

Original Article

COLREGs misunderstood or ignored?

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ABSTRACT

As various scholarly articles and accident investigation reports indicate, the risk of collisions at sea is still high. The objective of this research is to identify if this is due to misunderstanding of the International Regulations for Preventing Collisions at Sea 1972, as amended (COLREGs), by watchkeeping officers working onboard cargo ships.

A total of 76 collisions while navigating officers (OOW) were at the con that occurred during a period of 10 years were analysed.

80% of the collisions could have been avoided since one vessel was aware of the presence of the other. The highest number of collisions had taken place in cases of crossing situations. Furthermore, it is also important to note that 52% of the OOWs involved in collisions were sufficiently experienced.

No evidence was found to conclude that these accidents occurred due to misinterpretation or misunderstanding of the COLREG's by the OOW's onboard the cargo ships, but as incorrect or insufficient action had been taken by experienced OOW's, this could have been due to complacency and/or overconfidence on their part.

Among the measures to be taken to minimize collisions at sea, overconfidence and complacency are two factors that should also require attention by all interested parties.

Index Terms - COLREGs, Ship Collisions at Sea, Complacency and Over Confidence.

INTRODUCTION

When considering the ships of over 100 Gross Tonnage, Safety and Shipping Review [1] of 2022 states that, number of global maritime accidents/incidents from 2012 to 2021 have been

mainly caused by machinery damage or failure (9,968), followed by collision (3,134), contact (2,029), piracy (1,995) and fire/explosion (1,747). This indicates that collisions at sea are the second most common threat to safety, next to machinery damages of failures.

The objective of this research is to identify whether there were difficulties in understanding the International Regulations for Preventing Collisions at Sea 1972, as amended (COLREGs), by watchkeeping officers working onboard cargo ships, by analysing the facts which led to collisions during the period from 01/01/2012 to 13/12/2021.

Collisions which occurred whilst the Masters of both vessels were at the con have been excluded from this research, taking into consideration the experience they have on the practical application of the COLREG's over many years.

METHODOLOGY

A total of 76 Accident investigation reports of cargo ships involving navigating officers (OOW), issued by 11 major flag states were analysed. Though there were more than 76 accidents involving OOW at the con during the period considered, only 76 accident investigation reports were available for download from the Global Integrated Shipping Information System (GISIS) of the International Maritime Organization (IMO).

153 vessels were involved (including fishing vessels) in the said 76 collisions. All the collisions occurred between two vessels, except in one situation where a cargo ship collided with two fishing vessels.

DISCUSSION

A. Experience of the OOWs

In the graph below, experience is considered sufficient if the OOW had acquired at least 12 months

of sea experience in the capacity of OOW after obtaining the first Certificate of Competency (COC).

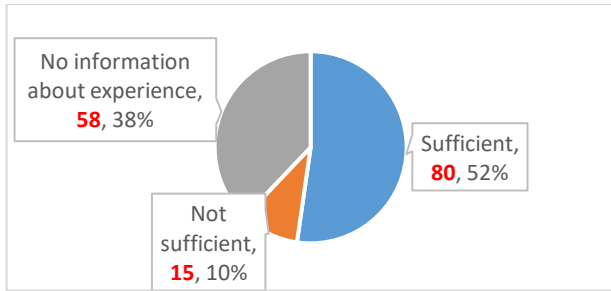


Figure 1 Experience of OOWs

When analysing the available facts, 52% of the OOWs involved were found to have sufficiently experienced. However, most scholarly articles state that a high number of collisions occur due to lack of experience of the OOWs. This may have changed over the past few decades due to the implementation of the ISM Code, STCW Code, efforts of the ship management companies and the efforts of the countries engaged in training of seafarers.

It is understood that this 76 accident investigation reports may not be sufficient for coming into a conclusion of identifying the connection between ‘experience’ and ‘collisions’. Since considerable number of the investigation reports on the GISIS cannot be downloaded, further analysis is required in this regard by parties having complete access to these accident investigation reports.

