COLREGs in STCW Convention

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Abstract

Studies have shown that vessel collisions have been identified as one of the most frequent type of accidents. According to some authors, the main reason for that is the lack of understanding or a wrong interpretation of International Regulations for Preventing Collisions at Sea. For the purpose of this paper, the answers of 625 respondents who participated in the research that was a part of the Avoiding Collisions at Sea project were analysed. The purpose of the project was to improve learning methods of COLREGs within the study programmes as well as to improve knowledge and understanding of seafarers.
For the purpose of this paper the answers of respondents with some experience at sea were analysed; 60 of them have served on vessels that had participated in collisions. The authors have studied areas where collisions occurred. Besides, competences prescribed by the STCW Convention, which refer to International Regulations for Preventing Collisions at Sea, teaching methods, methods for demonstrating competences and criteria for evaluating competences, were analysed as well. The answers obtained from 66 lecturers of International Regulations for Preventing Collisions at Sea were analysed and compared to the answers of other respondents in order to determine the most efficient teaching methods and to suggest methods of improvement, which is the primary purpose of this paper.

Key words: COLREGs, STCW Convention, collision, competence

1. Introduction

The 1972 Convention on The International Regulations for Preventing Collisions at Sea (hereinafter the COLREGs convention) prescribes a number of rules that serve as guidelines to officers responsible for the navigational watch when trying to avoid sea collisions, and represent the basis for the distribution of responsibility and blame when collisions occur [17 according to 16]. Although the COLREGs convention has been

ratified by 155 states representing 98.7% of the world merchant fleet [7], a strikingly large percentage of maritime accidents refer to collisions.

In literature, collisions have been identified as the most frequent or one of the most frequent types of sea accidents [14]. Some authors hold that the main reason for that is the lack of understanding or a wrong interpretation of The International Regulations for Preventing Collisions at Sea (hereinafter the COLREGs) which have been very frequently criticized for not being clearly written. It is considered that the lack of knowledge and understanding of the regulations is one of the main reasons why regulations are ignored and/or not obeyed when trying to avoid collision. In the research conducted in 2004, it was established that more than 50% of the seafarers (subjects to the research) ignored the COLREGs [1 according to Syms 2002], whereas 90% of them mentioned "lack of knowledge, poor knowledge of the COLREGs and lack of education" as main reasons for such a situation.

Considering the above-mentioned fact, it is not enough to only analyse and criticise regulations defined by the COLREGs Convention. It is necessary to re-examine and reassess the competences, that refer to COLREGs, which were defined by the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (hereinafter the STCW Convention).

Apart from competences, the paper will analyse teaching methods, methods for demonstrating competences and criteria for evaluating competences, which are not defined clearly enough by the STCW Convention, that is by the Seafarers Training, Certification and Watchkeeping Code adopted by the Resolution 2 of the 1995 STCW Convention, as amended (hereinafter the STCW Code).

2. Sea Collisions and application of the COLREGs

There is no unified classification of sea accidents based on their occurrence. There are several classifications to be found in literature and for the purpose of this paper the authors will use the classification by Mohović, D., et al, as shown in Figure 1. The Figure also shows the percentage of sea accidents that occur most frequently.

