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Importance of Leadership Qualities on Board Ships with Emphasis on Crisis Situations

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Abstract

Inadequate leadership is one of the factors that can cause maritime accidents and thus affect human lives and environment. An overview of maritime accidents caused by inadequate leadership and human relations among a ship's team members is presented in this paper. Good human relations and satisfaction among all ship's team members are preconditions for effective teamwork. Ship's masters should establish effective teamwork in order to implement adequate leadership style and increase safety on board ships. Knowledge of factors that can be crucial for implementing a proper leadership style can serve as a motivator for better work performance and stimulate the morale, especially in the case of maritime accidents that have evacuation of the vessel as a consequence. Implementations of positive characteristics and methods that can serve as guidelines and keys to successful leadership on board ships are introduced in this paper. Senior ship officers were asked to fill out a questionnaire ranking characteristics of leadership qualities. Important characteristics of leadership skills are summarized from the questionnaire analysis.

Introduction

Ships are specific working areas since their crews are working and living in isolated conditions. Ship's crew needs to work as one big team in order to effectively complete all tasks and safely take ship and her cargo and/or passengers from one place to another. But, ship's crew is not just one big team; it is composed of few smaller teams such as: bridge team, engine room team, deck team, galley team and so on. Since safety of persons, vessel, her cargo and environment is on a first place, all ship's teams need to function properly and besides that they need to cooperate between in order to perform all tasks safely and effectively. To be able to do that, each team needs to have a competent leader. On board ships, team leaders are highest ranking officers or petty officers, and overall team leader is ship's master. Leader of each shipboard team needs to guide his team-members towards safe execution of given tasks. Master as overall leader should monitor performance of all teams onboard and take responsibility for their actions and safe performance (Theotokas et al., 2014).

Unfortunately, maritime safety is still largely affected by the human factor, since about 80% of maritime accidents are caused by human error (Hanzu-Pazara et al., 2014). Human error is defined as: "A deviation from expected human performance, where the person that arbitrates did the error occurred has to have criterion what is and what is not an error. This distinction concerns whether the human behavior is examined alone, or the performance of the human-machine system as a whole" (Senders and Moray, 1991). In other words, an individual has to know what is expected from him to perform any given task correctly and efficiently. To be able to do that, explanation must be provided, ideally by his supervisor, i.e. team leader. Inadequate task related information and poor communication leads to error making that can easily lead to an accident. Inadequate leadership and poor human relations in certain conditions are recognized as contributing factors to human error.

In order to reduce human error and improve maritime safety, adequate leadership and human relations needs to be implemented on board ships. International Maritime Organization (IMO) addressed that problem and implemented model courses, which are "meant to suggest and help professors, lecturers and instructors in their teaching" (Horck, 2003). Ship's team leaders should attend IMO model courses and prepare themselves for effective crew management. But, just attending Leadership and Teamwork IMO model course is not a precondition for safe working environment on board a ship. Authors tried to identify the extent of teamwork and leadership abilities presence on board ships after implementation of 2010 Manila Amendments as a part of additional requirements for COC certification.

A shipping company needs to address that in company Safety Management System (SMS) and introduce healthy human relations and teamwork on all levels of ship hierarchy structure. Ship masters should be the ones to make sure that compliance on all levels is achieved.

Even though ship's masters and senior officers attended Leadership and Teamwork courses, maritime accidents caused by inadequate leadership and

teamwork (among other factors) still happen. In the following pages examples of such maritime accidents will be shown.

Research on Leadership and Crisis theory are discussed in "Research on Leadership" section. Analysis of maritime accidents caused by inadequate leadership and teamwork are presented in "Maritime Accidents caused by Inadequate Leadership and Teamwork" section. The methodology used in article is described in "Methodology" section. Results and discussion are presented in "Analysis and Discussion of Results" section, and then conclusions are following.

