BERTHING ALONG SIDE PIER: RISK FACTORS AND SAFETY PRACTICES DURING MOORING AND UNMOORING OPERATIONS

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ABSTRACT

Mooring and unmooring of vessels in berthing along side pier demands a high degree of teamwork for being potentially hazardous operation. Hence, a code was established to describe the good practices for the safe and efficient mooring of vessels. This descriptive -correlation study aimed to determine the correlation between risk factors and safety practices in mooring of 100 merchant officers of Marlow Navigation Philippines. The salient findings were (1) large percentage of the respondents had been on board for 3-5 years and held position of able seamen, (2) The respondents recognized the risk factors involved during mooring/unmooring operations, (3) The respondents observed safety practices during mooring/unmooring operations, (4) The respondents had the same safety practices during mooring/unmooring operations regardless of years spent onboard the ship, and (5) The more the respondents recognize the risk factors, the more they observe safety practices during mooring/unmooring operations. Therefore, the more the respondents are able to identify the risk factors involved in mooring, the greater safety practices will be implemented in marine operations.

Keywords: Mooring, Risk, Safety, Practices

Introduction

Mooring and unmooring of vessels together with the shifting, fastening or releasing of lines of a vessel demand high degree of teamwork for being potentially hazardous operation may be arranged for by shipping agents (Ashar, 2011). Oceangoing cargo vessels mooring and unmooring procedures involve many complexities and careful considerations will need to be made for safe berthing and unberthing from ports All concerned in the operation must be properly trained and equipped with clear understanding of respective role and responsibilities to ensure over-all safety. A well-trained and familiarized crew is an integral component of operating a safe ship with which each crew member has a personal responsibility to be acquainted with their ship. The master shall ensure that all important factors affecting safe mooring of the vessel throughout the duration of port stay are monitored and properly recorded (Ferguson, 2000 and IMO International Safety Management, ISM Code (2010)).

As cited in the Naval history (2011) fatalities and accidents revolving around the U.S. Navy's handling rigid airships on the ground -- entering and leaving a hangar, mooring and unmooring --

was difficult, manpower-intensive, and dangerous. The attempt of Los Angeles (ZR-3) to land aboard the carrier Saratoga (CV-3) whereby one of the many sailors helping out on the flight deck failed to let go of the control car's handrail when the airship suddenly rose. After going up about 100 feet, the seaman lost his grip, fell back to the deck, and later died of complications from the accident.

The Akron's tail began rising with her nose secured at the mooring mast while venting helium, five tons of ballast was accidentally discharged and the ship became uncontrollable. The ship's captain, shouted for ground crewmen to let go of mooring lines, and the cable to the mast was cut. But when it shot 1,000 feet skyward, three sailors who had failed to let go of their lines were carried aloft. Two fell to their deaths, and the third was able to secure himself to his line until hauled aboard the airship. Another casualties noted was when the mooring line pulled the victim's left hand down against the steel cleat," noted the ship's medical personnel, "hyper extending his arm and causing mild damage to tendons and ligaments.

As noted from the complied news (LP news, 2009) enumerated casualties and injuries meted during mooring operations: two seafarers killed when struck by a parting mooring lines, crewmember in come when struck in the head by a parting mooring line, 3//O sustained 90% partial amputation of leg and fructured elbow, A/B suffered a fractured hip when struck by a parting mooring line, both legs broken when struck by a parting mooring line and C/O killed when tow-line to barge parted and snapped back.

A code has been compiled with the assistance of the port community and river users to describe the established good practices for the safe and efficient mooring and unmooring of vessels. It was served in wide circulation in anticipation that linesmen, boatmen, tug crews, ship’s staff, masters, pilots or berth operators will be well guided by its provisions. The code is reviewed and amended as necessary at least every three years. The vessel master remains responsible not only for the safety of his crew onboard, but also when they are working at his direction in mooring operations. Likewise, responsible for the provision of their Personnel Protective Equipment or PPE (Gravesend, 2010). Endowed with the knowledge and skills, a seafarer can affirms to himself that he is ready one pace ahead to execute safety aboard the ship. This is in compliance with Procedures for Watchkeeping in port, Procedures for Navigational

Watchkeeping and Procedures for Watchkeeping in Engine Room and others mentioned in the ship specific "Standing Orders". (Shipsbusiness.com/ships-crew-familiarization - training-onboard, 2009).

