

## **ANALYSIS OF STUDENTS' VIEWS ON COLLISIONS AVOIDANCE**

### **With focus on shortcomings of maritime educational system**

OLGA KALINKOWSKA<sup>a</sup>

SZYMON WANTUŁA<sup>b</sup>

<sup>a</sup> Gdynia Maritime University, Faculty of Navigation, Science Club Navigator, [okalinkowska@gmail.com](mailto:okalinkowska@gmail.com), 00 48 508428830

<sup>b</sup> Gdynia Maritime University, Faculty of Navigation, Science Club Navigator, [szymonwantula@gmail.com](mailto:szymonwantula@gmail.com)

Collisions are a serious threat to ship's safety. We have decided to study this problem through the eyes of young officers – firstly because they are not affected by the 'old' mistakes, common among the people who have been working in this industry for a certain time, and secondly because they are the future of the maritime sector. The complexity of the issue makes it extremely hard to decide on any situation clearly in real time. The decision making is obstructed by ambiguous terms, such as 'good seamanship', and the outdated regulations.

We have used the knowledge elicitation method to extract the thoughts of our experts (students who have finished second of three-year programme to become officers). First, we have shown them an example (factors when two cars avoid a collision), then asked them to write or paint down their own take on the situation in which a vessel avoids a collision. Students had no constraints and were not allowed to communicate. The last part was an open discussion about the topic, connected with clarification of their notes and pictures.

As mentioned earlier, our experts' task was to describe the process of two ships passing. These are the factors they included.

### **Look-out**

Rule 5 of COLREGs is short and seems straightforward. It singles out the importance of maintaining a proper look-out with all available means. This includes simple visual observation, mentioned by 89% of the experts. Proper look-out is fundamental when it comes to interpreting the situation around ones' vessel and determining any possible dangers. However, the OOW must realise that circumstances on the other ship may be completely different, and should never assume the other vessel's situation. Weather conditions, such as visibility, rain, snow, fog, dust, wind force, sea state, and many others have to be considered, as well as the manner in which they affect both our own and other vessel's ability to maintain the proper look-out. Our experts acknowledge that in case of restricted visibility one has to assure noticeability by using both lights and sound signals, as both

visual and audial observation must be kept at all times. Officer should not be afraid to inform the master about the ambiguous situation and to request his presence on the bridge, as it should be considered a sign of responsibility. All in all, there is no denying that look-out is one of the most basic and important duties on the bridge.

## **Radar**

Radar is considered to be one of the most important and useful means of maintaining appropriate look-out, as required in Rule 5. When equipped with it, we should always include it in look-out duties and keep our visual observations in check, comparing what we see with echoes on the radar screen. This allows the OOW to constantly check the performance of the radar and its adjustment. Additionally, Rule 6 singles out 6 additional factors to be held in mind when determining a safe speed on vessels with operational radar, therefore reminding all mariners both of its importance and limitations. 78% of the experts mentioned usage of radar in preventing a collision, some of them also specified how bearing and distance to the ships in vicinity should be controlled. It is vital to remember about this, since there are many incidents caused by lack of situational awareness of the bridge team resulting from them making use of neither radar nor ARPA. This includes events in Singapore at the beginning of 2014<sup>1</sup>, when 3 collisions had taken place during two weeks, all because the crews did use neither radar nor ARPA to avoid it. However, it is crucial not to rely solely on the radar readings and alarms, as mentioned in Rule 7c, which may be one of the reasons our experts mentioned additional navigational equipment.

## **Additional navigational equipment**

67% of the experts believe that additional navigational equipment should be used to improve situational awareness of the crew. Most of them mentioned AIS, but some also listed ECDIS and GPS. Since having this instruments on board is compulsory for most vessels used in the merchant navy, they seem an obvious element of the proper look-out routine. While radar calculates the speed and course of other vessels, and therefore is susceptible to mistakes, AIS transmits information right from the source. So as long as the input is correct and the connected equipment is working properly, everyone around receives very precise information about the relevant object. It is important to actually use all available means to assess the situation, as information from only one source may be misleading.

---

<sup>1</sup><http://gcaptain.com/mpa-human-error-poor-judgement-caused-string-singapore-ship-collisions/>; access on 17/08/2018.

