

# Shipboard Training Performance of Cadets in one Maritime Academic Institution in the Philippines

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**Abstract** – *The shipping industry requires knowledge, technique, and experience for safety and proper handling of ships. As such, hands-on/practical experience is needed by would-be seafarers to acquire the necessary skills and competencies before they graduate from maritime institutions. This study aims to analyze the shipboard training performance of the Philippine Merchant Marine Academy cadets during their shipboard training according to their type of vessel and competency. Documentary analysis and key informant interviews were used to assess the problem-at-hand. According to their type of vessel, Bachelor of Science in Marine Transportation (BSMT) cadets who have their training in tanker ships have the highest performance with an average grade of 83.68 while Bachelor of Science in Marine Engineering (BSMarE) cadets who were under bulk ships have the highest rating of 79.28. On the other hand, BSMT cadets got the highest grade in Operation of the Ship and Care of Person Onboard with 82.72 while BSMarE cadets achieved the highest rating of 81.77 on Engine Operation. Results also showed that there is no significant difference between the shipboard performances of the cadets according to their type of vessel. The cadets' performance during their shipboard training ranges from Satisfactory to Good only, thus, as a recommendation, the institution should strengthen the established monitoring system to measure the progress of the cadets' shipboard training and upgrade its equipment for bridge and engine simulators to ensure they excel in their respective duties. Findings of the study will be of benefit to Philippine maritime institutions as it will serve as a basis to upgrade or enhance the status of maritime education and training especially shipboard training to adhere to the recent developments in maritime industry.*

**Keywords** – *shipboard training, maritime education, performance, Philippines*

## INTRODUCTION

Shipboard training program is a planned and structured program of training designed to assist a prospective seafarer candidate to achieve the standard of competence in accordance with the table of competence of the Standards of Training, Certification, and Watchkeeping for Seafarers (STCW) Code which include all seafarers, maritime industry stakeholder, maritime higher education institutions, maritime training institutions, and other entities concerned (Maritime Industry Authority, 2014).

The International Convention on STCW 1978 sets the minimum qualification standard for all seafarers onboard seagoing vessels. It was adopted in 1978 and entered into force by 1984 when the condition that it needs to be ratified by 25 nations, wherein these nations had at least 25% of the gross world tonnage of ships 100 gross tons or more was met (Maritime Skills Academy, 2019). It was later amended in 1994 and

2010 to include latest developments in the maritime industry as well as it also added security training due to increased problems with the hijacking of ships by pirates.

The 1978 STCW Convention established the minimum basic requirements on training, certification, and watchkeeping for seafarers on an international level. Previously, the minimum standards were set by individual governments which do not refer to practices in other countries. As a result, occasional issues arise as the minimum standards and procedures varied.

In the country, the Philippine Merchant Marine Academy (PMMA), the state's premier maritime higher education institution requires one-year shipboard training to students who are in their 3<sup>rd</sup> year of schooling. The minimum period of shipboard training, as prescribed by Commission on Higher Education Memorandum Order No. 20 s-2015 is 12 months or 1 year, ; 6 months of which must be spent on

supervised Bridge Watchkeeping Duties for Deck Cadets or Engine Watchkeeping for Engine Cadets; or for Bachelor of Science in Marine Transportation (BSMT) cadets, approved seagoing service not less than 36 months which involves the performance of bridge watchkeeping duties in a position other than a cadet or apprentice (eg. able seafarer, ordinary seaman, quarter-master, boatswain) under the supervision of the master or a qualified officer for a period of not less than six (6) months; for Bachelor of Science in Marine Engineering (BSMarE) cadets, a combined workshop skill training and an approved seagoing service not less than 36 months of which not less than 30 months will be seagoing service in the engine department, which involves the performance of engine-room watchkeeping duties in a position other than a cadet or apprentice (eg. able seafarer, engine, wiper, oiler, motorman, pump man) under the supervision of the chief engineer officer or a qualified engineer officer for a period of not less than six (6) months. The cadets' shipboard training shall be documented through the service record issued by the shipping/manning company to the cadet concerned.

Mendoza, Espiritu, and Devanadera (2004, cited in Ching, 2017) stated that the Philippine maritime education and training institutions are capable of producing an adequate number of graduates who will become officers in the future. Thus, the shipboard training is seen as an important component of maritime education and training curriculum as it is aimed to train students to become qualified and competent officers in an ever-changing and globally competitive maritime industry.

Moreover, the study of Sevilla and Arceño (2017) revealed that maritime students who have undergone shipboard training were qualified in terms of personal quality and professional knowledge. In addition, they were able to perform their tasks onboard as well as performed their jobs well regardless of the type of ship they have boarded on.

Further, Nam (2014) reiterated that shipboard training is required for an efficient maritime education. With the advent of automation, there has been a decrease in the number of crews onboard. Thus, marine officers need more capabilities than before to carry out multiple tasks and operate the latest technologies onboard.

This study aimed to analyze the performance of PMMA cadets during their shipboard training.