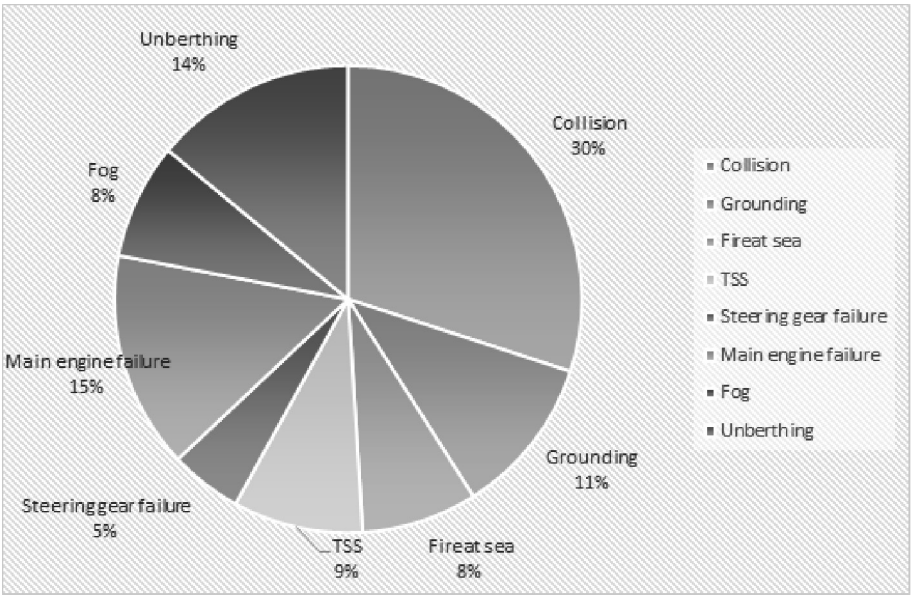

Figure 1 - Maritime Accident Types

Source: [12 according to 1]

In analysing sea accidents, vessel collisions were identified as one of the most frequent type of accidents, whereas human error and wrong interpretation of the COLREGs were identified as the most frequent causes of the accidents [13].

Therefore, a research was conducted as a part of the Avoiding Collisions at Sea Project (hereinafter the ACTs Project). The Faculty of Maritime Studies in Rijeka led the project that lasted for 24 months. The aim of the project was to improve the ways of teaching COLREGs. The participants were high school students, students of maritime faculties, ship apprentice officers, chief mates, masters, fishing boat and yacht skippers, pilots, port authorities' employees, VTS operators, lecturers and others.

The answers of 625 respondents with some sea service experience were analysed for the purpose of this paper; 60 of them have navigated on vessels that had participated in collisions. Figure 2 shows the areas where collisions have occurred.

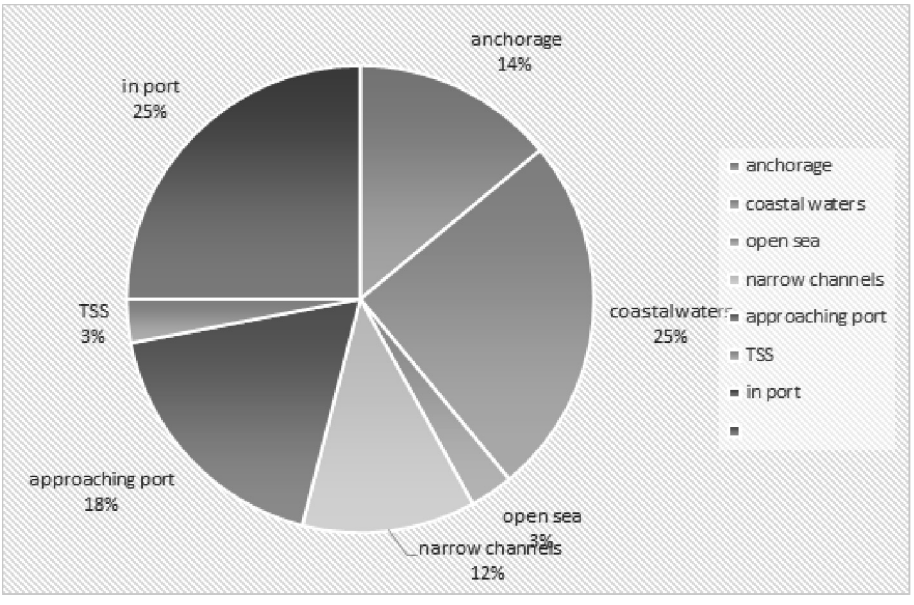

Figure 2 - Areas where collisions have occurred

Source: Authors

The results show that collisions most frequently occur in coastal waters, when approaching the port, in the port itself or at anchorage, and in narrow channels. Collisions are less frequent in the open sea or in traffic separation schemes; that is, the low-density traffic in the open sea, clearly regulated rules and guided traffic in traffic separation schemes could be possible reasons for such a situation. Besides, traffic in traffic separation schemes is usually controlled by VTS systems that improve additionally the safety of navigation. Other reasons refer to a series of other factors that limit vessels' manoeuvring, such as the non-existence of port infrastructure, traffic of small boats, shallow waters, etc.

3. The STCW Convention and competences that refer to the COLREGs

The differences between the knowledge acquired through study programmes and the knowledge required to perform certain jobs have led to the development of competences [11 according to 3]. There are various definitions of competences used in literature, and a number of authors defines them as skills and knowledge needed to be used effectively to achieve certain goals in specific situations [10]. However, the more suitable definition of competences is the one that defines them as the combination of certain characteristics, knowledge, skills, abilities and other qualities a person needs

to possess in order to perform a job successfully [2]. The STCW Convention defines competences as knowledge, understanding and proficiency and it mostly prescribes the professional ones [8]. Professional competences refer to the professional knowledge, understanding and proficiency needed to perform jobs on board ships and are in close correlation to scientific ideas and development of new technologies in this area.