Research on Leadership

Crisis management can be defined as the ability of employees, managers, or individuals in any type of atmosphere, scenario, or work environment to deal with an emergency or crisis. Leadership in crisis, emergency or disasters is important and can be crucial for success of given task. It is impossible to be prepared in detail for every crisis or disasters that may occur (Clarke, 1999). As per Boin and Hart (2010), leaders can ignore threat, make "stupid" decision or act as do not care make crisis situation worse. Crisis situation is a sum of activities to minimizing crisis impact or negative outcome. It is about organizing, directing, implementing actions and cooperation between agents (Boin et al., 2013). Authors in their article seek to provide framework for assessing leadership performance in crisis situations identifying critical functions (decision making, working together, communication, trainings and drills, learning etc.). Ship's master as a head team leader and decision maker has responsibility to manage and confront unexpected crisis situation. Some researches define leadership as a behavior and others as human relations. Many researches cited Stogdill (1974) and his observation that there are so many definitions of leadership as the number of people who tried to define it. As per IMO Model Course 1.39 leadership is a process where one group of individuals influenced by an individual tries to achieve a common goal. Besides scientific papers, many professional papers deal with leadership theory. All researches commonly accepted that without support of subordinates or followers it is impossible to be successful leader. As per Jeffery (2007), leadership is as about influence on followers to work together for success. Leader needs followers and followers need leader (Northouse, 2010).

Thetokas et al. (2014) in their paper identified the leadership profiles and attitudes in certain circumstances.

Multicultural crews and language differences present challenge in modern day maritime industry. It is extremely important that persons assigned with duties during emergency situations like abandon ship on cruise vessels can effectively communicate and clearly understand each other in order to prevent panic and perform their duties on safe way. Good understanding of their duties, experience and engagement are most important factors for making good decision (Horck, 2004).

Ability to supervise team member activities in a safe manner and be respected by followers defines good leader. Leading team members during crisis situation,

including communication and interaction with them are also desirable abilities for good leader to have (Hanzu-Pazara et al., 2014).

As per Yusuke (2014) there are different opinion about leadership between academia and the wider industry. His researches had different opinion between task or situation, leadership style and employees.

There is a different opinion about leadership between science and practice (academics and seafarers). Maritime industry established international requirements for minimum standards for certification of seafarers after 1978 – Standards for Training, Certification and Watch keeping for Seafarers (STCW). IMO Model Course on leadership and teamwork (IMO, 2014) was adopted in Manila 2010.

For the purpose of this article, ten popular styles of leadership will be mentioned as indicated by the IMO Model Course on Leadership (IMO, 2014d).

Autocratic leadership style is defined as extreme form of leadership where leader expects that followers will perform given tasks without opportunity for suggestions. But, leader will give clear orders and explain what is expected from followers. The best application of this leadership style would be when there is no time for group thinking and leader of the group has more knowledge than other members (Lewin et al., 1939).

Leader that uses bureaucratic leadership style expects that his team members will follow procedures and rules given by organization that employs them. Biggest disadvantage of this style is ineffectiveness when team members need to be flexible, creative or innovative for some reason (Leadership Foundation, 2014).

Leadership style where leaders inspires his followers and generates energy is called charismatic leadership. However, there is a risk that this style of leadership breeds inappropriate self-confidence and self-centeredness, because followers believe that achieved success is highly attributable to the leader (Yusuke, 2014).

Democratic leader invites his followers in decision making. Positive side of this style is that all team members are involved in decision making and can give their opinion. Negative side is that decision-making is time consuming since all team members are involved, and in crisis situation time is of essence (Anderson, 2011).

As per IMO (2014), Laissez-faire leadership style is referred to the leader who leaves his team to work and act on their own. It can be appropriate in highly skilled and competent teams, so leader has to know that his team has qualities for applying this leadership style, otherwise it can be disastrous. Task-oriented leadership is often showed in autocratic manner and it is concentrated on getting the job done. People oriented or relations – oriented leadership is focusing on organization and support of the team. Transactional leadership is popular on board ships where employees know and accept to do their job for payment. Transformational leadership is style where leader inspires his followers with a shared vision. Servant leadership is when someone leads simply by meeting the needs of the team. There are a number of disadvantages of servant leadership. One distinct disadvantage is the use of time - it takes time to implement this philosophy. As per leadership style definition it can be concluded that transactional style, which is more management type than leadership style, is traditional on board ships.

