

# Challenges Onboard: Effects of Maritime Accidents to Onboard Safety and Security

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**Abstract** – *The research paper aimed to determine the effects of maritime accidents to onboard safety and security. The study utilized the descriptive method of research. The sample of the study consisted of 119 cadets who finished their apprenticeship for the period of June-October 2016. The instrument used was a self-made questionnaire with three parts. The researchers found out that majority of the respondents are males, 18-21 years old and have 1to3- year experience on board and in the program of BSMT. Second, apprentice mates strongly agree with the challenges onboard to safety and security. Furthermore, they found out that apprentice mates strongly agree with the effects of challenges onboard to safety and security.*

**Keywords** – *accident, marine, maritime, Safety and Security*

## INTRODUCTION

Maritime accidents occur every day all over the world, and they often make the first page of the news when lives have been lost or environmental event caused great and often sudden damage or suffering. The custom of the exchange has been systematized after some time, and later, by the middle of the nineteenth century, the navigational standards developed basically as directions for anticipating collisions at sea.

Maritime accidents may result in serious damages such as injuries, asset damages, and sometimes may even result in life-threatening disaster. Safeguards, barriers, and defenses created by modern technology have lessened the occurrences of major accidents. Nevertheless, these accidents continue to occur and consistently bring in extremely disastrous damage of lives and property.

As Ćorović and Djurović[1] demonstrated at the start of the latest century, seafarers have realized that the maritime industry tries to upgrade, enhance and uplift the transport system's reliability and locally accessible operations in preventing and reducing the number of marine accidents.

The shipping company must assure that their crew have proper trainings and have experienced to be at sea onboard a ship. A ship should never sail with a crew of seafarers who are not equipped with the needed competence and required trainings as the crew shall be after the safety of ship and the passengers, while the captain is responsible for all of them.

The sea incidents are classified into those which did not cause harmful consequences but could have caused, and accidents which directly or indirectly caused death, endangering health, damage to property at sea or ashore, pollution, and other harmful effects. There are 75-96 percent of marine accidents, which are caused, at any rate to some degree, by a few types of human mistakes. They indicated that human mistake adds to 89-96 percent of collisions, 75 percent of explosions, and 79 percent of groundings.

A total of 21 accidents were identified last four decades ago at the Philippine seas. Among these 21 accidents, 71.43 percent of the deadliest accidents are due to human error. The 57.144 percent of it is collision and sank, followed by 19.048 percent, which is capsized, then 14.286 percent of fire, and damaged and terrorism are both 4.761 percent. [2]

In 2015, three percent of the reported marine casualties were very serious, 19 percent serious, 59 percent less serious and 19 percent were marine incidents, which is similar to the averages in 2011-2015. In the past five years, marine casualties and incidents were mainly reported to the accident investigation bodies through the Shore Authorities. Reporting by ship companies has also been significant and increased over the period, while reporting directly from the ship has been constant.

In order to prevent maritime accidents and increase the security and safety at sea, many successful measures have been introduced over the years but the necessity to further enhance them and introduce new

ones is vital. With the high incidence of maritime accidents that resulted in disastrous effects, improving the quality of ship safety measures has been required to prevent or minimize maritime accidents, and preparedness can significantly enhance the level of maritime transport safety.

The proponents of the study have chosen this topic because of the growing maritime incidents in the world in terms of safety and security that attract their attention. They want to inform the future mariners about the accidents and effects of maritime accidents and suggest the incidents could be lessened. Through this study, upon knowing the challenges onboard in terms of safety and security, it will greatly help the students of the Lyceum International Maritime Academy, as well as the future seafarers to gain more knowledge on the actions to be taken and at least minimize the incidents.

#### OBJECTIVES OF THE STUDY

The study aimed to determine the effects of maritime accidents to onboard safety and security. Specifically, this study sought to describe the profile of respondents' in terms of age, gender, number of years on board, and program, identify the challenges related in maritime accidents in terms of safety and security; determine the effects of challenges onboard; and to propose a plan of action based on the results of the study.