According to the STCW Code [9], activities on board ships that refer to the deck department are divided in navigation, cargo handling, controlling the ship's operations and care for persons on board. Competences needed are defined for every activity, while in this paper only the competences that refer to the COLREGs will be analysed. The activities in question can be performed at the management, operational and support level. For the purpose of this paper, only the competences needed at the management and operational levels will be analysed. The management level implies jobs and responsibilities associated with masters and chief mates, whereas the operational level implies jobs and responsibilities associated with officers in charge of navigational watch.

3.1. Competences that refer to the COLREGs at the operational and management levels of responsibilities

Competences that refer to the COLREGs are prescribed as a part of other competences. That is, competences that refer to the COLREGs at the operational level (Table II/1 of the STCW Code) are part of the competence:

- to maintain a safe navigational watch;
- to use radar and ARPA to maintain safety of navigation;
- to transmit and receive information by visual signalling.

Competences that refer to the COLREGs at the management level (Table II/2 of the STCW Code) are part of the competence:

- to establish procedures that refer to maintaining navigational watch;
- to maintain safe navigation by using information from navigation equipment and systems to assist decision-making.

For the competence "Maintain a safe navigational watch" at the operational level of responsibility and in the section that refers to the COLREGs, the following is prescribed: knowledge of the content, application and the intent of the COLREGs.

For the competence "Use radar and ARPA to maintain safety of navigation" at the operational level of responsibility and in the section that refers to the COLREGs, the application of the COLREGs is prescribed.

For the competence "Transmit and receive information by visual signalling" at the operational level of responsibility and in the section that refers to the COLREGs, the ability to transmit and receive by the Morse light distress signal SOS is prescribed, as stated at the COLREGs Convention.

For the competence "Establish procedures that refer to maintaining navigational watch" at the management level of responsibility and in the section that refers to the COLREGs, the following is prescribed: knowledge of the content, application and the intent of the COLREGs.

For the competence "Maintain safe navigation by using information from the navigation equipment and systems to assist decision-making" at the management level of responsibility and in the section that refers to the COLREGs, the prescribed ability is to examine and evaluate navigational information derived from all sources, including the radar and ARPA system. The goal is to make and implement the decision for collision avoidance and for directing the safe navigation of the ship.

The STCW Code states that for every competence, there will be knowledge, understanding and proficiency prescribed that it consists of. However, the established standard has been disregarded. It follows from above-mentioned examples that the concepts of knowledge, understanding and proficiency are not prescribed at all. Moreover, it has been noted that the same incomplete text is repeated at the operational and management level of responsibilities. To be more precise, for the competence "Maintain a safe navigational watch" at the operational level of responsibility, the prescribed knowledge of the content, application and the intent of the COLREGs are exactly the same requirements as at the management level of responsibility. It is quite unclear what the difference is between the knowledge, understanding and proficiency prescribed at the operational and management levels respectively. If the competences are prescribed at both the operational and management levels, the ones prescribed at the operational level should differ from those prescribed at the management level, which is not the case.

IMO Model Courses can be used in the process of education and training. The content, detailed teaching syllabuses, number of lessons needed for a certain topic, etc. are regulated by the Model Courses. They can be used when organising and introducing new programmes or when improving and updating already existent programmes [4]. The IMO Model Courses 7.01 [5] and 7.03 [6] prescribe contents that refer to the COLREGs. Furthermore, they define more clearly the knowledge, understanding and proficiency refering to the COLREGs. According to the IMO Model Course 7.03, the officers should already be familiar with the content and implementation of the COLREGs. However, there is a certain overlapping (risk of collision, safety speed, visual and sound signalling, etc.). That is, it is not clear enough what new competences are to be acquired at the end of the programme, which is in accordance with the Model 7.03, that are not already included in the Model 7.01. It is important to say that the IMO Model Course 7.01 puts the emphasis on assessing situations that impose the need of informing and calling the master to the bridge. This is prescribed by chapter 8 of the STCW Code (section B, chapter 8). All standards that refer to watchkeeping are prescribed in this chapter. Furthermore, in the section that refers to the conditions of reduced visibility, it prescribes that the officer in charge of the navigational watch should act according to the COLREGs with special regard to fog signals, navigating at

a safe speed with the engines ready for a manoeuvre. Moreover, the officer in charge of the navigational watch should also [9]:
- inform the master;
- post the proper lookout;
- exhibit the adequate navigation lights; and
- operate and use the radar.