## Contact via VHF, VTS, etc.

Communication with other vessel was one of the very few factors mentioned by all of the experts. It can be interpreted as a part of “all available means” in Rule 5, which helps to understand an ambiguous situation. Those means are also mentioned in Rule 7 on risk of collision. However, contact between vessels via VHF or VTS is not mentioned directly in any rule of the COLREGs. Our teachers at GMU quite often advise students against using VHF communication in potentially dangerous situations. They usually list problems with understanding each other because of lack of proper level of maritime English among officers or incomprehensible accent. This particular issue had caused multiple accidents, such as the collision of m/v Baltic Ace with m/v Corvus J in 2012<sup>2</sup>, where OOWs contacted via VHF to determine their course of action in a situation involving risk of collision. They agreed on a manoeuvre that contravened COLREGs. However, the intended actions of the Officers as communicated by VHF were not reflective of the action that was actually taken, possibly because of them failing to understand each other even though both were of the same (Polish) nationality. The issue with maritime English skills is currently acknowledged and well-documented within our community<sup>3</sup>.

## The manoeuvrability of the vessel

According to Rule 6 of COLREGs, the manoeuvrability of the vessel, among other things, should be taken into account when determining a safe speed in any conditions of visibility. Turning circles and stopping distances should be one of the first things that an officer boarding a new ship familiarizes themselves with. This is why they should be in a visible place on a wheelhouse poster, always available to the OOW. Therefore, no wonder that manoeuvrability was mentioned by every single of our experts as one of the most important factor, along with only few others. Some of the experts went as far as dividing it into several factors, such as engine and rudder control, realising that manoeuvrability is a more complex issue and that it is not to be ignored. According to the distance left to the other vessel, they have advised to manoeuvre using only engine (altering speed to avoid collision) if there is enough time (some mentioned the distance of 3-5 NM from the other vessel as a moment to start the manoeuvre), only rudder (altering course in a way that is clearly visible to the other ship) if it is closer (around 2-3 NM from the other vessel), or both, if the situation requires it. Some, however, advised against manoeuvring only with speed, as this may not be clearly visible to the other ship. They repeatedly mentioned that one must know their vessel thoroughly before considering any manoeuvres.

---

<sup>2</sup> *Report of the investigation into the loss of m.v Baltic Ace following a collision with m.v Corvus J at the North Hinder Junction Precautionary Area on the 5th December 2012*; The Bahamas Maritime Authority, 2016.

<sup>3</sup> O. Kalinkowska, S. Wantuła; *Human Factor in Maritime Accidents*, Prace Wydziału Nawigacyjnego Akademii Morskiej w Gdyni, 2016.

## Weather

Weather is another of four factors mentioned by all of the experts. It seemed obvious for them to consider it in a situation involving risk of collision, and that OOW should adjust their actions accordingly. COLREGs most importantly mentions it in Rule 6 on safe speed, where in point a) it lists that when determining a safe speed all vessels must take into account the following:

*“i) the state of visibility;*

*(...)*

*v) the state of wind, sea and current and the proximity of navigational hazards; (...)”<sup>4</sup>*

As it can be seen, being able to observe and understand weather is a skill necessary for an officer. Meteorological conditions always affect both our and other’s vessels, and therefore influence the decisions made on both bridges. However, the effects of the weather may differ on a different ship. Force 7 wind may not be an issue for a supertanker, while OOW on the bridge of a small vessel will be glad to remain standing, and performing a look-out duty will be very difficult. It is important to remember that, as both of these ships are subject to the same rules of COLREGs.

There is no doubt that meteorology should be taught at maritime universities, and it is an opinion shared by all of our experts.

## Obstructions

Obstructions – such as wrecks – were mentioned by 33% of the experts. In the COLREGs, they are mentioned in point v) of rule 6a, under navigational hazards that have to be taken into account in determination of safe speed. It is an obvious and important issue, but one that can be assessed beforehand.