High safety level on board cannot be achieved without applying effective teamwork. But in order to achieve that, traditional hierarchy on board vessels needs to be replaced with leadership that will instill safety culture. In order to do that, master needs to make balance between his authority and the team member initiative. He should avoid utilizing blame culture whenever it is possible and motivate crew members to report any deficiencies that they may observe but did not report due to fear of retribution (Bielic et al., 2017).

Teamwork should be a base for success in crisis situations, and leadership characteristics as human relations, interaction with followers, traits (intelligent, confidence, social), proficiency, competence of leaders are key points.

Maritime Accidents caused by Inadequate Leadership and Teamwork

MAIB[1]and NTSB[2] databases (accessible online via web – open access) were searched for maritime accidents that had leadership, teamwork or human relations as one of safety issues directly or not directly contributing to the accident.

Each MAIB accident report constitutes of at least the following chapters: summary, factual information, analysis, conclusions, action taken and recommendation. Most interesting chapter for this research was conclusion where contributing factors as per accident investigators are listed. Search was done manually by using following filters: merchant vessels 100 gross tons and over, accidents occurred from 1 January 2010 to 31 December 2016, and published reports. There were 146 accidents found and each of them was read and checked for contributing factors. Some of the contributing factors as per accident investigators found in reports are listed below.

One of the causes for grounding of m/t *Ovit* was dysfunctional onboard management and insufficient leadership that was given by master of the vessel. Since his leadership was inadequate, safety culture could not be developed and embedded on his bridge (MAIB Report No. 24/2014).

Fire on m/v *Celtic Carrier* occurred since master and chief officer did not provide necessary leadership that was expected from them, especially for planning and combating fire. Instead of well-organized fire – fighting, their inadequate leadership resulted in confusion and substandard performance of fire – fighting team (MAIB Report No. 18/2014).

One of the causes for contact and grounding of m/v *Amber* was poor communications within bridge team that affected situational awareness. Each team member was not assigned clear role and responsibility at the briefing stage, what resulted in work in isolation at the later stage. Restricted visibility during port departure amplified poor situational awareness that was produced by the fact that bridge team members were working on their own, without communicating

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[1]MAIB – Marine Accident Investigation Branch is a UK Government Agency authorized to investigate accidents in UK waters and accidents involving UK registered ships worldwide.
[2]NTSB – National Transportation Safety Board is an independent U.S. Federal Government Agency that investigates transportation accidents in U.S.

their actions to other team members or assisting tugboat (MAIB Report No. 22/2013).

Inadequate communication from the master to his crewmembers during accident (contact of m/v *Saffier*) limited their response reactions to the following damage (MAIB Report No. 09/2012).

There were 19 maritime accidents out of 146 reviewed that were caused by inadequate leadership, teamwork and poor human relations, among other factors. Out of 19 accidents, there were seven groundings; one injury to a person, six contacts, two collisions, one fire, one accidental release of lifeboats and one fatal injury to a person (see Figure 1).