The core business of the mooring service is mooring and unmooring from sea going vessels. In the mooring process, the mooring men receive a call with information of the vessel to determine the quantity of the equipment they need to prepare and set up which usually consists of two boats and two cars with each two crew members come to secure the boat to the mooring site of choice. With the right equipment it can be done safely, fast and economically. It is understood that mooring equipment onboard shall be maintained in good working condition so as to secure safety in mooring operations.

As an example bollards (a sturdy post firmly fixed to the dock) will be used to explain the procedure. When a vessel enters the port, the mooring men receive the call and wait with the required equipment at the mooring dock. When the vessel is close, the mooring lines are thrown to the men on the launches (the vessels the mooring men use); this is all done under the supervision of the pilot on board. The mooring lines have to be handed to the linesmen at the shore through with another rope which is lighter with a weight on the end. This line is attached to the mooring lines so the shore man can lift it and fasten the bollard. When the mooring line is already attach to the bollard, a mechanism on board of the vessel starts tightening the line until the vessel lies sturdy on the quay wall mooring (Krve, 2014).

Rotterdam is one of the biggest ports in the world and in Europe. The mooring company in the port of Rotterdam is called the KRVE ("Koninklijke Roeiers Vereniging Eendracht"). It is important to have a good mooring company that runs the mooring business smoothly. The KRVE founded in 1895 was called royal since their 100 anniversaries in 1995. When this company started, all mooring was done by hand and with small rowing boats, nowadays KRVE has about 60 launches to work with but most of the work is still done by hand and is thus very tough. Mooring is not the only job of the KRVE, they also rent fully equipped vessels, vessel crews, bring pilots to/from the vessels by boat or car and also assist when there is a calamity, like setting up an oil screen when there is an oil spill. Likewise, KRVE who educates pupils till they become fully certified mooring men is very innovative when it comes to mooring systems. An

example of such an innovative system is the shore tension, which makes sure the tension on the line stays constant all the 18 time and thus ensures a sturdy lying vessel and KRVE sells this system to other ports all over the world (Krve, 2014).

In Florida economy, boating industry is important, thus mooring field design is formulated to maximize the total number of boat feet mooring in the field. The model allowed two adjacent moorings to overlap which introduces a risk that under certain conditions the boats on these moorings could contact each other. Thus, identify the conditions and quantify the probability of possible contact. The mooring field model rationalizes the mooring field design and shows that in one case by increasing the risk from 0 to 1%, the mooring efficiency increases from 74.8% to 96.2% (Wiley Periodicals, Inc. and Naval Research Logistics, 2009).

Viking Sea Tech adhered to various design parameters to optimized mooring solution that involved an eight point mooring systems. This optimized solution used a single mooring system by two different MODU's at two different locations to minimize the amount of equipment required as well as mobilization cost and time. On an average length of approximately 1800 meters, utilized 15 tonnage Strvpris MK5 anchors with 250 meters section of 84 millimeter study link chain and 158 millimeter polyester rope. The polyester ropes allowed specified design criteria in meeting client subsea clerance and kedging requirements (Viking Sea Tech, 2014). Similarly, the Samson Mooring Advantage Program has been proven to enhance operation performance and reduce the risk of mooring line failures. A wide range of jacketed and none jacketed line options best suited for specific mooring applications to ensure safety (Samson Rope Technology, 2014). In the same way, Habitat Mooring System founded the concept of scalable mooring system to serve a variety of end-use applications from large ballast filled silos for mooring offshore wind turbines to smallest units of cast concrete for mooring vessels in harbours and near shore areas (Fishermen's Voice, 2010).