However, despite the above-mentioned possibility, the IMO Model Course 7.01 also emphasises the officer's responsibility for the navigational watch until the master takes officially full responsibility. The officer in charge of the navigational watch has to undertake all actions needed to ensure the safety of navigation.

Competences, that is, knowledge, understanding and proficiency that refer to the COLREGs, should be completely comprised at the operational level of responsibilities since the officer in charge of the navigational watch is responsible for the application of the COLREGs. There is also a possibility to prescribe additional competences but in that case, they should differ from the ones prescribed at the operational level of responsibility.

3.2. Teaching methods, methods for demonstrating competences and criteria for evaluating competences

Teaching methods should be clearly defined in the competency based educational programmes. Some of the most frequently used teaching methods are [15]:
1. lectures and explanations;
2. document study;
3. case study;
4. projects;
5. problem-solving;
6. group dynamics;
7. discussion and debate;
8. delivering talks, etc.

Teaching methods are not defined by the STCW Convention, but are defined partially by the IMO Model Courses. In the research conducted as a part of the ACTs Project in which 62 lecturers of the COLREGs took part, the most frequently used teaching methods of the COLREGs were determined. Figure 3 shows the results.

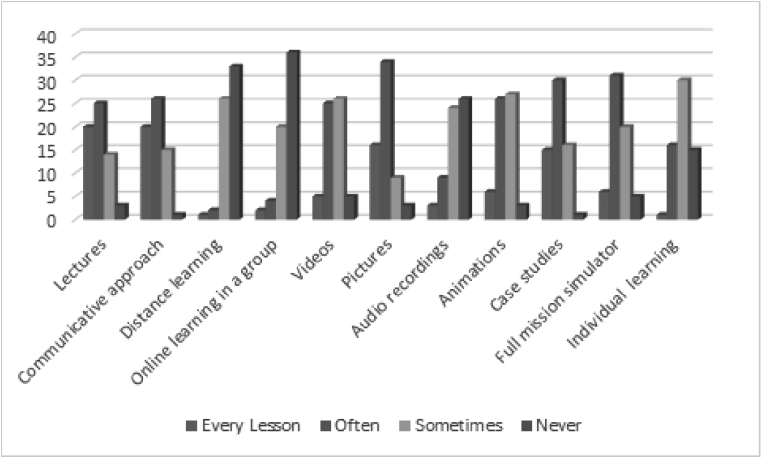

Figure 3 - The most frequently used teaching methods

Source: Authors

The most frequently used teaching methods are compared to the respondents' answers on the most efficient teaching methods, as shown in Figures 4 and 5. In both figures, rank 1 represents the least efficient method, whereas rank 7 represents the most efficient method.

