INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY: APPLIED BUSINESS AND EDUCATION RESEARCH
2024, Vol. 5, No. 7, 2651 – 2670
http://dx.doi.org/10.11594/ijmaber.05.07.23

Research Article

Evaluation of the MARPOL 73/78 Surveyor Training Course Towards its Enhancement

Anthony T. Sevilla II*

Department of Maritime Education and Training, Philippine Merchant Marine Academy, Manila, Philippines

Article history:
Submission 30 June 2024
Revised 07 July 2024
Accepted 23 July 2024

**Corresponding author:*
E-mail:
atats7@gmail.com

ABSTRACT

This thesis investigated the effectiveness of the MARPOL 73/78 Surveyor Training Course offered by Oceanwide Maritime Services Corp. and identified potential areas for enhancement. The study assessed course content, instructor qualifications, delivery methods, facilities, equipment, and learning assessment using Kirkpatrick's Model. It engaged 110 maritime professionals through structured questionnaires and client satisfaction surveys. Findings indicated that the course was highly effective in terms of content, instructor qualifications, and assessment methods while teaching materials and course duration received lower scores. Recommendations included updating course content, increasing hands-on training, upgrading facilities, diversifying delivery methods, enhancing assessment techniques, extending course duration, and providing support for complex topics. In conclusion, the MARPOL 73/78 Surveyor's Training Course is highly effective but needs improvements in teaching materials, course segments, and regular content updates to maintain training quality and relevance.

Keywords: *MARPOL 73/78, Surveyor Training, Maritime Education, Marine Pollution Prevention*

Introduction

In recent years, the International Maritime Organization's (IMO) Marine Pollution (MARPOL) Convention has risen to prominence as a critical instrument in the global fight against marine pollution. Established in 1973 and subsequently amended by the Protocol of 1978, MARPOL 73/78 aims to minimize pollution from ships by regulating the discharge of oil, noxious liquid substances, harmful substances in packaged form, sewage, garbage, and air pollution. The convention is structured around six annexes, each addressing a different source of ship-generated pollution, thereby offering a comprehensive approach to marine environmental protection.

The Philippines, as an archipelagic nation with a vast maritime industry, bears significant responsibility in adhering to MARPOL stand-

How to cite:
Sevilla II, A. T. (2024). Evaluation of the MARPOL 73/78 Surveyor Training Course Towards its Enhancement. *International Journal of Multidisciplinary: Applied Business and Education Research*. *5*(7), 2651 – 2670. doi: 10.11594/ijmaber.05.07.23

ards. The country's commitment to implementing these regulations is crucial for safeguarding its marine ecosystems and contributing to global environmental conservation efforts. The Philippine Coast Guard (PCG) and the Maritime Industry Authority (MARINA) are the primary bodies responsible for ensuring compliance with MARPOL regulations among vessels operating within Philippine waters.

Oceanwide Maritime Services Corp. (Oceanwide) plays a pivotal role in this regulatory framework by offering the MARPOL Surveyor Training Course. This course is designed to equip maritime professionals with the necessary knowledge and skills to conduct thorough inspections and ensure vessel compliance with MARPOL standards. The training program is structured in accordance with the Philippine Coast Guard's Standard Operating Procedure 02-22, which outlines the guidelines and procedures for the training of MARPOL surveyors.

The MARPOL 73/78 Surveyor Training Course encompasses various critical components, including an introduction to MARPOL, the requirements of the convention and national regulations, potential risks and impacts of shipping on the marine environment, marine pollution surveying, discharge criteria for oil (Annex I) and sewage (Annex IV), inspection protocols, and the issuance of Oil Pollution Prevention Certification (OPPC) and Sewage Pollution Prevention Certificate (SPPC). By integrating theoretical knowledge with practical exercises, the course aims to prepare surveyors for the complex task of ensuring compliance with environmental regulations.

This study evaluates the effectiveness of the MARPOL 73/78 Surveyor Training Course provided by Oceanwide Maritime Services Corp., with a particular focus on its content, instructor qualifications, delivery methods, facilities, equipment, and learning assessment techniques. Through structured questionnaires and client satisfaction surveys, the study engages maritime professionals to gather insights on the course's impact on their professional competencies and overall satisfaction. The findings of this research are intended to identify areas for enhancement and contribute to the continuous improvement of maritime training programs, ultimately promoting safer and cleaner seas.

Methods

Research Design

This study employed a convergent parallel mixed-method design, combining quantitative and qualitative approaches. The quantitative phase used a descriptive research design with survey forms including Likert scale questions. The qualitative phase involved in-depth interviews and open-ended surveys to gather detailed insights into experiences and perceptions.