Figure 1. *MAIB Reviewed Accident Categories*
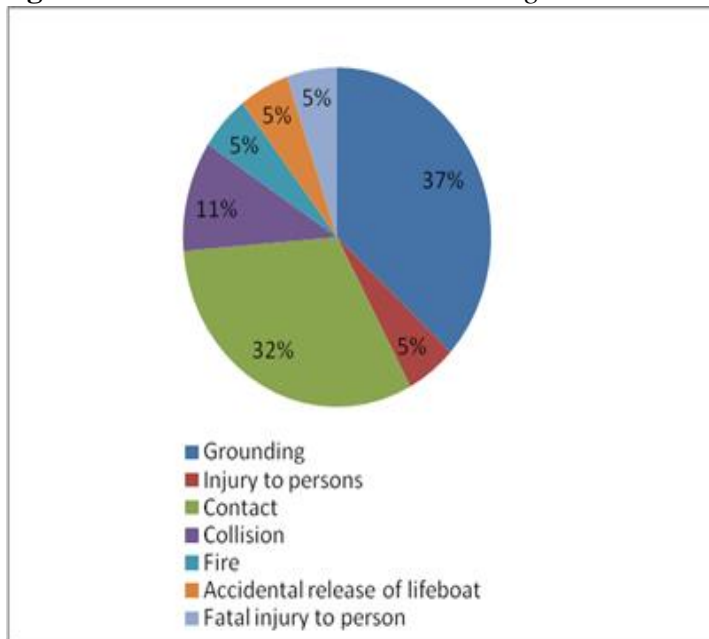
Types of ships involved in maritime accidents that were investigated by MAIB caused by factors researched in this paper are shown in Figure 2.

Figure 2. *Types of Ships Involved in Maritime Accidents Investigated by MAIB from 2010 to 2016*
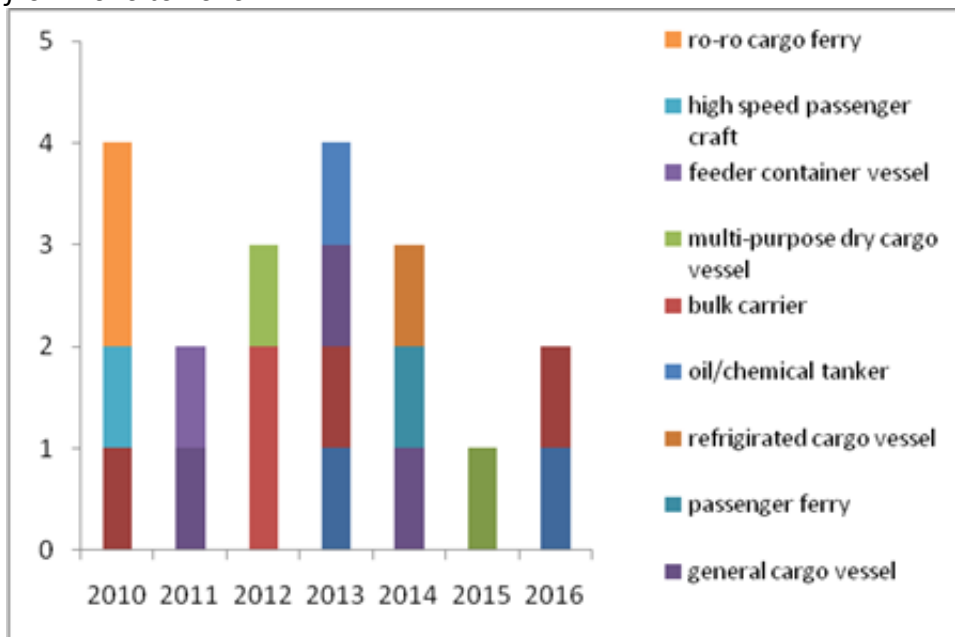
NTSB reports are very similar to MAIB reports. Accident information, vessel information, accident events, analysis, findings, probable cause and vessel particulars are parts of NTSB accident reports. Most interesting part for this research was probable cause. Some of accidents contributing factors as per NTSB investigators are listed below.

One of the factors that contributed to collision between Bulk Carrier *Conti Peridot* and Tanker *Carla Maersk* was inadequate communication between the master and the pilot on the Conti *Peridot*. Lack of situational awareness presented by the master and inadequate communication between the master and the pilot are signs of inadequate bridge resource management on the vessel that significantly reduced the effectiveness of the navigating team on *Conti Peridot* (NTSB Report No. MAR1601).