#### MATERIALS AND METHODS

This study utilized the descriptive method of research. Descriptive research is used to describe characteristics of a population or phenomenon being studied. It does not answer the questions about how/when/why the characteristics occurred but addresses the "what" question. The characteristics used to describe the situation or population are descriptive categories. In this particular study, descriptive method was used to determine the challenges in onboard training of maritime professionals, as well as determine the effects of maritime accidents.

The sample of the study consisted of 119 cadets who finished their apprenticeship in June-October 2016. This was computed with an effect size of 35 percent and a power size of 95 using G\* Power 3.1.9. The instrument used was a self-made questionnaire with three parts. The first part of the questionnaire included the respondent's demographic profile such as age, gender, number of years onboard, and program; Part two consisted of the challenges

related in maritime accidents and Part three dealt with the effects of challenges on board. The questionnaire was validated by technical experts.

#### RESULTS AND DISCUSSION

**Table 1**  
**Percentage Distribution of the Respondents' Profile**

<b>Courses</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Age</b>		
18 – 21 years old	53	58.20
22 – 25 years old	32	35.20
26 years old and above	6	6.60
<b>Gender</b>		
Male	91	100.00
<b>Number of years on board</b>		
1 – 3 years	57	62.60
4 – 6 years	31	34.10
7 years and above	3	3.30
<b>Program</b>		
BS MT	81	89.00
BS MarE	10	11.00

Table 1 presents the percentage distribution of the respondent's profile. In terms of age, it shows that the majority of the respondents are 18-21 years old with a frequency of 53 and a percentage of 58.20 percent. Based on the table, 32 or 35.20 percent of the respondents fall on the age range of 22-25 years old while 26 years old above got the lowest frequency of 6 or 6.60 percent

In terms of sex, the males dominate with a frequency of 91 and a percentage of 100 percent. It only shows that the respondents are all males. Today, women have shown their contributions in all fields. They have successfully handled all kinds of responsibilities. The entry of women into the seafaring trade is a small but a growing phenomenon. As seafaring is conventionally a man's world, many women fear to take it up as a profession. However, fear is nothing but only a product of the imagination. Everything is achievable to one who believes in oneself. [3]

In terms of number of years on board, most of the respondents have 1-3 years of experience with a frequency of 57 and a percentage of 62.60 percent while 31 or 34.10 percent of the respondents have at least 4-6 years of experience onboard ship. However, 3

or 3.30 percent of them have 7-year experience, which is the lowest in terms of the number of years onboard.

Among the two programs in Maritime Education, 81 or 89 percent of the respondents are graduates of Bachelor of Science in Marine Transportation while 11 percent graduated with a degree of Bachelor of Science in Marine Engineering, which has a frequency of 10.

**Table 2**

Challenges Related to Maritime Accident with Regard to Safety (Cargo Operation)

Indicators	WM	VI	R
1. Mingling cargo with other tank cargoes	3.54	SA	2
2. Checking/calculating the loading rate in every hour	3.53	SA	3.5
3. Estimating the time of completion of loading in every hour	3.53	SA	3.5
4. Communicating with shore personnel regarding how the loading operation is going	3.57	SA	1
<b>Composite Mean</b>	<b>3.54</b>	<b>SA</b>	

Table 2 presents the challenges related to maritime accident as to safety (Cargo Operation: Loading). The composite means of 3.54 indicates that the respondents strongly agree. All items were verbally assessed as strongly agree and communicating with shore personnel regarding how the loading operation is going ranked first and it was followed by mingling cargo with other tank cargoes rated strongly agree. It means that communication plays a significant part with shore personnel regarding how the loading operation is carried out.

However, items such as checking/calculating the loading rate in every hour and estimating the time of completion of loading in every hour ranked the lowest, also rated strongly agree. These two items indicate that completion of loading should be done in the prescribed hour, thus, the prescribed loading capacity of the ship should also be considered. It is a regular practice for the Chief Officer to furnish the payload what has been shown by the ship's operators at the last port of release or the following loading port. Assessment of this would give subtle elements on all freight packages, comprehensive of the tonnages and the goal of said load. This would then permit a stacking plan to be developed, ideally before entry. [4]

Table 3 shows the challenges related to maritime accident as to safety (Bunkering). The composite mean of 3.56 shows that the respondents strongly agree with the challenges mentioned (bunkering).