Respondents

Participants included MARPOL 73/78 Surveyors, Instructors, Philippine Coast Guard officers, MARPOL Survey Clients, Classification Society representatives, and MARPOL 73/78 Surveyor's Course Providers. The distribution of respondents and their qualifications are shown in Tables 1 and 2, respectively. Purposive sampling was used to select individuals with relevant experience and knowledge.

Table 1. Distribution of respondents by category

Category	Number of Respondents
MARPOL 73/78 Surveyors	10
MARPOL 73/78 Surveyor's Course Instructors	10
Philippine Coast Guards	15
OMSC MARPOL Survey Clients	10
Classification Society	10
International MARPOL 73/78 Surveyor's Course Providers	5

Table 2. Respondent groups and their qualifications

Category	Qualifications
MARPOL 73/78 Surveyors	5 yrs. field experience
MARPOL 73/78 Surveyor's Course Instructors	5 yrs. teaching experience
Philippine Coast Guards	District Officer and has direct MARPOL engagement
OMSC MARPOL Survey Clients	5 yrs. of association
Classification Society	5 yrs. of experience
International MARPOL 73/78 Surveyor's Course Providers	Offered the course in the past 5 yrs.

Ethical Considerations

Ethical standards were strictly followed, with permissions obtained from relevant authorities and respondents. Informed consent was provided, and participants were assured of confidentiality and the voluntary nature of their involvement.

Instrumentation

Two types of survey instruments were used: a quantitative survey with a four-point Likert scale for MARPOL 73/78 Surveyors, Instructors, PCG Officers, and Classification Society Representatives, and open-ended questions for MARPOL Survey Clients and other Maritime Training Institutions.

Validation of Instrument

Pre-testing with 30 respondents was conducted to ensure validity, and Cronbach's alpha was used to test reliability, resulting in a coefficient of 0.7738 as shown in Table 3.

Table 3. Validation of Instrument (Cronbach Alpha)

Item	Cronbach Alpha	STD. Alpha	G6	Ave R
All items	0.7336	0.7816	0.9586	0.1399

Data Gathering Procedure

Data were collected through online surveys using Microsoft Forms, following approval from the PMMA Graduate School. Additional data mining was performed on feedback from PCG supervisors collected in 2018 and 2023.

Data Analysis

Quantitative data were analyzed using MS Excel, focusing on mean values to determine perceptions of various aspects of the training course. Qualitative data were transcribed, coded, and analyzed to identify themes and patterns.

Result and Discussion

Surveyor Qualifications

The qualifications of the 10 MARPOL Surveyors participating in this study provided valuable insights into the effectiveness of the MARPOL Surveyors Training Course, as presented in Table 4. The majority of surveyors (60%) were aged 45-54, with 20% aged 35-44, indicating a predominance of mid to late-career professionals in the field. Most surveyors (80%) held a bachelor's degree, with 10% holding a master's degree and another 10% holding a doctorate. This demonstrates a high level of educational attainment among the participants. In terms of experience, all surveyors had 5-14 years of experience as marine surveyors, although 70% had less than 5 years specifically as MARPOL surveyors. This suggests that while they are experienced in general marine surveying, many are relatively new to the specific requirements of MARPOL surveying.

Table 4. Surveyors Qualifications (Frequency and Percentage)

Qualifications	Frequency	Percentage
Age		
25-34	1	10
35-44	2	20
45-44	6	60
55-64	0	0
Above 64	1	10
Total	**10**	**100**
Highest Educational Attainment		
Associate degree	0	0
Bachelor's degree	8	80
Master's degree		
- Completed	1	10
- With Units	0	0
Professional courses	0	0
Doctorate degree		
- Completed	0	0
- With Units	1	10
Total	**10**	**100**
Years experience as MARPOL Surveyor		
5-14 years	10	100
15-24 years	0	0
25-34 years	0	0
35-44 years	0	0
45-54 years	0	0
55-64 years	0	0
65 years or above	0	0
Total	**10**	**100**
Years experience as Marine Surveyor		
Less than 5 years	7	70
5-14 years	3	30
15-24 years	0	0
25-34 years	0	0
35-44 years	0	0
45-54 years	0	0
55-64 years	0	0
65 years or above	0	0
Total	**10**	**100**
Years experience in other maritime-related work		
Less than 5 years	0	0
5-14 years	4	40
15-24 years	3	30
25-34 years	3	30
35-44 years	0	0
45-54 years	0	0
55-64 years	0	0
65 years or above	0	0
Total	**10**	**100**

Assessment of the MARPOL 73/78 Surveyor's Course

The quantitative data were collected through a survey questionnaire administered to four groups of respondents: Surveyors (S), Course Instructors (I), Philippine Coast Guard Officers (P), and Classification Society Representatives (C). Each group provides critical insights into various aspects of the training program, including instructor qualifications, teaching methods, facilities, assessment techniques, and the duration of the course.