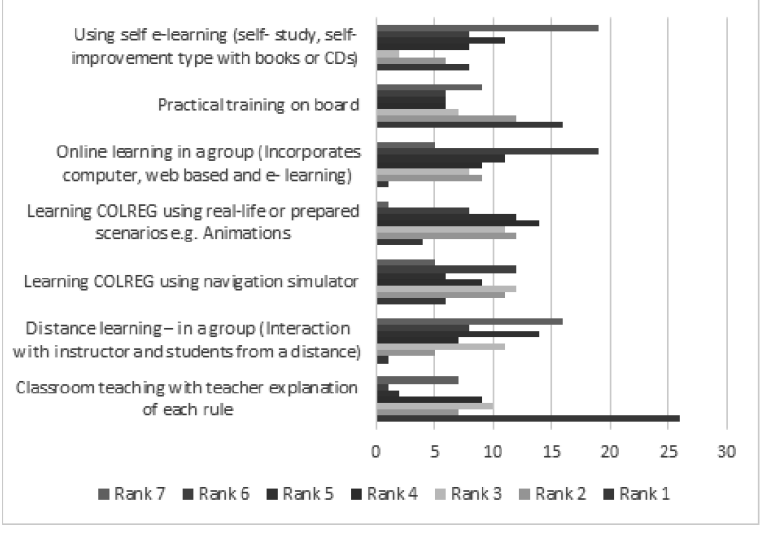

Figure 4 - The most efficient teaching methods, according to the lecturers

Source: Authors

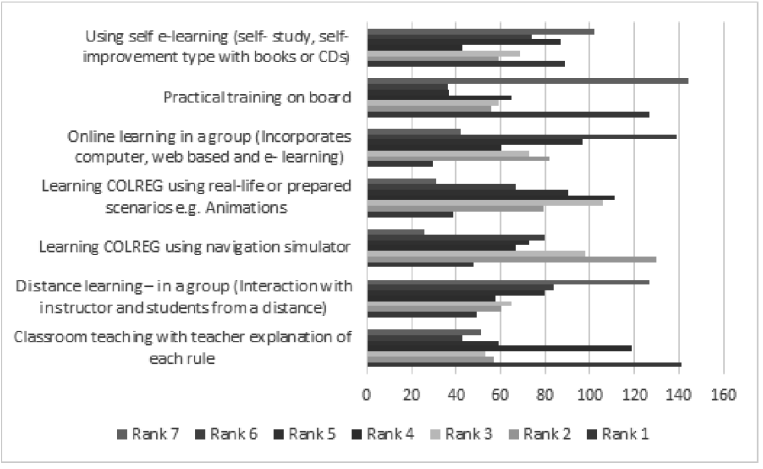

Figure 5 - The most efficient teaching methods, according to the respondents with sea experience

Source: Authors

The research has shown that the most efficient methods, apart from teaching, are practical training on board, using self e-learning, and distance learning – in a group, whereas the least efficient method is classroom teaching with teacher's explanation of each rule.

The STCW Convention prescribes methods for demonstrating competences and criteria for evaluating competences. Methods for demonstrating competences, which can be applied to the COLREGs, are the use of simulators, assessment of evidence obtained from the radar and ARPA simulators, in-service experience, etc. It is very important to define with precision what method refers to what part of the competence and how it is demonstrated.

Apart from methods prescribed for demonstrating competences, criteria for evaluating competences are prescribed as well. That is, the following is stated for the COLREGs: knowledge of lights, shapes and sound signals that should be in accordance with the demands of the COLREGs; avoidance of close encounters and collision with other vessels, and applying manoeuvre signals in accordance with the COLREGs; successful internal communication at various levels of responsibilities, etc. The afore-mentioned is closely connected to the problem of determining knowledge, understanding and proficiency that refer to the COLREGs, as already mentioned in the paper. Furthermore, only after defining the knowledge, understanding and proficiency that should be evaluated, the criteria for evaluation can be determined. When defining criteria for evaluating competences, it is very important to define learning outcomes by using Blooms taxonomy (as suggested by the IMO Model Course).

Figure 6 shows teaching methods, methods for demonstrating competences and criteria for evaluating competences that the authors suggest to be used for the competences that refer to the COLREGs.