B. Situations that led to collisions

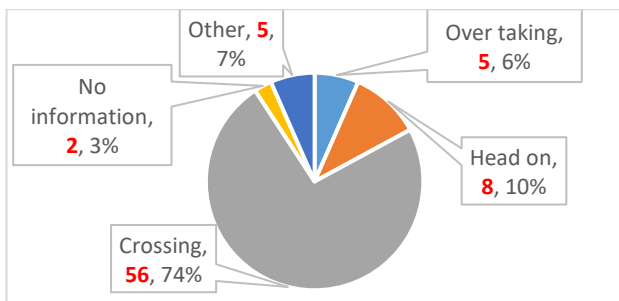


Figure 2 Situations that led to collisions

A very high number of accidents have occurred during crossing situations. Even though it was not evident from the casualty investigation reports, the reason could be that the probability of encountering crossing situations is higher than other situations, rather than misunderstanding or

misinterpreting Rule 15 and Rule 17 of the COLREGs. This view is further strengthened by the research conducted by Demirel & Bayer [2], where it was identified that the Rule 15 of COLREGs is not that difficult to understand.

As per the above graph;

- “No information’ includes situations where OOWs of both vessels involved in collisions were unaware of the other vessel until the collision occurred.
- ‘Other’ include one collision with an anchored vessel, two collisions with vessels drifting and two collisions due to breaching of Rule10 of COLREGs.

C. Collisions between cargo ships and fishing vessels

During the period considered, 36 fishing vessels were damaged or foundered after 35 collisions encountered with cargo ships. 143 fishermen had died or were declared missing. When considering fishing vessels, application of COLREG differs, depending on whether they were engaged in fishing or not. Therefore, it is important to identify with certainty whether these vessels were engaged in fishing or not at the time of collision, as it is otherwise to be construed as a collision between two power driven vessels.

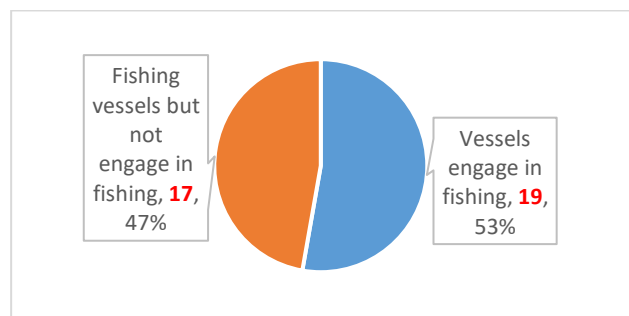


Figure 3 Collisions between cargo ships and fishing vessels

There is no appreciable difference of collisions between cargo ships and vessels engaged in fishing or not engaged in fishing. Further in accordance with the accident investigation reports there were no occasions where the lights and shapes were misunderstood by the OOWs of the cargo vessels.

When considering fishing vessels (engaged and not engaged in fishing), it is also important to note that there were a number of occasions where;

- the appropriate light signals and shapes were not displayed by the vessels.
- the Rule 5 was violated.
- the vessel had erratic manoeuvres prior to the collision and
- altered to port for power driven vessels on port side and noncompliance of other parts of Rule 17 being the ‘stand on’ vessel.

As the competency of watchkeepers onboard fishing vessels is beyond the scope of this research, it is not addressed further. But measures should be taken by Coastal States to carry out further research to identify the reasons for these collisions from the perspective of the fishing vessels while taking steps to enhance training on COLREGs for watchkeepers working onboard fishing vessels because of the high risk of collisions involved.

D. Awareness of the other vessel in the vicinity before the collision

The Steamship Mutual P & I Club [3] states that they regularly experience claims arising from collisions or other navigational errors, some of them large, where failure to maintain a proper and effective lookout often features as a proximate or contributing cause. Furthermore, the Seafarers International Research Centre [4] states that during 2002 and 2016, the most common immediate cause of collisions, close quarters and contact accidents were found to be the maintenance of an ‘inadequate lookout’. Similarly, considerable number of accidents considered in this research were also caused due to improper lookout. But, when the cause of a collision is categorized as ‘improper lookout’, the understanding of COLREGs and its application by the OOW cannot be analysed further. Therefore, for the purpose of this article, the awareness of the OOW regarding the presence of the other vessel was considered instead of considering whether Rule 5 was violated or not.