Lack of communication between vessel's teams, namely engine team and bridge team was the probable cause of the allision of bulk carrier *Anna Smile* with Louis Dreyfus Grain Elevator during docking as determined by the NTSB. Vessel was having problems with main engine starting system, but that fact was not communicated to the vessel's bridge team and pilots by the engineers that were aware of the problem, as it should have been. Another contributing factor was absence of ship specific procedures and training for emergency engine operations (NTSB Report No. MAB 1508).

There were 94 reviewed marine accidents that occurred from 01.01.2010 to 31.12.2016 and six of them were found with contributing factors researched in this paper, namely inadequate communication between ship's teams.

There were only two categories of reviewed accidents, collision and allision. Figure 3 shows the percentage of categories of accidents caused by inadequate communication between ship's personnel.

Figure 3. *NTSB Reviewed Accident Categories*
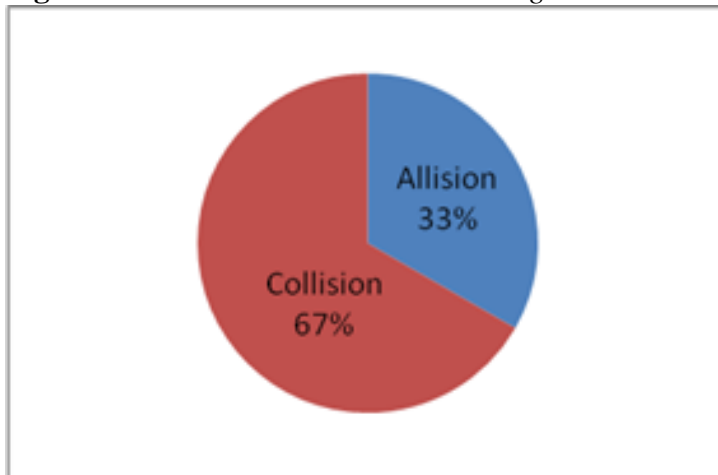
Types of ships involved in maritime accidents over the time frame from 2010 to 2016 that were investigated by NTSB caused by factors researched in this paper are shown in Figure 4.

Figure 4. *Types of Ships Involved in Maritime Accidents Investigated by NTSB from 2010 to 2016*
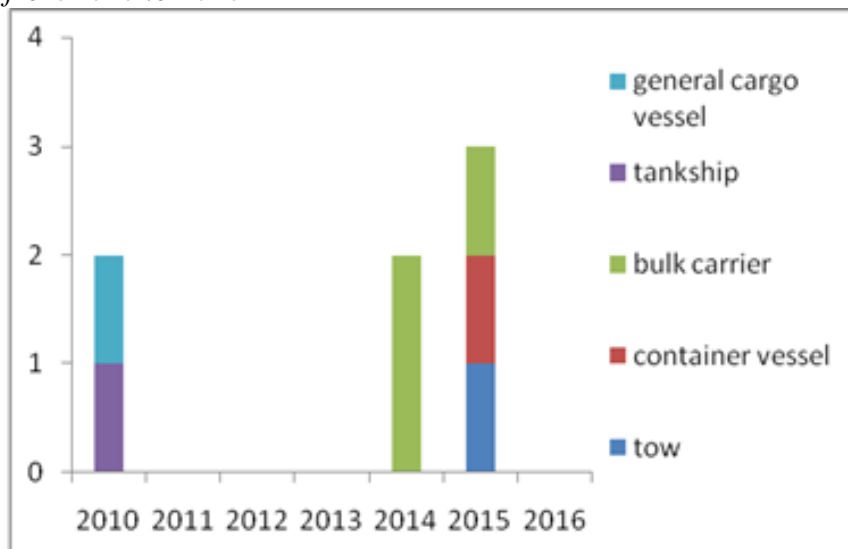
Statistics show that 80% of collisions at sea are caused by gross negligence, breach of regulations or wrong decisions made by the navigator (Hanzu-Pazara et al., 2014). According to Gale (2007) 24% of collisions are caused by the insufficient situation assessment, 23% by poor control of situation, and 13% by officers who were unaware of hazards. Other causes comprise poor communication both between ships and on the bridge, the failure to comply with COLREGS, and the influence of fatigue on making timely decisions (Vujicic et al., 2017).