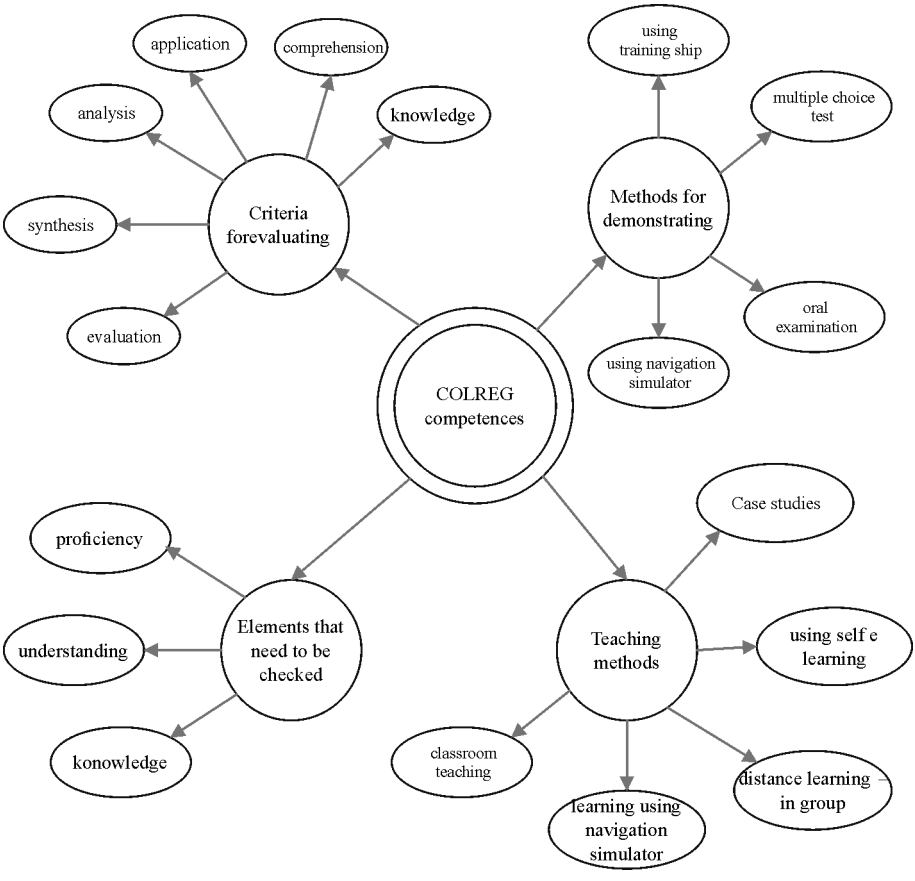

Figure 6

Source: Authors

4. Conclusion

The research conducted as a part of the ACTs Project has shown that there is a problem in understanding and interpreting the respective part of the COLREGs. The 2004 research showed that almost half of the seafarers either did not obey or ignored the COLREGs in actions undertaken to avoid collision. This figure could be reduced

if competences needed for the COLREGs were more clearly written in the STCW Convention and if the necessary knowledge, understanding, and proficiency of the officer in charge of the navigational watch were listed as well.

It is very important to re-examine the definition of setting the operational and management level of responsibilities for the competences that refer to the COLREGs since the officer in charge of the navigational watch should demonstrate them all. The officer in charge usually holds only the certificate of competency for the officer of the watch. The above-mentioned does not mean that methods for demonstrating competences at the management level should be ignored and not tested. It means that the knowledge, understanding, and proficiency should be comprised in the programmes prescribed for the operational level of responsibility. Moreover, additional competences that refer to the COLREGs could be prescribed for the management level of responsibility, but they should be more clearly defined.

The authors believe that for teaching COLREGs the following teaching methods should be used: self e-learning, distance learning – in group, learning using a navigation simulator, whereas in order to evaluate competences, learning outcomes should be determined by using Blooms taxonomy.

According to the authors, learning outcomes that refer to the COLREGs, could be evaluated using the following methods: using training ship, multiple choice test, oral examination and using a navigation simulator.

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Kompetencije koje se odnose na Međunarodna pravila o izbjegavanju sudara na moru u STCW konvenciji

Sažetak

Analizom dostupne literature utvrđeno je da je pomorska nezgoda sudara jedna od najčešćih vrsta pomorske nezgode. Dio autora smatra da je razlog nerazumijevanje ili pogrešna interpretacija Međunarodnih pravila za izbjegavanje sudara na moru. Za potrebe ovog rada analizirani su odgovori 625 ispitanika koji su sudjelovali u istraživanju koje se provodilo kao dio Avoiding Collisions at Sea projekta čija je svrha bila poboljšati načine učenja Međunarodnih pravila za izbjegavanje sudara na moru na studijskim programima i povećati znanje i razumijevanje pomoraca.
Za potrebe ovog rada analizirani su odgovori ispitanika s plovidbenim iskustvom, od kojih je 60 izjavilo da su plovili na brodu na kojem se dogodio sudar. Autori su analizirali područja na kojima se sudar dogodio. Osim navedenog, u radu su analizirane kompetencije koje su propisane STCW konvencijom i koje se odnose na Međunarodna pravila o izbjegavanju sudara na moru, metode podučavanja, metode dokazivanja kompetencija i kriteriji za dokazivanje kompetencija. Analizirani su odgovori 66 predavača koji sudjeluju u izvođenju nastave iz Međunarodnih pravila za izbjegavanje sudara na moru, te su njihovi odgovori uspoređeni s odgovorima ostalih ispitanika kako bi se utvrdilo koje metode podučavanja su najučinkovitije i kako bi se predložile mjere za poboljšanje, što je i osnovni cilj rada.

Ključne riječi: COLREGs, STCW konvencije, sudar, kompetencija