Parted ropes/wires normally occur during general mooring, tug and ship to ship operations with equipment failure, misuse, wash damage and weather also playing a role. Injuries from non parted ropes/wires normally occur due to crew being caught up in ropes/wires and ropes wires slipping off and becoming jammed on drum ends during normal mooring operations (see pie charts). Whilst mooring injuries are the seventh most frequent cause of personal injuries in the

UK Club and the third most expensive per claim indicating how horrific some of these injuries can become (LP News, 2009). The mooring rope ruptures during deboarding of a passenger ship (Valet, 2013). Preventive measures should target fatalities during mooring and towing operations. Internationally, most shipping fleets have over time experienced large decreases in fatal accident rates (Roberts, 2014)

This study premised on the theory of knowledge by Huang, Chai-Cheng(2010) involving his development of single-point mooring (SPM) cage systems. However, natural disasters such as hurricanes and typhoons can cause severe damage to the integrity of net cage system. To avoid mooring system failure, selecting an appropriate breaking strength for mooring lines is becoming an important issue in marine aquaculture industry. This study evaluates the failure risk of a mooring line based on extended-period environmental loadings. Results indicate that the recommended replacement period of a polyester (PET) mooring line (diameter 38mm) is about 6.55 years if the line"s safety factor is 1. If the required safety factor increases to 1.5 (diameter 50mm), then the replacement period extends to 23.81 years about six times that of original life. The fatigue failure probability for mooringlines in the service period is about 0.49 and 0.29 for safety factors of 1 and 1.5, respectively (Hua, 2010)

Single point mooring (SPM) is used when typical port facilities cannot be applied. Offshore platforms and terminals producing oil and gas are the places where SPM can be employed. Accidents with SPM equipment and ships occurring during loading or unloading operations are very dangerous and may cause serious losses due to the high prices of tankers and facilities and polluting the environment with poisonous materials. Any possibilities of decreasing risk and increasing safety are very important (Paulauskas, 2009).

The main main safety factors affecting ship berthing at port docks are: working concentration, the condition of mooring lines, emergency response, port policy of improving business and berth length (Hsu, 2015). In marine applications, single point or spread mooring systems are used for providing temporary berthing of vessels. It is suggested that pile anchors and suction anchors can be used depending on the water depth. The influence of parameters like mooring chain inclination, consistency of the clayey soil in the seabed and anchor embedment

ratios on pullout capacity has been brought out by testing model. Tests were carried out on single pile, 2-pile, 4-pile anchors made out of pipe piles of 25.4 mm dia with length to diameter ratios, L/D of 10, 14 and 18 and model suction anchors (closed-top caisson) of 113 mm dia with $L/D = 2$, 3 and 4. These were installed in a model test bed made out of soft marine clay. The results indicate that in respect of pile anchors as of the chain inclination changes from horizontal to vertical direction, the pullout resistance shifts from passive earth pressure to skin friction. The results in respect of suction anchors can be interpreted in terms of various components (Elvesier, 2014).

The unmooring —the loss of one or both anchors—of multilingualism are myriad and are occurring at the levels of self and personhood, kinship and family, community, work, environment, market, politics (local/global). All of these aspects have attracted considerable scholarly attention (Adejunmobi 2004; Fishman 2001; Kelly and Jones 2003; Kramsch 2009; Phipps 2007; van Lier 2004) although the discussion focused on the geopolitical questions and on professional academic insecurities of loss, unmoored, split apart in the tossing and turbulence and flotsam and jetsam which create migration and mobility. The unmooring, with their contradictions, creative forms and emerging symbolic systems are experienced multilingually (Kramsch, 2009).

Considering the literature and studies of Ohde and Thomas (2012); Ingold (2011); Elsevier (2014); Adejunmobi (2004); Fishman (2001); Kelly and Jones (2003); Kramsch (2009); Phipps (2007); Van Lier(2004) that centered on the risk factors and safety in mooring. However,

Elvesier (2014) mentioned that there are numerous diverse papers that have addressed issues within maritime safety; to date there has been no comprehensive review of this literature to aggregate the causal factors within accidents in shipping and surmise current knowledge. More likely, it was observed that there was dearth of local literature and studies. Similarly, it was noted then that no study yet conducted concerning the respondents from Marlow Navigation Phils., Inc.(MNPI).

Although there are many studies conducted along the risk factors and safety practices involving mooring operations, there is still a need to improve the structure of the study. In view

of the identified gaps, the researchers determined the risk factors and safety practices during mooring operations berthing along side pier.