Specifically, it seeks to: (1) determine the performance of BSMT and BSMarE cadets in terms of type of vessel and competency; (2) analyze the significant difference between the cadets' shipboard training performance according to type of vessel; and (3) propose suggestions on how to improve the shipboard training performance of PMMA cadets.

## METHODS

The study used descriptive quantitative method to determine the problem-at-hand. The grades of the cadets during their shipboard training were collected from the Office of the Registrar. To supplement this, semi-structured key informant interview was conducted to verify the results of the study. Respondents during the key informant interview were briefed on the purpose of the study and subsequently signed an informed consent form.

The respondents were fifty-six (56) BSMT and seventy-seven (77) first class (4<sup>th</sup> year) cadets. They were categorized in terms of the type of vessel they have boarded on:

Table 1. Number of Respondents per Type of Vessel and Course

Type of Vessel	BSMT	BSMarE	TOTAL
Bulk	28	30	58
Carship	5	8	13
Tanker	23	39	62
<b>TOTAL</b>	<b>65</b>	<b>77</b>	<b>133</b>

On the other hand, the grades of the cadets were based on the PMMA grading system (see table below). To analyze the data collected, mean and analysis of variance were used.

Table 2. PMMA Grading System

Percentage	Scale	Qualitative Interpretation
100%	1.00	Excellent (A)
95% – 99%	1.25	
90% – 94%	1.50	Very Good (B)
85% - 89%	1.75	
80% - 84%	2.00	Good (C)
75% - 79%	2.25	
70% - 74%	2.50	Satisfactory (D)
65% - 69%	2.75	
60% -64%	3.00	Pass (E)
0 – 49%	5.00	Fail (F)

**RESULTS AND DISCUSSION**

Table 3. Shipboard Training Performance of BSMT Cadets per Type of Vessel

Type of Vessel	Average Grade	QI	RANK
Bulk	81.69	Good	2
Carship	79.13	Good	3
Tanker	83.68	Good	1
<b>Total Average</b>	<b>82.28</b>	<b>Good</b>	

Table 3 shows the performance of BSMT cadets on their shipboard training according to type of vessel they boarded. Those who boarded tanker vessels got the highest performance with 83.68% average grade, followed by those who boarded the bulk vessels with 81.69% average grade. Conversely, those who boarded car ship vessels got the lowest grade of 79.73%.

According to the interviews conducted, cadets' onboard tanker vessels were trained to always listen attentively and cooperate to higher officials onboard in terms of operational and navigational duty because tanker vessel is very complicated and there are a lot of safety parameters onboard. Cadets are well taught of safety and officer duties and responsibilities by regularly conducting safety drills and fire inspection, man overboard and rescue operations. Further, they also have computer-based training onboard. Computer-based training such as virtual reality (VR) has been used onboard to simulate environment that can be effectively used for training and mission rehearsal for shipboard firefighting (Tate, Sibert, & King, 1997) or as a mission planning tool (Rosenblum, et.al., 1996).

Table 4. Shipboard Training Performance of BSMarE Cadets per Type of Vessel

Type of Vessel	Average Grade	QI	RANK
Bulk	79.28	Good	1
Carship	76.82	Good	2
Tanker	76.31	Good	3
<b>Total Average</b>	<b>77.52</b>	<b>Good</b>	

Table 4 shows that BSMarE cadets who boarded bulk ships got the highest average grade with 79.29% while those who boarded in car ship got the next highest rating of 76.82%. Consequently, those who have boarded tanker vessel got the lowest average grade of 76.83%.

The ICL BSMarE cadets are also more exposed to engine works such as maintenance of ship's equipment and machineries rather than those regarding the operation of electronic or electrical control systems. The engine cadets have also minimal knowledge on the

control systems compared to ship's maintenance and repair since the former were already taken during the first two years in the Academy while the latter will only be taken up during the last year (1<sup>st</sup> class) (PMMA BSMarE Curriculum).

Table 5. Shipboard Training Performance of BSMT Cadets per Competency

Competency	Average Grade	QI	RANK
Navigation	81.76	Good	3
Cargo Handling and Stowage	82.40	Good	2
Operation of The Ship and Care of Person Onboard	82.72	Good	1
<b>Total Average</b>	<b>82.29</b>	<b>Good</b>	

Table 5 shows that ICL BSMT cadets have the highest average performance on Operation of the Ship and Care person with a grade of 82.72% while cargo handling and stowage has a grade of 82.40% and navigation got the lowest rating with a grade of 81.76%.

The BSMT ICL cadets regardless of type of vessel they have boarded showed that they performed well in competency for Operation for the Ship and Care person since some cadets spent most of the time for deck works and ship maintenance. Thus, they are exposed in cargo operations and ship maneuvering and regularly conducting safety drill and well informed of safety procedures onboard. During their shipboard training, deck cadet-trainees were given tasks under navigation at the operational level such as planning and conducting a passage and determining position, use of RADAR & ARPA to maintain safety of navigation, maneuvering of the ship including use of available information as to ship's turning and stopping, and steering the ship using compass by day and night. On the other hand, cargo handling and stowage operations that they have accomplished onboard include monitoring the loading, stowage, securing, and unloading of cargoes and their acre during voyage (Paragga, et.al., 2015).