**Table 3**

Challenges Related to Maritime Accident with Regard to Safety (Bunkering)

Indicators	WM	VI	R
1. Availability of the SOPEP Materials	3.52	SA	4
2. Placing a portable chemical fire extinguisher sited near the manifold	3.60	SA	1
3. Maintaining continuous communication from ship to shore	3.59	SA	2
4. Checking the quantity loaded of the receiving tank	3.53	SA	3
<b>Composite Mean</b>	<b>3.56</b>	<b>SA</b>	

Having a portable chemical fire extinguisher placed near the manifold got the highest rank which was rated strongly agree. Every ship must carry a fire extinguisher on board that may be used in times of accidents such as fire. It was followed by maintaining continuous communication from the ship to shore (vice versa) and checking the quantity loaded of the receiving tank both rated strongly agree.

On the other hand, availability of the SOPEP materials was evaluated by the respondents to be the lowest rank, rated as strongly agree. Ship Oil Pollution Emergency Plan (SOPEP) must be carried by the ship onboard. This provides some measures to be applied in times of oil spill accidents at sea to ensure the safety at sea. As stated by Boutsikas [5], bunkering industry provides the shipping industry with the fuel oil that the vessels consume. The quality of the fuel oil provided ensures the safe operation of vessels. Shipping companies under their fuel oil management program confirm that the quality and quantity of fuel oil provided are as requested. To ensure the quality and quantity loaded, correctly performed bunkering procedures must be included in the fuel oil management program.

**Table 4**

Challenges Related to Maritime Accident with Regard to Safety (Arrival)

Indicators	WM	VI	R
1. Testing of main engine	3.77	SA	1
2. Testing of the bridge equipment	3.64	SA	3
3. Testing the radio communication	3.66	SA	2
4. Displaying of proper lights and shapes	3.52	SA	4
<b>Composite Mean</b>	<b>3.65</b>	<b>SA</b>	

Table 4 presents the challenges related to maritime accidents as to safety (Arrival). The respondents strongly agree in terms of the safety (arrival) with the composite mean of 3.65. Among other

items enumerated above, testing of main engine got the highest weighted mean score of 3.77 and rated strongly agree. Ship engine is one of the most important things to be considered; it is a must that the engine should be tested before the ship sail to avoid any untoward incident. Then, it was followed by testing the radio communication, and testing of bridge equipment, both verbally assessed as strongly agree.

However, among the indicators enumerated, displaying of proper lights and shapes got the lowest weighted mean of 3.52 and was verbally assessed as strongly agree. The primary function of marine navigation light is to help prevent any major accident from happening, thus all ships are required to have night lights as a part of the navigation system. As indicated by Raunek [6], landing in port and take off from port are two critical parts of a ship's voyage. Both these strategies are viewed as basic as a result of different complexities required with them. Both motor and deck divisions need to set themselves up well ahead of time with the end goal to guarantee well-being of the ship and the group. Before touching base at a port, the ship's group needs to figure out and talk about each of the issues that would be required for safe berthing and payload operation of the ship at the port. The ace of the ship will advise well ahead of time the "season of entry" of the ship to the main officer and the central architect. If necessary, conduct a meeting with the senior officers or the officers in control to discuss all issues essential for ship's landing in the port.

**Table 5**

Challenges Related to Maritime Accident with Regard to Safety (Entering an Enclosed Space)

Indicators	WM	VI	R
1. Having permit to work signed by the master	3.65	SA	1
2. Checking the oxygen inside the enclosed space	3.45	A	4
3. Having a look out stationed at the entrance with hand held radio	3.54	SA	3
4. Having emergency resuscitation equipment on standby near the entrance	3.58	SA	2
<b>Composite Mean</b>	<b>3.55</b>	<b>SA</b>	

Table 5 indicates the challenges related to maritime accident with regard to safety (Entering an Enclosed Space). The composite mean of 3.55 reveals that the respondents strongly agree to the safety as to entering an enclosed space. Having permit to work signed by the master got the highest rank. This proves that securing permit to work signed by the master is important since its purpose is to prevent conflicts

among mariners. It was followed by having emergency resuscitation equipment on standby near the entrance and having a look out stationed at the entrance with the hand-held radio, interpreted as strongly agree.