The International Maritime Organization (IMO) introduced specialized training through IMO Model Course 1.39 to encourage development leadership

qualities and teamwork between seafarers, for all officers and engineers, as a mandatory part of certificate of competency (COC).

For this reason, during the 2010 Manila Conference, one of the subjects discussed was the introduction of the new requirements for training of knowledge about teamwork and leadership. At the same Conference, assertiveness training for all seafarers was also included, given its importance not only for those who have to direct operations, but also for those in lower grades who may have to communicate on safety matters with senior officers and master of the ship (Hanzu-Pazara et al., 2014). The programme is not about technical marine knowledge or skills it is focused on the non-technical leader skills and qualities required in modern day leadership.

Methodology

The authors conducted a survey in order to determine the importance of major leadership qualities onboard vessels. Tool for the above mentioned survey was questionnaire based on literature review, maritime accident databases and authors' expertise. Survey involved 131 seafarers of different nationalities and ranks. For all seafarers that had direct online access questionnaire, it was available online. For those which did not have that opportunity it was available in paper form.

Nationalities of seafarers were Croatian (92%), Turkish (3%), Montenegrin (1%), Bosnian (1%), Egyptian (1%), Serbian (1%) and Ukrainian (1%). The analysis of sea service time shows that majority of respondents served ships between 5 and 10 years (Figure 5).

Figure 5. *Respondents' Years of Sea Service Time*
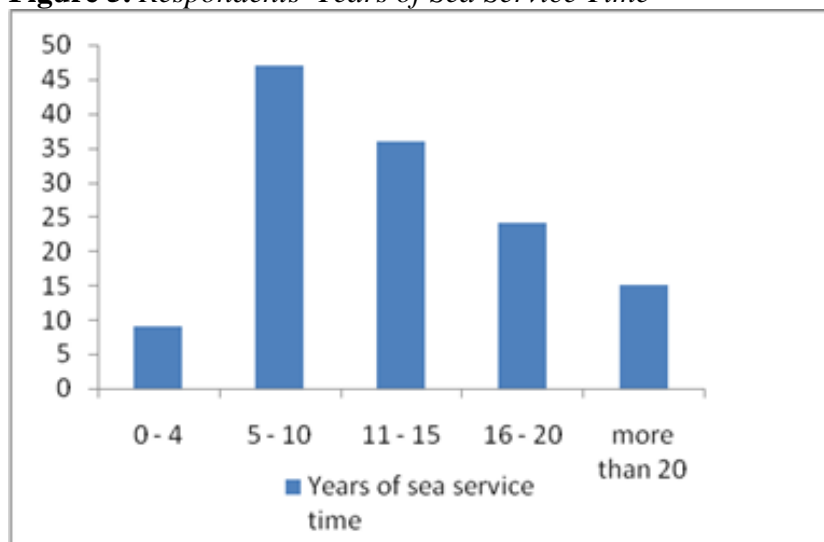
Out of 131 respondents, 18% were working aboard passenger ships, 48% on ships transporting liquid cargo (oil tankers, product tankers and LNG), 17% aboard bulk carriers, 4% on container ships, and 13% on other ship types (Figure 6).