Table 6 shows that BSMarE cadets performed well on Engine Operation with an average grade of 81.77% while Marine Engineering System got the next highest rating of 77.99%, then Maintenance and Repair with average grade 77.99%. Finally, the competency on Electrical/Electronic Control System got the lowest rating with an average grade of 73.94%.

Table 6. Shipboard Training Performance of BSMarE Cadets per Competency

Competency	Average Grade	QI	RAN K
Marine Engineering System	77.99	Good	2
Electronic/Electrical Control System	73.94	Satisfactor y	4
Maintenance & Repair	76.44	Good	3
Engine Operation	81.77	Good	1
<b>Total Average</b>	<b>77.54</b>	<b>Good</b>	

According to respondent, the 1CL BSMarE cadets are also more exposed to engine works such as maintenance of ship's equipment and machineries rather than those regarding the operation of electronic or electrical control systems. The engine cadets have also minimal knowledge on the control systems compared to ship's maintenance and repair, the units regarding since these subjects were taken up in their first two years before their shipboard training while the subject covering electronic/electrical control system will be taken on their 1st Class years after their shipboard training (PMMA BSMarE Curriculum).

Table 7. Significant Difference between the Shipboard Training Performance of BSMT Cadets according to Type of Vessel

Source of Variation	SS	df	MS	F	P-value
Between Groups	104.74	2	52.3735	3.155875	0.050709
Within Groups	879.56	53	16.59556		
<b>Total</b>	<b>984.31</b>	<b>55</b>			

*F-critical: 3.171626*

Using one-way ANOVA, results showed that there is no significant difference between the shipboard performance of BSMT cadets in terms of type of vessel ( $F = 3.16$ ,  $p = 0.051$ ). This implies that the shipboard performance of those in bulk ships ( $81.69 \pm 3.72$ ), tanker ships ( $83.68 \pm 4.32$ ), and car ships ( $79.13 \pm 6.72$ ) do not vary.

This simply means that all cadets from BSMT do not vary any type of vessel they boarded. According to the respondents they were more attentive to the work or job they are intended to do and accepted and do not care what type of vessel they are going to board because it is the company per se who chooses.

Table 8 reveals the significant difference between the Shipboard Training Performance of BSMarE Cadets according to Type of Vessel.

Table 8. Significant Difference between the Shipboard Training Performance of BSMarE Cadets according to Type of Vessel

Source of Variation	SS	df	MS	F	P-value
Between Groups	153.53	2	76.76356	2.876999	0.062623
Within Groups	1974.46	74	26.68182		
<b>Total</b>	<b>2127.98</b>	<b>76</b>			

*\*F-critical: 3.12034851*

Accordingly, using one-way ANOVA, results showed that there is no significant difference between the shipboard performance of BSMarE cadets in terms of type of vessel ( $F = 2.88$ ,  $p = 0.062$ ). This implies that the shipboard performance of those in bulk ships ( $79.28 \pm 4.75$ ), tanker ships ( $76.31 \pm 5.72$ ), and carships ( $76.82 \pm 3.27$ ) do not vary.

BsMarE cadets stated that they are more focused and gave attention to the works or jobs they had to do rather than the type of vessel they are going to board.

### Suggestions on Improvement of Shipboard Training Performance of Cadets

The respondents stated that the shipboard training performance of cadets may be improved by ensuring a more updated training program in which the latest technologies and techniques will be taught to them prior on-boardship especially on electronic and electrical control system (engine cadets) and navigation (deck cadets). In addition, the shipboard training of cadets onboard should be monitored by the Department of Shipboard Training to ensure the high performance of the cadets onboard. Lastly, the use of simulators and equipment should be made more often to cadets to use so that they can familiarize the system and function which is essential in navigational/engine watch keeping.

### CONCLUSION AND RECOMMENDATION

Shipboard training is indeed a crucial part in ensuring that maritime higher education institutions produce quality and competent future marine officers. Findings of this study revealed that most of the BSMT and BSMarE respondents got a "good" performance during their shipboard training. On the other hand, there is no significant difference between the shipboard training performances of BSMT and BSMarE in terms of type of vessel they have boarded on. In addition, respondents mentioned that shipboard training performance can be improved by using simulators and equipment to familiarize the cadets on the operations

that are conducted during navigation and engine watch keeping as well as monitoring of cadets onboard should be done so that cadets as well as the Department of Shipboard Training of the Academy will know the progress of their training and if the program for them has been followed. Finally, subsequent study on curriculum mapping vis-à-vis shipboard training performance of cadets may be explored in order to provide recommendations on what specific subjects may be taught prior to cadets' shipboard training. This will ensure that the cadets will gain the necessary knowledge and skills before they go onboard, which will ultimately improve their shipboard training performance.

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