On the other hand, checking the oxygen inside the enclosed space got the lowest weighted mean of 3.45, which was rated agree. This suggests that oxygen must be carried by the ship on board, since a ship is a complex structure with several enclosed spaces. Oxygen must be ready and easily accessible in times of emergency. According to Mohit [7], a ship is a complex structure from inside with several small and enclosed spaces, which are used for installing some machinery or for storing machine parts or workshop equipment. It has a matrix of pipelines, which runs through each of its parts, including enclosed spaces.

**Table 6**

Challenges Related to Maritime Accident with Regard to Security (Pre-Departure)

Indicators	WM	VI	R
1. Conducting engine/deck room search prior to departure	3.64	SA	1
2. Testing of security equipment (CCTV, seals, razor wire)	3.38	A	3
3. Checking all documents are in place (port clearance, cargo declaration)	3.62	SA	2
4. Reporting to the proper authorities (AMVER, JASREP, AUSREP)	3.36	A	4
<b>Composite Mean</b>	<b>3.50</b>	<b>SA</b>	

Table 6 shows the challenges related to maritime accident with regard to security (Pre-Departure). The composite mean of 3.50 indicates that the respondents strongly agree to the security as to pre-departure. As shown in the table, conducting engine/deck room search prior to departure got the highest weighted mean of 3.64, which was verbally assessed as strongly agree. Checking the engine or deck room before leaving the port must be performed by the designated security officers. There must be officers in charge of the room, who are authorized to handle the ship engines. Checking all documents are in place (port clearance, cargo declaration) was also verbally assessed as strongly agree, Nevertheless, reporting to the proper authorities (AMVER, JASREP, AUSREP) got the lowest weighted mean score of 3.36 and rated agree. The ship security officers are responsible for reporting to the master or higher authority the conditions of the ship before the ship leaves the port. It is also shown in the table that testing of security equipment such as CCTV, seals, razor wire.

As indicated by Rudley [8], every ship has to be prepared in all regard previously withdrawing for ocean, and the most critical part of those arrangements is having a total group on board. One hour before take-off, a deck officer will be assigned to watch as the group has finished. Normally, he appoints one individual from every office to check that all individuals from that division are ready. In the event that a group member is noted as missing, the ace is told instantly. The ace should then choose if the ship can continue without the missing person. A ship cannot cruise without its radio officer, yet some other positions can be secured by a qualified staff standing expanded watches. In the event that the ace concludes that it is sheltered to continue he may do as such, given that he presents a report of the occurrence, including his announcement of how the vessel was appropriately kept an eye on.

**Table 7**

Challenges Related to Maritime Accident with Regard to Security (Anti-piracy)

Indicators	WM	VI	R
1. Posting of additional look out	3.70	SA	1
2. Having obstacles and barriers constructed	3.49	A	2.5
3. Using the AIS (automatic identification system)	3.49	A	2.5
4. Coordinating with the proper authorities while navigating in pirate infested area	3.42	A	4
<b>Composite Mean</b>	<b>3.53</b>	<b>SA</b>	

Table 7 presents the challenges with regard to security (Anti-Piracy). Based on the table, the composite mean of 3.53 depicts that the respondents strongly agree with the challenges related to maritime accidents as to security (anti-piracy). Among the items cited, posting of additional look out got the highest rank with the verbal interpretation of strongly agree. Designation of additional guards and look out must be considered for this will provide additional safety and security, especially when the ship sails in the pirate-infested waters.

In spite of that, coordinating with the proper authorities while navigating in pirate-infested area got the lowest weighted mean score of 3.42, rated agree. Passing through the pirate-infested area posts risks to both safety and security of life and properties at sea. Security officers must inform and coordinate with the designated authorities when navigating in pirate-infested waters so that the necessary security procedures will be followed. Having obstacles and barriers constructed and using the AIS (automatic

identification system) were both verbally assessed as agree having the same weighted mean score of 3.4.

