Rickmers Dubai's OOW did not see Walcon Wizard or recognise that Kingston was engaged in towing. VTS would be able to ensure that CNIS safety broadcasts highlight when AIS information is not being transmitted by vessels that may pose a risk to navigation, such as tugs operating with tows.

Also, regarding the third Error that it is almost certain that the late detection of Kingston by Rickmers Dubai's OOW and his ignorance of the proximity of Walcon Wizard were due to an over-reliance on AIS information shown on the ECDIS. This error would have been prevented if actions were taken to ensure the behaviour of bridge watch keepers on board its vessels accords with its instructions and guidance, with particular emphasis on the contents of its recent fleet circular concerning Over-reliance on AIS.

Besides the fourth error is that the radar targets of Kingston and Walcon Wizard were on the X-band radar display on board Rickmers Dubai for almost 1 hour, but the OOW did not use ARPA to determine if a risk of collision existed, or look out of the window to try and correlate the targets with visual sightings. Therefore, it is likely that he was not monitoring the radar display at all.

Fifth Error; it is likely that Rickmers Dubai's OOW's level of arousal was low. Consequently, he was not proactive in maintaining his situational awareness or reactive to changing circumstances. This error would have prevented if additional lookouts were used [12].

CONCLUSIONS

It could be claimed that several problems could be prevented if VTS regulations are applied in the proper way. Additionally, there will be a possibility that alarms and indications for any events happening. Because of this, the IMO have issued their guidance.

VTS users should ensure that their system always conforms to the latest standards. In general, the main problem was shown to be that despite having attended training courses that met the required standard, Rickmers Dubai and Walcon wizrd bridge watch keepers lacked an understanding of the VTS safety features and/or their value. VTS provides the watch keepers with an efficient and effective means of navigation. However, its ability to continuously provide the vessel's current position and projected track, and to warn of approaching dangers, can lead to over-reliance and complacency. The watch keeper still needs to monitor the vessel's position and projected track at regular intervals and to fully understand the safety regulations in order to make best use of them. Thus, the above shortfalls can be addressed through better training courses and onboard instructions and guidance.

REFERENCES

1. International Maritime Organization. (2009). SOLAS, consolidated edition, 2009: consolidated text of the International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988: articles, annexes and certificates. London, International Maritime Organization.

2. IALA VESSEL TRAFFIC SERVICES MANUAL, Edition 5, 2012. International Association of Marine Aids to Navigation and Lighthouse Authorities
3. Marine Accident Investigation Branch, 2012. REPORT NO 2/2012, Report on the investigation of the collision of Rickmers Dubai with the crane barge Walcon Wizard being towed by the tug Kingston in the south-west lane of the Dover Strait Traffic Separation Scheme on 11 January 2014.
4. Marine Accident Investigation Branch, 2014. REPORT NO 20/2014, Report on Collision between fishing vessels SAPPHIRE STONE and KAREN resulting in the loss of KAREN 11 miles south-east of Campbeltown, 22 January 2014
5. IMO/ILO Document for guidance: An international maritime training guide, 1985 (London, 1987)
6. IHO Publication S-66. Facts about Electronic Charts and Carriage Requirements. Edition 1.0.0 January 2010
7. IMO RESOLUTION MSC. 232(82) adopted on 5 December 2006: Adoption Of The Revised Performance Standards For Electronic Chart Display And Information Systems (ECDIS). [On line]. Available at: http://www.imo.org/includes/blastDataOnly.asp/dataid%3D17269/232%2882%29.pdf
8. Emergency procedures for ships carrying dangerous goods (EmS) (London, 1991). International code for the safe carriage of grain in bulk (International Grain Code) (London, 1991).
9. International Convention for Safe Containers (CSC) (London, 1992).
10. International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78), consolidated edition (London, 1991).
11. International Convention for the Safety of Life at Sea (SOLAS) (London, latest consolidated text).
12. International Convention on Standards of Training, Certification and Watch keeping for Seafarers