As a descriptive research, consider for the independent variables the respondents' profile in terms of year on board and position and rank as the risk factors involved during mooring operations while the dependent variable consider the safety practices of seafarers during mooring. With such realization, this study which focused on the risk factors and safety practices during mooring operations as perceived by chosen respondents comprising of merchant mariner officers, seafarersand able bodies seaman from Marlow Navigation Phils, Inc (MNPI) was very timely. Specifically, the study attempted to answer the following sub problems: (1) What is the profile of the respondents along years on board and position or rank? (2) What are the risk factors involved during mooring operations? (3) What are the respondents' safety practices during mooring? (4) Is there a significant difference in the respondents' safety practices during mooring when respondents were grouped according to profile variables? and (5) Is there a significant relationship between the risk factors and safety practices involved during mooring operations?

Methods

This study utilized descriptive research design which tug assistance in ports for increasing ship maneuverability, mooring and unmooring operations is a very important issue. Taylor and Francis (2011) stressed the increased possibilities, advantages and disadvantages as well as work methods for tugs that must be carefully studied, evaluated and practically applied.

The primary sources of data originated from the one hundred (100) seafarers of the Marlow Navigation Philippines, Inc (MNPI) chosen as respondents through convenience sampling technique. A self-made questionnaire consisting of three parts to determine the profile of respondents, risk factors and safety practices during mooring was utilized in the process. Part I dealt with the profile of the respondents', Part II uncovered the risk factors during mooring operations while Part III focused on safety practices during mooring operations. The questionnaire was validated by the panel of experts in research, statistics, and maritime education with all suggestions and comments well noted and considered.

The 4-point Likert Scale which reflected the assigned points for its corresponding categorical responses (4- Strongly Agree, 3- Agree, 2- Disagree and 1- Strong Disagree) was created to measure the respondents' feedback. For in-depth treatment of the data gathered, the frequency, percentages and weighted mean were computed from the average responses of the respondents, then interpreted and further ranked. T-test and pearson r were established to identify the relative significance of risk factors and safety practices during mooring operations.

The researcher conformed to the ethical standards through series of communication. Likewise ensure that the purpose and importance of the study was clearly explained and understood by the respondents so as not to be intimidated in providing the much needed information. Moreover, the researcher assured the respondents that whatever feedback drawn from the study has nothing to do with their work and salary grade performances and everything will be held in strict confidentiality. The activity was conducted with prudence to ensure 100 percent retrieval of accomplished questionnaires. The answered questionnaires were tallied, tabulated, and subjected to quantitative analysis using frequency and percentages, weighted mean, t-test and Pearson r for the statistical treatment and interpretation.

Results and Discussion

The researcher aimed on the risk factors and safety practices involved during mooring operations encountered by the seafarers; thus, focused to answer the following sub-problems: (1) What is the profile of the respondents along years on board and position or rank? (2) What are the risk factors involved during mooring and unmooring operations? (3) What are the respondents' safety practices during mooring and unmooring operations? (4) Is there a significant difference in the respondents' safety practices during mooring and unmooring operations when grouped according to profile variables? and (5) Is there a significant relationship between the risk factors involved and the respondents safety practices during mooring and unmooring operations?

1. Respondents' Profile

Table 1 reflects the profile of the respondents useful in the foregoing interpretation of results.

Table 1. Profile of the Respondents

Profile	Frequency	Percentage
Years on board		
Below 3	20	20.00
3-5	28	28.00
6-8	26	26.00
9 and above	26	26.00
Position or rank		
Able Seaman(AB)	29	29.00
Ordinary Seaman(OS)	20	20.00
2nd Officer	17	17.00
3rd Officer	11	11.00
Master/Captain	9	9.00
Chief Mate	5	5.00
Deck Cadet	4	4.00
Chief Engineer	2	2.00
2nd Engineer	1	1.00
4th Engineer	1	1.00
Boat Swain	1	1.00
Total Number of Respondents = 100		

Table 1 presents the profile of the respondents', showing there were twenty (20) respondents or 20% that had been on board below 3 years, twenty eight (28) respondents or 28% who had been on board for 3- 5 years while twenty six (26) respondents or 26% had been on board for 6 - 8 years and 9 and above. As to position or rank, twenty nine (29%) of the respondents were able bodied seamen (AB) position while twenty (20%) were ordinary seamen (OS) while fifty one (51%) were officers.