As indicated by Carral, et al. [9], robbery at sea weaken oceanic security by putting in danger, specifically, the welfare of seafarers and the security of route and trade. These criminal demonstrations may result in death toll, physical mischief or prisoner taking of seafarers, critical interruptions to business and route, money-related misfortunes to dispatch proprietors, expanded protection premiums and security costs, expanded expenses to buyers and makers, and harm to the marine condition.

**Table 8**

Challenges Related to Maritime Accident with Regard to Security (At Anchor)

Indicators	WM	VI	R
1. Identifying the vessel within the vicinity	3.59	SA	1.5
2. Securing of openings, loose objects	3.45	A	4
3. Monitoring of the radio communication	3.49	A	3
4. Displaying of proper lights and shapes	3.59	SA	1.5
<b>Composite Mean</b>	<b>3.53</b>	<b>SA</b>	

Table 8 displays the challenges related to maritime accident as to security (At Anchor). As shown in the table, the composite mean of 3.53 indicates that the respondents strongly agree with the challenges related to maritime accident as to security (at anchor). Identifying the vessel within the vicinity and displaying of proper lights and shapes shared the highest rank

On the other hand, securing of the openings, loose objects got the lowest weighted mean score of 3.45. Lights make the vessel visible at night; therefore, light and shapes of the ship must be displayed and checked properly for it is one of the most important conditions on a dark night. It was followed by monitoring of the radio communication, rated as strongly agree.

As stated by Chief Officer Bhanawat [10], anchoring is one of the very frequent operations onboard ships. Many variables and external factors influence the duration and location of an anchoring operation. While the type of seabed is of utmost importance during anchoring, soft muddy grounds or clay bottoms are best preferred. It should be checked carefully that the anchoring bottom is free of power lines, submarine cables, pipelines or

rocks. Various methods on anchoring include consideration of direction and strength of wind, current and tidal stream. Often good local knowledge helps a mariner determine required maneuvers and actions to be taken while anchoring.

**Table 9**

Effects of Challenges Related to Maritime Accident with Regard to Safety (Cargo Operation)

Indicators	WM	VI	R
1. Preventing contamination cargoes and avoid explosion specifically fuels	3.69	SA	1
2. Monitoring the hourly rate of the quantity loaded of the vessel to prevent overloading	3.46	A	4
3. Having the estimated time of completion of loading	3.56	SA	2
4. Identifying the primary means in regard to communication, in additional of that, to know the hourly loading rate, quantity loaded, and signal for emergency stop to prevent the accidents in marine environment like pollution	3.54	SA	3
<b>Composite Mean</b>	<b>3.56</b>	<b>SA</b>	

Table 9 shows the effects of challenges related to maritime accidents as to safety (Cargo Operation). The composite mean of 3.56 indicates that the respondents strongly agree on the effects of challenges related to maritime accidents as to safety. Preventing contamination of cargoes and avoid explosion, specifically fuels got the highest rank, which was verbally assessed as strongly agree. Contamination of cargoes and explosion of fuels are major accidents that may occur anytime on board. The conditions of the cargoes must be monitored and checked, and fuels must be handled with proper care. It was followed by having the estimated time of completion and identifying the primary means in regard to communication. In addition to that, to know the hourly loading rate, quantity loaded and signal for emergency stop to prevent the accidents in marine environment like pollution were also both rated strongly agree.

Nevertheless, monitoring the hourly rate of the quantity loaded of the vessel to prevent overloading was rated the least with the weighted mean score of 3.46, agree. Setting in proper limit the quantity of the cargoes loaded on board is a must to ensure that the ship would not be overloading, and the capacity of the ship is met. Moreover, regular monitoring must be performed. Stevedores who are experienced men appointed for cargo handling do the actual handling of

the cargo in loading and discharging when a vessel arrives at a port. The Master has the responsibility for the safety of the ship and cargo; hence he must supervise the work of the stevedores for general safety. Therefore, during stowage the safety must be primarily considered, i.e., the cargo must be stowed so that the ship will be stable and seaworthy, and it must be secured in such a way that it does not shift if the vessel encounters bad weather [6].