Figure 6. *Types of Ships on which Respondents Sail*
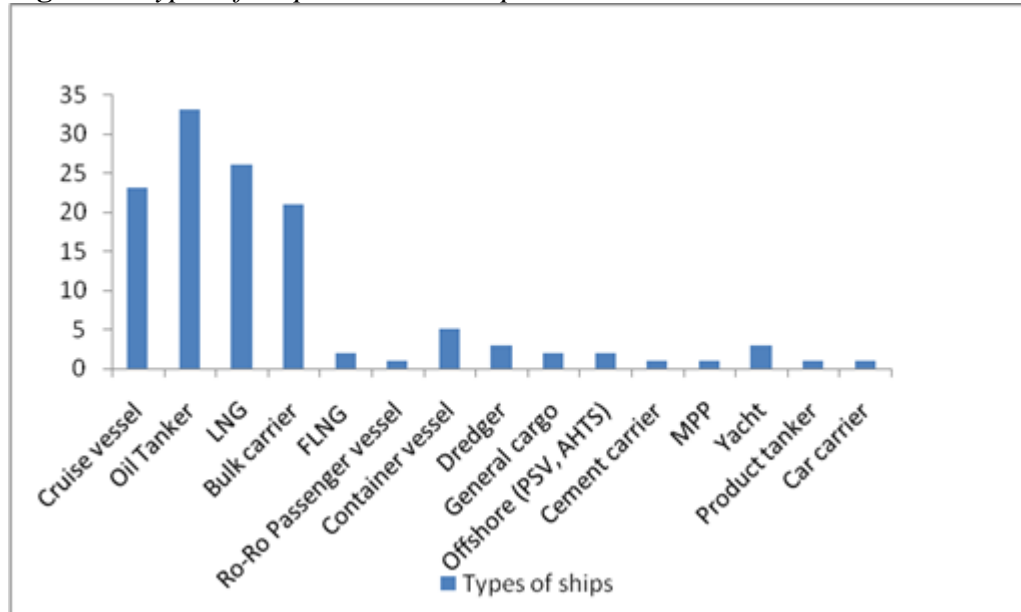
All age groups are represented in survey, majority being between 31 and 40 years old. For the purpose of the survey shipboard ranks were divided into following groups: Master, Chief Engineer, Senior Officer, Junior Officer, ETO and Assistant Officer. Lower ranking crewmembers were not included in this survey.

Analysis and Discussion of Results

Important positive characteristics of leadership skills are summarized from questionnaire analysis. Questions are summarized in groups as per following tables.

Table 1 presented stream of questions from questionnaire focused on leaders' behaviour. As per questionnaire analysis 87.8% of respondents (mean 1.700) answered that leader should promote safety, encourage safe behaviour and safe thinking on board ships. When asked if leader should bring decision without opinions from team members, different answers (mean 3.362) or different opinions about that were found. There is slightly higher percentage of answers in total for disagree (29.8%) and strongly disagree (22.9%). However, when seafarers were asked if leader should promote positive working environment and be able to inspire others, respondents (61.8%) or (mean 1.669) strongly agreed. Respondents strongly agreed (23.7%) and agreed (38.2%) that leader should provide guidance and let subordinates perform their work without supervision or pressure (mean 2.400).

Finally, according to answers with mean value of 3.140 on the question about hierarchy leadership in the crisis situation, it can be concluded that different opinions still exist. Moreover, equal percentage (agreed 29.2% and 29.2% disagreed) of the respondents are not sure what is adequate behaviour or leadership style.

Table 1. *Leaders Behaviour*

Question	Mean	Standard Deviation
Do you agree that leader should promote safety, encourage safe behaviour at all times and promote safe thinking and use of risk assessments?	1.700	0.895
Do you agree that leader should bring important decisions on his own without hearing opinions of other team members and be strong authority?	3.362	1.300
Do you agree that leader should promote positive working environment and be able to inspire others?	1.669	1.109
Do you agree that leader should provide guidance and let his subordinates perform work without supervision and pressure?	2.400	1.165
Do you agree that leader should promote strict hierarchy and be able to depend just on himself once making important decisions in crisis situations?	3.140	1.164

Scale: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Table 2 comprises stream of questions focused on teamwork and human relations on board ships. About half of respondents are satisfied (45.8%; 48.1%) and very satisfied (14.5%; 14.5%) with teamwork and human relations on board ships with mean value of 2.485 for teamwork and 2.400 for human relations. Assertiveness can improve teamwork and help creating better working environment as per respondents. For current behaviour in total 50.8% of respondents, agreed and 10.8% strongly agreed, with mean value of 2.395. High percentage of respondents (strongly agreed 38.2% and agreed 38.2%) stated that it is very important to involve ships team in decision making process and encourage them to express their opinion without fear (mean 1.985).