A well-trained and familiarized crew is an integral component of operating a safe ship with which each crew member has a personal responsibility to be acquainted with their ship. The master shall ensure that all importatn factors affecting safe mooring of the vessel throughout the duration of port stay are monitored and properly recorded (Ferguson, 2000 and IMO International Safety Management, ISM Code (2010)).

2. Risk Factors involved in Mooring and Unmooring Operations

Table 2 displays the indicators used to evaluate the risk factors involved during mooring and unmooring operations

Table 2. Risk Factors Involved During Mooring and Unmooring Operations

Indicators Improper handling of mooring and unmooring might result to accident such as	Weighted Mean	Verbal Interpretation	Rank
1. Twisted back resulting to subsequent pain	3.63	Strongly Agree	7.5
2. Damage to the Ship's Fitting	3.80	Strongly Agree	2
3. Severed fingers	3.78	Strongly Agree	3
4. Swelling and minor abrasion	3.63	Strongly Agree	7.5
5. Tendon damage to the shoulder	3.60	Strongly Agree	9
6. Falling from height	3.68	Strongly Agree	5
7. Losing of hearing and vision	3.66	Strongly Agree	6
8. Fall in to the water	3.77	Strongly Agree	4
9. Fractured the skull	3.54	Strongly Agree	10
10. Cause of death	3.83	Strongly Agree	1
Average Weighted Mean	3.69	Strongly Agree	

Foregoing table 2 reflects the risk factors involved during mooring and unmoorirng operations. The respondents strongly agreed on indicator #10 which stated that "Cause of Death" with a weighted mean 3.83 and ranked 1st. Likewise, strongly agreed on indicator #2 which stated "Damage to the Ship's Fitting" obtained a weighted mean of 3.80 and ranked 2nd and indicator #3 which stated "Severed fingers" obtained a weighted mean of 3.78 and ranked 3rd. Similarly, the respondents strongly agreed with indicators #1 and #4 which stated "Twisted back resulting to subsequent pain" and "Swelling and minor abrasion" obtained a weighted mean of 3.63 and ranked 8th while indicator #5 which stated "Tendon damage to the shoulder" obtained a weighted mean of 3.60 and ranked 9th. Lastlym indicator #9 which stated "Fractured the skull" obtained a weighted mean of 3.54 and ranked 10th. To sum up, all the indicators on risk factors involved during mooring operations had an average weighted mean of 3.69 and interpreted as Strongly Agree. From the summary of results, the respondents affirmed that certain ideals on how improper handling of mooring might yield to accidents and fatalities.

As cited in the Naval history (2011) fatalities and accidents revolving around the U.S. Navy's handling rigid airships on the ground -- entering and leaving a hangar, mooring and unmooring -- was difficult, manpower-intensive, and dangerous. The attempt of Los Angeles (ZR-3) to land aboard the carrier Saratoga (CV-3) whereby one of the many sailors helping out

on the flight deck failed to let go of the control car's handrail when the airship suddenly rose. After going up about 100 feet, the seaman lost his grip, fell back to the deck, and later died of complications from the accident.

The Akron's tail began rising with her nose secured at the mooring mast while venting helium, five tons of ballast was accidentally discharged and the ship became uncontrollable. The ship's captain, shouted for ground crewmen to let go of mooring lines, and the cable to the mast was cut. But when it shot 1,000 feet skyward, three sailors who had failed to let go of their lines were carried aloft. Two fell to their deaths, and the third was able to secure himself to his line until hauled aboard the airship. Another casualties noted was when the mooring line pulled the victim's left hand down against the steel cleat," noted the ship's medical personnel, "hyper extending his arm and causing mild damage to tendons and ligaments.