**Table 10**

Effects of Challenges Related to Maritime Accident with Regard to Safety (Bunkering)

Indicators	WM	VI	R
1. Dealing with the accidental escapes to prevent oil pollution	3.53	SA	2
2. Preparing in case of fire during bunkering to extinguish small fire onboard	3.46	A	3
3. Having open communication from ship to shore (vice versa) for bunkering operation	3.67	SA	1
4. Monitoring the received cargo, quantity of cargo, and estimate time of completion	3.45	A	4
<b>Composite Mean</b>	<b>3.53</b>	<b>SA</b>	

Table 10 presents the effects of the challenges related to maritime accident with regard to safety (Bunkering). The composite mean of 3.53 means that the respondents strongly agree on the effects of challenges related to maritime accidents as to safety (bunkering). Having open communication from ship to shore (vice versa) for bunkering operation ranked the highest with the weighted mean score of 3.67, rated strongly agree. Communication is one of the most important factors in the shipping and maritime industry. Proper communication must be observed between the port and ship authorities for bunkering and other related activities. Dealing with the accidental escapes to prevent oil pollution was also assessed verbally as strongly agree.

However, monitoring the received cargo, quantity or cargo and estimate time of completion got the lowest weighted mean score of 3.45 and was rated agree. It was then followed by preparing in case of fire during bunkering to extinguish small fire on board with the weighted mean score of 3.46, rated agree. The bunkering of fuel or diesel should be carefully handled to prevent any fire accidents. Fire extinguisher must be carried in all parts of the ship where it is accessible in times of fire emergency.

According to Styliadis and Koliouis [11], bunkering, like a number of shipboard activities, carries

risks. Most bunkering operations are conducted and completed without any incident, but in a small number of cases something does go wrong. Frequently, incident occurred due to excessive pumping rate by the bunker barge, but investigations reveal that the root cause is more often due to poor onboard/onshore practices and permitting the operation to proceed at an excessive rate. Also, it is important to remember that careful risk assessment and implementation of effective control measures can, in the event of an overflow occurring, contain the spill on board and prevent, or at least minimize, any environmental impact. Finally, all bunkering operations should be carefully planned and executed in accordance with applicable regulations.

**Table 11**

Effects of Challenges Related to Maritime Accident with Regard to Safety (Arrival)

Indicators	WM	VI	R
1. Avoiding engine failure	3.66	SA	2
2. Knowing the readiness of all bridge equipment	3.57	SA	4
3. Ensuring the communication between two parties	3.60	SA	3
4. Ensuring the vessel compliance with international policy and regulation	3.71	SA	1
<b>Composite Mean</b>	<b>3.64</b>	<b>SA</b>	

Table 11 presents the effects of challenges related to maritime accident with regard to safety (Arrival). The composite mean of 3.64 indicates that the respondents strongly agree on the effects of the challenges related to maritime accident with regard to safety (Arrival). Among all the items enumerated, ensuring the vessel compliance with international policy and regulation got the highest rank and verbally assessed as strongly agree. This means that the shipping company must comply with the international policy and regulations since the legal regulation is crucial of maritime navigation. Laroya [12] emphasized that preparations of ships in entering ports involve many complexities and safe berthing has to be considered. Watch officers must always be properly guided by the procedures and practices of good seamanship. Also, remember that a specific ship will have her own characteristics.

The Master should advise the evaluated time of landing port to the head of divisions. There should be a gathering between every single Senior officer and where essential, Junior officers and Crew, to meet a long time before landing port, and talk about all issues

relating to the port entry and remain. The concerned officers might affirm the finished state of the relating things of the "Checklist for Entering Port" and report the same to the ace. Applicable passage has to be made in the Deck Logbook to this effect.