Table 2. *Teamwork and Human Relations*

Question	Mean	Standard Deviation
*How are you satisfied with teamwork on board your vessel?	2.485	1.058
*How are you satisfied with human relations on board your vessel?	2.400	0.961
Do you agree that assertiveness can improve teamwork on board a vessel and help creating better working environment?	2.395	0.852
Do you agree that all members of ship's team should participate in decision-making and be able to express their opinion without fear?	1.985	1.019

*Scale: 1=very satisfied; 2=satisfied; 3=neutral; 4=dissatisfied; 5=very dissatisfied
Scale: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

The last group of questions from questionnaire and answers of respondents and their opinion about safety trainings and working hours are presented in Table 3. Safety training must be carried out on board ships as per SOLAS requirement and working hours for each crew member should be carried out as per MLC requirement. As per respondents, there are still some issues in working schedules on board ships. As per answers, 29.5% of respondents agreed and 26.4% disagreed for compliance and all the time truthfully filled form of working and rest hours.

Trainings on board are adequately performed, as per seafarers own experience, according to high percentage of respondents' positive answers.

Table 9. *Safety Training and Hours of Work and Rest Compliance*

Question	Mean	Standard Deviation
Do you agree that onboard safety trainings are adequately performed (from your own experience)?	2.415	0.963
Do you agree that periods of work and rest that are on board at a vessel are complied at all times and truthfully filled in?	2.984	1.292

Scale: 1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree

Analysis of additional questions showed that respondents opinion for the main reason for creation of hierarchy/autocratic leadership is company pressure (35.2%) and fear of losing authority (28.8%) following with stereotype thinking (24.8%). More than half of respondents (48.9%) reported that they were directly blamed by their supervisors for unintentional mistakes, instead they enforced "Just Culture – Essential for Safety" (IMO-MSC 88/16/1).

Results showed that majority of respondents (76.2%) stated that their superior officer did not explain to them their tasks and what he expects from them. When asked do they call each other by name or by rank 60.5% stated by name.

Three main causes for human error onboard vessels, according to respondent's opinion, are lack of situation awareness (33.9%), human fatigue (25%) and lack of teamwork (20.2%).

Questionnaire revealed that three most important leadership qualities in crisis situation are knowledge, communication skills and confidence. According to analysis from question number 5 in Table 1, it remains unclear whether leader should promote strict hierarchy and be able to depend just on himself once making important decisions in crisis situations.

Conclusions

According to maritime accident statistics (MAIB and NTSB) accidents caused by inadequate leadership, teamwork and poor human relations, among other factors still occure. Inadequate human relations and teamwork, which are very important aspects of seaferers life on board ships, can influence organization in crisis situations. Danger of high and low workload can lead to fatigue or boredom which can cause loss of situation awareness.

As per respondents answers, assertivness, which is relatively new term in maritime industry, can improve teamwork and help creating better work enviroment. Whole ship's team involvement in decision making processis crucial for obtaining healthy hierarchy on board ship. Senior officers should encourage their followers to express their opinion and feelings without fear to ballance distance relation between leader and follower. The authors' opinion is that more and more master's decision making depends on shore side crisis management team. Shore side crisis team is handling with emergency situation on board ship, giving technical suggestion to the master based on information received from the ship.

According to survey correct leadership behaviour indicates disparity of opinions, but other results define key elements of correct leading qualities in crisis situations. Based on questionnaire analysis it can be concluded that three most influental characteristics are knowledge, communication skills and confidence.

Further research shall be carried out in next survey in order to conclude most hazardous types of ships. Impact of multiculturality is not considered in this paper.

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