As noted from the complied news (LP news, 2009) enumerated casualties and injuries meted during mooring operations: two seafarers killed when struck by a parting mooring lines, crewmember in come when struck in the head by a parting mooring line, 3//O sustained 90% partial amputation of leg and fructured elbow, A/B suffered a fractured hip when struck by a parting mooring line, both legs broken when struck by a parting mooring line and C/O killed when tow-line to barge parted and snapped back. Whilst mooring injuries are the seventh most frequent cause of personal injuries in the UK Club and the third most expensive per claim indicating how horrific some of these injuries can become (LP News, 2009). The above cited casualties shown that improper handling of mooring might result to accidents.

It is gleaned from the foregoing data that high risk occurs during mooring and unmooring, thus, well trained personnel must be responsible.

3. Safety Practices during Mooring and Unmooring Operations

   Table 2 displays the indicators used to evaluate the safety practices during mooring and unmooring operations

Table 3. Safety Practices during Mooring and Unmooring Operations

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. The communication equipment connecting the bridge and the mooring stations should be carefully tested.	3.90	Strongly Agree	1
2. The supervision and operation of the winches should be entrusted to an experienced crew member	3.53	Strongly Agree	10
3. The officers in charge should have an unobstructed view of the situation at all times	3.69	Strongly Agree	8
4. The crew should wear appropriate protective clothing, including reflecting overalls, helmets, safety shoes, safety goggles and gloves.	3.64	Strongly Agree	9
5. All tools and equipment used should be regularly inspected and maintained.	3.76	Strongly Agree	2
6. All of the mooring gear's movable parts should be clean, free, unobstructed and properly greased.	3.73	Strongly Agree	4.5
7. All ropes and warps should be recently inspected and in good condition.	3.73	Strongly Agree	4.5
8. Mooring equipment falls allowing vessel to move resulting passenger falling into the sea	3.70	Strongly Agree	7
9. Be aware that, despite proper care, control and maintenance, ropes may snap at any time.	3.71	Strongly Agree	6
10. Crew members can avoid these potential hazards by becoming familiar with the danger zones on deck.	3.74	Strongly Agree	3
Average Weighted Mean	3.71	Strongly Agree	

Table 3 shows the respondents' safety practices during mooring and unmooring operations. The respondents strongly agreed on indicator #1 which stated that "The communication equipment connecting the bridge and the mooring stations should be carefully tested" with a weighted mean 3.90 and ranked 1st. Likewise, strongly agreed on indicator #5 which stated "All tools and equipment used should be regularly inspected and maintained" with a weighted mean of 3.76 and ranked 2nd.and on indicator #10 which stated "Crew members can avoid these potential hazards by becoming familiar with the danger zones on deck" obtained a weighted mean of 3.74 and ranked 3rd. Similarly, the respondents strongly agreed on indicator #3 which stated "The officers in charge should have an unobstructed view of the situation at all times" with a weighted mean of 3.69 and ranked 8th while indicator #4 which stated "The crew should wear appropriate protective clothing, including reflecting overalls, helmets, safety shoes, safety goggles and gloves" obtained a weighted mean of 3.64 and ranked 9th. Lastly, indicator #2 which stated "The supervision and operation of the winches should be entrusted to an experienced crew member" obtained a weighted mean of 3.53 and ranked 10th. Over-all, the

respondents' safety practices during mooring operations got an average weighted mean of 3.71 and interpreted as strongly agree. This means that the respondents concur that certain ideals on safety practices during mooring and unmooring operation is deem important.

Gravesen (2010) emphasized that the vessel master remains responsible not only for the safety of his crew onboard, but also with the supervision while undergoing mooring and unmooring operations. Likewise, he is the one responsible for the provision of their Personnel Protective Equipment or PPE. Similarly, Elvesier (2014) revealed the relative contributions of individual and organizational factors in shipping accidents as well as the interventions to make shipping safer. Endowed with the knowledge and skills, a seafarer can affirms that he is ready one pace ahead to execute safety aboard the ship which is in in compliance with Procedures for Watchkeeping in port, Procedures for Navigational Watchkeeping and Procedures for Watchkeeping in Engine Room and others mentioned in the ship specific "Standing Orders". (Shipsbusiness.com/ships-crew-familiarization - training-onboard, 2009).