In the graph below, ‘Aware’ means the OOW was aware of the presence of the other vessel with sufficient time to take action to avoid collision.

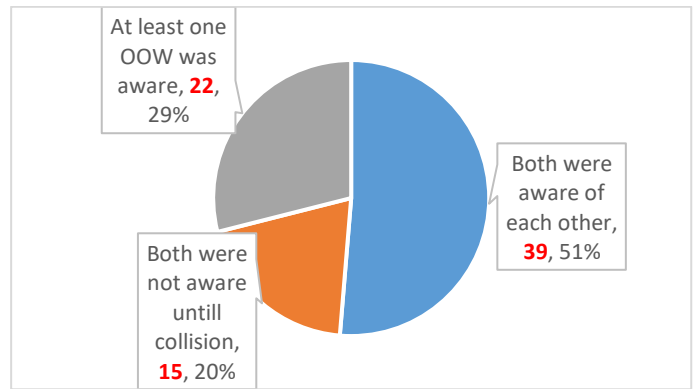


Figure 4 Awareness of the presence of the other vessel before the collision

Only 20% accidents had taken place without the knowledge of both vessels involved. Which means the remaining 80% could have been avoided since at least one OOW was aware of the presence of the other vessel, provided the OOW correctly followed the COLREGs.

If both vessels were not aware of the presence of the other vessel, understanding of the individual Rules in COLREGs cannot be verified. Therefore, other than in Rule 6 and Rule 19, these 20% of the collisions are not considered hereafter in this article.

E. Breaches of Rules in COLREGs

Below graph indicates breaches of Rules by the vessels involved in collisions other than Rule 13, Rule 14 and Rule 15 since they were discussed above.

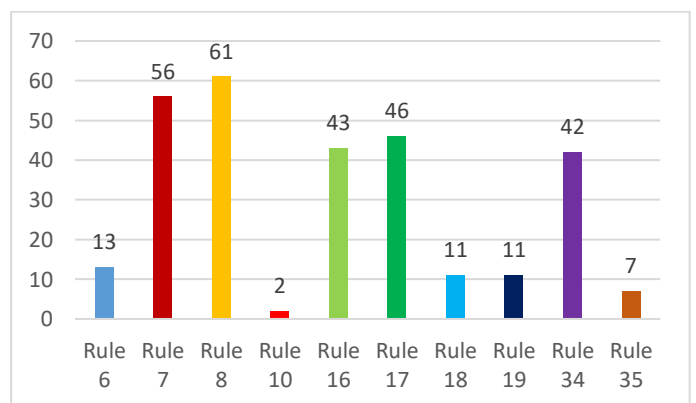


Figure 5 Breach by rule number

F. Rule 6 (Safe Speed)

Out of the 13 collisions which occurred due to maintaining an unsafe speed, 07 had occurred in restricted visibility.

In the case of Tenes [5] the judge said that it is well known with the assistance of an efficient radar

lookout, ships are proceeding at full speed in dense fog and agreed that continuing to proceed at full speed in dense fog after the presence of the other ships became known, were proceeding at unsafe speeds. Proceeding at full sea speed in restricted visibility when no traffic around in open ocean is not considered unsafe provided a good radar lookout is maintained. However, proceeding at full sea speed could be unsafe even when the visibility is good but heavy traffic is around.

No evidence was found in the accident investigation reports that the OOW had misunderstood Rule 6 specially when considering the experience of the OOWs involved. It was identified that lack of professionalism in the application of Rule 6 as a common mistake.

The officer in charge of the navigational watch shall notify the Master immediately if in any doubt [6]. Therefore, if the OOW cannot take a decision regarding the safe speed of the vessel, the Master shall be called before a risk of collision develops (in case the of a give-way vessel) or a close quarter situation develops (in case of a stand-on vessel).