**Table 12**

Effects of Challenges Related to Maritime Accident with Regard to Safety (Entering an enclosed space)

Indicators	WM	VI	R
1. Having legitimate entry to enclosed space	3.56	SA	3
2. Ensuring 21% of breathable oxygen	3.60	SA	2
3. Assisting you if have a problem that happens inside the enclosed space	3.65	SA	1
4. Having lifesaving appliance like Compressed Air Breathing Apparatus (CABA) for standby for immediate use of emergency	3.46	A	4
<b>Composite Mean</b>	<b>3.57</b>	<b>SA</b>	

Table 12 presents the effects of challenges related to maritime accident as to safety (Entering Enclosed Space). The composite mean of 3.57 indicates that the respondents strongly agree on the effects of challenges related to maritime accidents as to safety (entering an enclosed space). Assisting you if have a problem that happens inside the enclosed space got the highest rank, rated strongly agree. Mariners should also be trained in handling and responding properly in case an emergency arises. It was followed by ensuring 21% of breathable oxygen and having legitimate entry to enclosed space rated strongly agree.

On the other hand, having lifesaving appliance like Compressed Air Breathing Apparatus (CABA) for stand by for immediate use of emergency got the lowest rank, was verbally assessed as agree. Life saving devices such as CABA must be carried onboard ship all the time. Designated security officers must ensure that these devices are always in good condition and accessible for use. Spencer [13] stated that the challenge of entering enclosed spaces safely is a subject that has tragically been with the industry for many decades. There is no exact record of the number of seafarers, workers, surveyors, and stevedores who have died in enclosed spaces on ships and offshore units, but it is estimated that there are dozens of fatalities every year. This implies that those who join the industry learn at an early stage of the dangers of entering into enclosed spaces. Seafarers must realize how unsafe it can be to go ill-prepared into an enclosed space to assist a colleague or carry out some tasks. No enclosed space

should be entered without proper precautions. Doing so puts lives at risk, and this means that training is essential.

**Table 13**

Effects of Challenges Related to Maritime Accident with Regard to Security (Pre-Departure)			
Indicators	WM	VI	R
1. Knowing if there are intruders onboard ship	3.63	SA	1
2. Knowing the state of readiness of security equipment	3.53	SA	4
3. Knowing if there is deficiency document carried by the ship	3.57	SA	2
4. Ensuring that vessel will appear on an Amver Surface Picture (SURPIC) until its next voyage	3.56	SA	3
<b>Composite Mean</b>	<b>3.57</b>	<b>SA</b>	

Table 13 presents the effects of challenges related to maritime accident with regard to security (Pre-Departure). The composite mean of 3.57 shows that the respondents strongly agree on the effects of challenges related to maritime accident as to security plan (pre departure). Knowing if there are intruders onboard ship got the highest weighted mean score of 3.63 strongly agree. It is evident that the shipping company security officers are vigilant when it comes to unauthorized person getting onboard. For security purposes, security officers do not permit intruders to get onboard to avoid any untoward incidents that can harm the passengers, crew, and other individuals onboard. Knowing if there is deficiency document carried by the ship got the weighted mean score of 3.57, strongly agree.

Nevertheless, knowing the state of readiness of security equipment was ranked the least, strongly agree. Accessibility of the security equipment is one that must always be ensured by the ship security officers. As stated by Gold and Scott [14], prior to the departure of the ship, the chief officer must have posted a provisional sailing time shortly after arrival at the unloading dock. When the progress of the cargo discharge permits a better estimate of sailing time, the chief officer will advise the master who will authorize the posting of the revised time. This should be done six hours ahead of the previous or new sailing time (whichever is earlier). Enter the original sailing board posting and all changes to the sailing time in the deck log book. Normally the crew is required to be on board at least one hour prior to un-docking.

**Table 14**

Effects of Challenges Related to Maritime Accident with Regard to Security (Anti-Piracy)

Indicators	WM	VI	R
1. Early warning of unidentified vessel	3.59	SA	2
2. Preventing the pirates or the hijackers to enter the ship	3.40	A	4
3. Identifying the approaching vessel nearby	3.46	A	3
4. Ensuring that all authorities are well informed	3.60	SA	1
<b>Composite Mean</b>	<b>3.51</b>	<b>SA</b>	

Table 14 presents the effects of challenges related to maritime accident with regard to security (Anti-Piracy). The respondents strongly agree on the effects of challenges related to maritime accident as to security (anti-piracy) as revealed by the composite mean of 3.5. Among the items enumerated above, ensuring that all authorities are well informed got the highest rank, rated strongly agree. Information dissemination among security officers and other personnel determines the success and safety of the ship as it is one of the most important factors in dealing with the implementation of security measures. It was followed by early warning of unidentified vessel.