During deboarding of a passenger ship, the mooring rope tend to rupture (Valet, 2013), thus, preventive measures should target fatalities during mooring and towing operations. Internationally, most shipping fleets have over time experienced large decreases in fatal accident rates (Roberts, 2014). Similarly, Paulauskas (2009) stressed that accidents with SPM equipment and ships occurring during loading or unloading operations are very dangerous and may cause serious losses due to the high prices of tankers and facilities and polluting the environment with poisonous materials. To avoid mooring system failure, selecting an appropriate breaking strength for mooring lines is becoming an important issue in marine aquaculture industry (Hua, 2010). It is understood that mooring equipment onboard shall be maintained in good working condition so as to secure safety in mooring operations.

4. Difference in the Respondents' Safety Practices during Mooring and Unmooring Operations when grouped according to Years on Board

Table 4 depicts the difference in the safety practices during mooring and unmooring operations when respondents' were grouped according to years on board

Table 4. Difference in the Respondents' Safety Practices During Mooring and Unmooring Operations when grouped according to Years on Board

Years on board	Mean	Test Statistic	Interpretation
Below 3	3.63		
3 – 5	3.74	F=1.014	Not Significant
6 – 9	3.74	P=0.390	
9 and above	3.72		
Significance level @ 0.05			

Table 4 displays the difference in the respondents' safety practices during mooring and unmooring operations when grouped according to years on board. The obtained p – value of 0.390 was higher than the level of significance set at 0.05. As gleaned from the results, no significant difference was noted which means that regardless of respondents' number of years on-board, they have exhibited the same safety practices during mooring operations.

When KRVE started in 1895, all mooring and unmooring was done by hand and with small rowing boats, now, though KRVE has about 60 launches to work with, still much of the works were done by hand. This task is very tough one that's why KRVE educates pupils up to fully certified mooring men who turn to be very innovative when it comes to mooring systems (Krve, 2014).

5. Relationship between the Risk Factors and the Respondents' Safety Practices in Mooring and Unmooring Operations

Table 5 exhibits the relationship between the risk factors and safety practices during mooring and unmooring operations.

Table 5. Relationship between the Risk Factors and Safety Practices during Mooring and Unmooring Operations

Indicators	Test Statistics	Interpretation
Risk factors and Safety Practices	R = 0.419** Moderate correlation P = 0.000	Significant
**Significant @ 0.01		

Table 5 shows the relationship between the risk factors and safety practices during mooring and unmooring operations. As shown on the foregoing table, the obtained r - value of 0.419 is higher compared with the significant value of 0.01. This affirms that a significant relationship between the risk factors and the respondents' safety practices during mooring and unmooring operations exist. This means that the more the respondents recognize the risk factors,

the more likely they observe safety practices during mooring and unmooring operations. With such, we may say there will be least occurrence of casualties while berthing alongside pier.

CONCLUSION

Based on the salient findings of the study, the following conclusions were deduced: (1) There is large percentage of the respondents had been on board for 3-5 years and held position of able seamen, (2) The respondents recognized the risk factors involved during mooring operations, (3) The respondents observed safety practices during mooring operations, (4) The respondents had the same safety practices during mooring operations regardless of years spent onboard the ship, and (5) The more the respondents recognize the risk factors, the more they observe safety practices during mooring operations.

Evidently, respondents exhibited similarity in considering "cause of death" as the leading risk factors involved during the mooring operations at the ship. This is further reaffirmed by the majority of seafarers who considered "the communication equipment connecting the bridge and the mooring stations should be carefully tested" as safety practices during mooring operations should be given much attention and emphasis. The "strongly agree" feedback generated by the respondents on the risk factors and safety practices during mooring operations are already good start to review closely the issues.

DIRECTION FOR FUTURE USE

At its ends, the outcomes of this study might consider the following recommendations: (1) the company or institution should provide seminars/trainings for the seafarers to further enhance their safety practices in mooring and other relevant operations, (2) Seafarers should expound their skills on safety practices in mooring considering that the learning is a continuous process leading to best people establishing best practices, (3) Future researchers may conduct a similar study that would verify the results of this research. Furthermore, suggested that a modification and inclusion of other variables or factors be considered in future.

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