G. Rules 7, 8 and 16

These three rules are discussed under one paragraph considering their connection to each other. On a considerable number of occasions, it appears there is misunderstanding or erroneous application of Rules 7, 8 and 16. In a nutshell, these Rules states;

- to identify the risk of collision (Rule 7)
- to take appropriate action in ample time (Rule 8) and
- the ‘give way’ vessel shall keep out of the way of the ‘stand on’ vessel (Rule 16)

Rule 7 & 8 applies to ‘give way’ vessels, ‘stand on’ vessels and vessels in restricted visibility, i.e., to all vessels.

In five occasions both vessels were involved in VHF agreements in order to avoid collision. That indicates that they had identified a risk of collision even though the actions taken were incorrect or insufficient. That is why there is a deference between the breaches of Rule 7 and Rule 8 on the graph above.

In number of occasions, the vessel involved in the collision was not even acquired on the ARPA. Without plotting, the next viable option to determine a risk of collision would be by taking a series of bearings of the target. This is not practicable under heavy traffic conditions and when quick decisions are required. ARPA plotting makes the application of Rule 7 easy. Therefore, the use of ARPA in identifying whether a risk of collision exists and/or a close quarters situation is developing is very important.

Though the ‘trial manoeuvre’ facility in ARPA can be used to decide the most appropriate action to take to maintain the required Closest Point of Approach (CPA), it has not been used in most of the cases studied in this research. This facility would be helpful in the application of Rule 8.

It is clear, when Rules 7 and 8 are not applied properly, application of Rule 16 and Rule 17 will not be effective, which could eventually lead to a close quarter situation or a collision.

‘Give way’ vessels and vessels in restricted visibility shall effectively identify whether there is a risk of collision and shall take effective action to avoid a close quarter situation in ample time. After assessing the risk, if the OOW on ‘give way’ vessel or in restricted visibility cannot take an effective action due to the presence of the other vessels and/or lack of navigable sea room, the Master shall be called without delay, as the Master also needs time to assess the situation before taking an action.

Except in 4 collisions there was a high possibility that most of the collisions could have been avoided had the master was called soon after the risk of collision was identified. In the cases studied, the Master was called only in a hand full of cases, and only when the collision was imminent and it was too late to avoid the other vessel.

Furthermore, the use of VHF radio communication to avoid collisions while manoeuvring is very common by Masters and marine Pilots. This is of course done making sure both the vessels are clearly identified and the final actions are clearly understood. One of the accident investigation reports states that the use of VHF radio communication as an aid for collision avoidance is strongly discouraged [7]. This might be very true when it comes to junior officers as the

agreed actions may be misunderstood due to language barriers.

When studying the cases involved, it was identified that insufficient action in accordance with these Rules contributed to the accidents, possibly due to overconfidence or complacency, rather than a misunderstanding of the COLREGs.

H. Rule 10 (Traffic Separation Schemes)

In total there were 08 collisions took place within Traffic Separation Schemes (TSS). Out of these collisions;

- 05 were while overtaking
- 01 when engaged in crossing
- 01 when a vessel had mistakenly entered the opposite traffic lane and
- 01 when a vessel had mistakenly entered the traffic separation zone while the other vessel was getting ready to pick a pilot.

Therefore, Rule 10 was violated only in two occasions (the last two mentioned above). These two accidents had taken place due to the lack of positional and situational awareness while experienced OOWs were on duty, therefore, misunderstanding of Rule 10 can be ruled out.

I. Rule 17 (Action by stand-on vessel)

In accordance with the Rule 17 of COLREGs the 'stand on' vessel may take an action to avoid the collision by her manoeuvre alone if she finds the 'give way' vessel is not complying with the Rules. When taking an action, the stand on vessel shall, if the circumstances of the case admit, not alter her course to 'port' for a power-driven vessel on her own port side.

This action may include change of speed or alteration of course to starboard. If the OOW on stand on vessel is not able to act as above due to various other factors, the Master shall be called before a close-quarter situation develops.

In the cases studied, the master was called only on few occasions, even then it was at the last moment where there was insufficient time to assess the situation. As mentioned above, in most of the cases, the OOWs were well experienced and

therefore cannot be considered that there could have been any problem in understanding the COLREGs, rather that the required actions were not taken.