However, preventing the pirates or the hijackers to enter the ship got the lowest rank. Several security measures are implemented on board ship to prevent pirates from getting onboard. Different security measures such as posting of armed guards, installation of electric fence are made to prevent the possible intrusion of the pirates. Identifying the approaching vessel nearby.

The United Nations Security Council has helped nations in fighting piracy by passing five different resolutions aimed at authorizing nations to patrol the waters off the Somali coast and to pursue pirates, whether on the high seas or in Somali territorial waters; pirate attacks now occur over an area in excess of one million square miles of ocean. Accordingly, patrolling ships usually come too late to help drive away an attack, as vessels under attack typically have less than fifteen to thirty minutes from the first pirate sighting to the time the pirates has taken the vessel. Despite the use of military force, death of crew members or escalation of violence can still occur. [15]

Table 15 presents the effects of challenges related to maritime accident with regard to security (At Anchor). The composite mean of 3.53 indicates that the respondents strongly agree on the effects of challenges related to maritime accident as to security (at anchor).



**Table 15**  
Effects of Challenges Related to Maritime Accident with Regard to Security (At Anchor)

Indicators	WM	VI	R
1. Preventing collision by monitoring another vessel	3.51	SA	4
2. Preventing theft of equipment	3.52	SA	2.5
3. Ensuring that all broadcast information coming from authorities has been received	3.58	SA	1
4. Monitoring the other vessels within the area for possible collision	3.52	SA	2.5
<b>Composite Mean</b>	<b>3.53</b>	<b>SA</b>	

Of all the indicators presented, ensuring that all broadcast information coming from authorities has been received got the highest weighted mean score of 3.58 rated strongly agree. This shows that information

is properly disseminated from the authorities. Preventing theft of equipment and monitoring the other vessels within the area for possible collision.

On the other hand, preventing collision, monitoring other vessels got the lowest weighted mean score of 3.51 and was also rated strongly agree. It means that navigation rules are monitored by the ship officers to prevent collision. Bhattathiri [16] mentioned that anchoring is one of the many essential operations going under the obligation of deck officers. It includes the use of basic shipboard hardware and requires abnormal state of situational mindfulness. The key duty of the deck officer at a grapple station is to utilize the tying down hardware and accessible labor for doing the operation securely and productively as per the ace's guidelines.

**Table 16**  
**Proposed Action Plan for Enhancement of Knowledge in Accident Prevention**

Key Results	Strategy/Action Plan	Persons involved
Coordinating with the proper authorities while navigating in pirate infested area	Having an orientation before the passage in pirate areas	Shipping Company, Master/Officers/Crew of vessel
Testing of security equipment (CCTV, seals, razor wire)	Requiring a checklist of equipment onboard.	Ship Security Officer
Reporting to the proper authorities (AMVER, JASREP, AUSREP)	Keeping a record onboard regarding threats while transiting in pirate areas.	Master/ Officer

## CONCLUSIONS AND RECOMMENDATIONS

Majority of the respondents are males, 18-21 years old and have 1 to 3- year experience on board and in the program of BSMT. Apprentice mates strongly agree with the challenges onboard to safety and security. Apprentice mates strongly agree with the effects of challenges onboard to safety and security. A plan of action has been proposed to reduce the maritime accidents onboard. Lyceum International Maritime Academy may provide additional information on how to deal or contact coast guards in their professional courses. Seafarers who will be Ship Security Officer (SSO) may always keep the record when the equipment was done on checking and testing for proper operation. Seafarers onboard may always be reminded to keep the record of reporting for future reference in case that investigation will happen. The proposed plan of action may be implemented. The study is limited to the apprentice mate's assessment on the challenges onboard, thus further study may investigate on the

possible opportunities and innovation on safety and security onboard.

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