## Circumstances

A wide term of circumstances was listed by 67% of the experts. This included mainly other vessels in vicinity, their intentions and manoeuvres. In COLREGs, similar factor is considered in Rule 6a point ii), stating as follows:

*“(...) In determining a safe speed the following factors shall be among those taken into account:*

*a. By all vessels:*

*(...)*

*ii). the traffic density including concentrations of fishing vessels or any other vessels; (...)”<sup>5</sup>.*

What is so important in considering all of the vessels in vicinity is the fact that the rules of COLREGs are written for situations when the risk of collision is between just two ships. Thus the situation

---

<sup>4</sup> *Convention on the International Regulations for Preventing Collisions at Sea, 1972, Rule 6.*

<sup>5</sup> *Convention on the International Regulations for Preventing Collisions at Sea, 1972, Rule 6.*

complicates significantly when another ship enters the equation. A manoeuvre of giving way to one vessel may lead to a collision with another. To bring every other present vessel into the equation, one must consider possible manoeuvres and their results on our situation.

### **Geographical conditions**

Numerous geographical factors were mentioned by 44% of our experts. Some of them, like depth or rocks, are included in Rule 6 of COLREGs, but others, like venture effect, are nowhere to be found in legislation. However, having been taught meteorology and oceanography for 2 semesters, we can assume that most of our colleagues do realise that such phenomena exist and need to be taken into account

### **Readiness for unexpected manoeuvres**

In Rule 6 of COLREGs, the following sentence can be found:

*“Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.”<sup>6</sup>*

However, only one of the experts included readiness for unexpected manoeuvres in their mind map. This was unexpected for us, yet later, in the discussion phase, other experts confronted about it explained that it was obvious for them as a part of the wider term “good seamanship”.

### **Lights**

Navigational lights are another factor mentioned by all of the experts. They are an obvious part of COLREGs, taking up whole Part C of it, therefore it is no surprise that everyone included it in their mind maps

### **Sound signals**

Mentioned by 44% of the experts, sound signals take up whole Part D of COLREGs. Apparently, they do not seem as obvious as lights, but that may be due to sound signals being used noticeably less frequently.

### **Good seamanship**

Experts listed some factors that are not included in COLREGs, like mental condition (22%) and experience (44%) of the OOW, ship’s technical condition (33%), aids to navigation (44%),

---

<sup>6</sup> *Convention on the International Regulations for Preventing Collisions at Sea, 1972, Rule 6.*

navigational aids (11%) and autopilot (11%). We can assume that some of them may be fitted under the umbrella term of “good seamanship“. However, it is our belief that this term is too vague to be useful, and may cause trouble to young, unexperienced mariners, as there is no reliable source from which one could learn it. Additionally, what is considered good seamanship changes locally.

## CONCLUSIONS

The study suggests that a change of approach within the schooling system would help to make the future officers more eligible and suitable for the moment when they are thrown in at the deep end. The difference between knowledge of Rule 5 and Rule 6 is clearly noticeable – while all the 4 factors covered by the former were always mentioned by at least 6 experts, the latter scored visibly lower, with 4 factors (out of 6): readiness for unexpected manoeuvres, obstructions, geographical conditions and circumstances being considered by 1, 3, 4, and 6 experts respectively. This is a clear result of our schooling system at GMU in which after 2 years of studying, we have only half of the semester of COLREGs classes, during which we have covered only first 5 Rules and Part C on lights and shapes. Considering that before this study all the experts have completed at least their first cadet practice, we believe that the subject of COLREGs should have been made clearer.

## BIBLIOGRAPHY

1. <http://gcaptain.com/mpa-human-error-poor-judgement-caused-string-singapore-ship-collisions/>; access on 17/08/2018
2. “Report of the investigation into the loss of m.v Baltic Ace following a collision with m.v Corvus J at the North Hinder Junction Precautionary Area on the 5th December 2012”; The Bahamas Maritime Authority, 2016
3. O. Kalinkowska, S. Wantuła; „Human Factor in Maritime Accidents”, Prace Wydziału Nawigacyjnego Akademii Morskiej w Gdyni, 2016
4. “Convention on the International Regulations for Preventing Collisions at Sea”, 1972
5. Klaas van Dokkum, “The Colregs Guide”, DOKMAR, 2012
6. “Annual overview of marine casualties and incidents 2016”, European Maritime Safety Agency, 2016