Out of the total 46 accidents where the Rule 17 was breached, there were 21 incidents where the 'stand on' vessel had altered to port for power driven vessels on her own port side when taking actions in accordance with the section (a) part ii of Rule 17. Therefore, maritime trainers, ship management companies and ship Masters shall emphasize their trainees and OOWs to strictly not to alter course to port when taking an action in accordance with the Rule 17 (a)ii.

J. Rule 18 (Responsibilities between vessels)

10 out of the 11 collisions which occurred due to breaching Rule 18 had taken place with vessels engaged in fishing. Out of these 10 collisions, in 07 occasions, the actions of the fishing vessels may also have contributed to the collisions. These actions include;

- Not displaying correct light signals
- Alteration of course toward the ship
- Change of speed/course continuously at close range

The other collision occurred between a cargo ship and a tug which was engaged in towing operations. At the time of the collision, the tug was not exhibiting the 'restricted in her ability to manoeuvre' lights due to a defective light.

Therefore, it is hard to believe that there is a problem in understanding Rule 18. Most probable cause of breaching Rule 18 would have been inadequate or delayed actions required by Rules 7, 8, and 16.

K. Rule 19 and 35 (Conduct of vessels in restricted visibility and Sound signals in restricted visibility)

In this article, visibility is considered as restricted in situations where the visibility was reduced to three nautical miles or less. There were 11 collisions in such conditions, out of which 07 had taken place where at least one vessel was aware of the presence of the other vessel and the rest of 04 collisions had taken place while both vessels were unaware of the other. These 07 collisions could have been avoided had the OOW complied with Rules 6, 7, 8 and 19. Rules 6, 7 and 8

are not addressed further as those were discussed earlier.

Out of the 22 vessels involved in the 11 collisions, 16 vessels were cargo ships. Out of these 16 OOWs on cargo ships only 02 officers were inexperienced. Rule 19 was breached on one occasion by altering to port for a vessel forward of the beam while having sufficient sea room on starboard side, also by an experienced OOW.

Based on above facts, rather than misinterpretation of Rule 19, these collisions may have taken place due to incorrect action taken at that situation.

Rule 35 has not been complied with on 07 occasions and in other cases no information could be found. Due to proper structuring of the Rule 35, it is hard to believe that there are any complications in understanding of Rule 35.

L. Rule 34 (Manoeuvring and warning signals)

In accordance with the Rule 34 (d), if a vessel is in doubt regarding the actions of another vessel, she may give at least five short and rapid blasts on the whistle and the sound signal may be supplemented by light signals. As per the reports, in most of the cases, the 'stand on' vessel had used flashes to attract the attention of the 'give way' vessel but without any response from the latter. This could have been due to restrictions caused by blind sectors on certain cargo vessels and fishing vessels where the light signal may not have attracted the attention of the OOW or the other vessel may not have maintained a proper lookout by sight. Therefore, light flashes may not be seen by the other vessel and it would be more prudent for the OOWs to use whistle signals when at close range rather than light flashes to attract the attention of the other vessel.

As discussed earlier, a considerable number of accidents had occurred due to altering of course to port by the 'stand on' vessel for power driven vessels on her own port side. This may have been avoided if the 'stand on' vessel or the 'give way' vessel complied with Rule 34(a), before taking an action when a close quarter situation is developing to eliminate misunderstanding of the actions of each other.

M. Complacency and overconfidence

As most of the OOWs involved in collisions had sufficient sea experience and no information was available to say that the OOWs had misunderstood the COLREGs, ignoring the COLREGs may have contributed to the collisions. This may have led to incorrect or delayed actions, which could have been due to complacency and overconfidence.

Complacency is a deceiving and unwarranted satisfaction with a given level of proficiency, which leads to stagnation and unknowing deterioration of proficiency [8]. One may become complacent when engage in routine work and when becoming experienced specially when the same work is done over a long period of time without any incident. Since most of the accidents involving merchant ships had taken place while an experienced OOW was on duty, rather than misunderstanding, complacency may have taken an active part for the OOW to take incorrect actions.

In one of the accident investigation reports, an experienced OOW stated that she did not call the Master even when a fishing vessel was found to be heading towards her ship, assuming it would come closer and then veer off at the last moment to keep clear. In another case, a chief officer did not take effective action even after the lookout man informed him a few times of the presence of another vessel on the starboard side. If these are not complacency and overconfidence, what else would they be?

With no doubt, IMO has managed to reduce accidents at sea by;

- adopting the STCW Code with the aim of standardising the training of seafarers,
- adopting the ISM Code to reduce human error and
- introducing work and rest hours to minimise fatigue.

But accidents still occur at sea and these may be linked to complacency and overconfidence and this will lead to lack of situational awareness. Therefore, stakeholders of the industry must address complacency and overconfidence more widely than been addressed today. In order to eliminate complacency, MCA, UK [9] recommends the following;

- update situational awareness regularly
- get regular input from the team
- give/receive an effective briefing at handover
- actively look for problems
- use checklists effectively
- get help if don't understand a situation
- always follow company procedures
- never assume everything is working fine
- never expect something to be alright just because it always has been in the past

N. When to call the master

Among other situations, maritime trainers, ship managing companies and Masters shall urge their students and OOWs to call the Master;

- In cases of 'give way' vessel as soon as a risk of collision develops, and an appropriate action cannot be taken due to other ships in the vicinity and/or limited navigable waters.
- In cases of being the 'stand on' vessel, before a close quarter situation develops and an action cannot be taken due to the surrounding factors.

In the cases studied, some companies have provided instructions on their safety management system (SMS) with regards to minimum limits of CPA and Time to Closest Point of Approach (TCPA), where the Master is to be called in case the OOW is unable to maintain the required limits. These instructions were not followed by the OOWs in the cases studied. IMO has adopted the ISM Code and the SMS was implemented through ISM Code, aiming to minimize accidents due to human error, through the implementation of SMS onboard. Though it is the case, even at present there are accidents reported due to non-compliance of SMS. Again, this may be mainly due to the complacency and overconfidence on the part of watchkeeping officers which has led the objective of ISM code to be lost. Maritime trainers, shipowners and Masters shall educate the students and OOWs to strictly comply with the SMS.

Probably the industry may consider of setting the ARPA to plot all the vessels in a certain range automatically (OOW can un-acquire the targets which are not important), and if the OOW does not take an action prior to a pre-set time period and cannot maintain the pre-set minimum CPA and

TCPA limits (which may be adjusted by the Master) to generate an alarm automatically in the Master's cabin and appropriate places onboard.

Of course, the automatic plotting option is available on the ARPA, but the activation and the deactivation are at the OOW's discretion. ARPA will not automatically start plotting if that option is disabled by the OOW. Industry shall consider making this compulsory rather than keeping it as an option.

CONCLUSION

Highest number of collisions had taken place in cases of crossing situations. This may be because of the higher frequency of encountering crossing situations compared to over taking and head-on situations.

80% of the collisions could have been avoided as at least one vessel was aware of the presence of the other vessel and 52% of the OOWs involved in collisions were sufficiently experienced (had more than one year experience at sea after the first Certificate of Competency).

COLREGs are often misunderstood, misinterpreted, or just plainly ignored on frequent occasions [10]. No facts were found to prove the misunderstanding of COLREGs by OOWs onboard cargo ships. But most probably, the COLREGs were ignored.

As most of the collisions had occurred with an experienced OOW, this could be due to complacency and over confidence. This may require further research as the number of samples and statistics are insufficient. For the time being as the probability of accidents due to complacency and overconfidence is high, industry need to take immediate steps to address this issue.

Maritime trainers, shipowners and Masters shall encourage the OOWs to;

- comply with the SMS and COLREGs.
- use RADAR and ARPA when applying Rules 7 and 8.
- call Master in ample time.
- avoid VHF communication for collision avoidance unless at the presence of the Master.
- use appropriate sound signals when applying Rule 17 and when taking actions at close range.

Further, the shipowners, ship managers and IMO shall consider of;

- broadly addressing about the overconfidence and complacency,
- making it compulsory to use automatic acquisition zone on the ARPA rather than keeping it as an option for the duty officer to decide and to raise an alarm in the master's cabin and other appropriate places onboard if a pre-set CPA and TCPA limits cannot be maintained with the targets plotted on the ARPA.

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