The means obtained from the analysis were interpreted according to a predefined scale: Strongly Disagree (SD) for scores ranging from 1.00 to 1.75, Disagree (D) for scores ranging from 1.76 to 2.50, Agree (A) for scores ranging from 2.51 to 3,.25, and Strongly Agree (SA) for scores ranging from 3.26 to 4.00.

Course Content

The course content, presented in Table 5, was evaluated by respondent groups. Surveyors rated the content highest, with a mean of 3.92 (Strongly Agree), indicating satisfaction with the comprehensiveness and relevance of the course material. Instructors also rated the content highly, with a mean of 3.68 (Strongly Agree), suggesting the material effectively covered essential topics. Philippine Coast Guard officers provided a positive rating, with a mean of 3.34 (Strongly Agree), but indicated some areas for improvement. Classification Society representatives rated the content similarly, with a mean of 3.35 (Strongly Agree), suggesting overall satisfaction but a need for better balance between theory and practical exercises.

Table 5. Evaluation of Course Content.

Statements	S		I	
	x̄	**VD**	**x̄**	**VD**
..1 The training program comprehensively addressed all key topics essential for MARPOL 73/78 surveyors, ensuring a thorough understanding of the convention's requirements and practical applications: (rate each topic)	3.80	SA	3.80	SA
.1 Introduction to MARPOL				
.2 Requirements of the Convention and the National Regulations	3.90	SA	3.80	SA
.3 Potential Risks and Impacts of Shipping on the Marine Environment	3.90	SA	3.80	SA
.4 Marine Pollution Surveying	4.00	SA	3.80	SA
.5 Annex I (Oil) Discharge Criteria	3.90	SA	3.80	SA
.6 Annex IV (Sewage) Discharge Criteria	3.90	SA	3.80	SA
.7 Inspections	3.90	SA	3.70	SA
.8 Issuance of Oil Pollution Prevention Certification (OPPC) and Sewage Pollution Prevention Certificate (SPPC)	3.90	SA	3.70	SA
1.2 The MARPOL 73/78 survey forms provided were up-to-date with current industry practices.	4.00	SA	3.80	SA
1.3 The presentation of content was easy to understand.	4.00	SA	3.60	SA
1.4 The course offered a balance between theory and practical exercises.	4.00	SA	3.30	D
1.5 The case studies were instrumental in forming a practical understanding of MARPOL 73/78 regulations.	3.89	SA	3.30	A
Aggregated Mean	**3.92**	**SA**	**3.68**	**SA**

Statements	P		C	
	x̄	VD	x̄	VD
..1 The training program comprehensively addressed all key topics essential for MARPOL 73/78 surveyors, ensuring a thorough understanding of the convention's requirements and practical applications: (rate each topic)	3.40	SA	3.60	SA
.1 Introduction to MARPOL				
.2 Requirements of the Convention and the National Regulations	3.13	A	3.50	SA
.3 Potential Risks and Impacts of Shipping on the Marine Environment	3.33	SA	3.50	SA
.4 Marine Pollution Surveying	3.47	SA	3.50	SA
.5 Annex I (Oil) Discharge Criteria	3.47	SA	3.44	SA
.6 Annex IV (Sewage) Discharge Criteria	3.40	SA	3.40	SA
.7 Inspections	3.47	SA	3.40	SA
.8 Issuance of Oil Pollution Prevention Certification (OPPC) and Sewage Pollution Prevention Certificate (SPPC)	3.20	A	3.40	SA
1.2 The MARPOL 73/78 survey forms provided were up-to-date with current industry practices.	3.20	A	3.50	SA
1.3 The presentation of content was easy to understand.	3.27	SA	3.50	SA
1.4 The course offered a balance between theory and practical exercises.	3.40	SA	2.30	D
1.5 The case studies were instrumental in forming a practical understanding of MARPOL 73/78 regulations.	3.40	SA	3.20	A
Aggregated Mean	**3.34**	**SA**	**3.35**	**SA**

Qualifications of Instructors

Instructors' qualifications were rated highly across all groups, as shown in Table 6, though there were differences in the level of agreement. Surveyors and Instructors rated the qualifications very highly, with a mean of 3.98 (Strongly Agree). Philippine Coast Guard officers also provided a positive view, with a mean of 3.55 (Strongly Agree). However, Classification Society representatives provided a slightly lower rating, with a mean of 3.06 (Agree), suggesting room for improvement in technical knowledge.

Table 6. Evaluation of Instructor's Qualifications

Statements	S		I	
	x̄	VD	x̄	VD
2.1 The instructor has a professional license in a relevant field such as Marine Transportation, Marine Engineering, or Naval Architecture and Marine Engineering.	4.00	SA	4.00	SA
2.2 The instructor was equipped with an educational background in environmental science or related fields, essential for understanding the MARPOL convention.	4.00	SA	4.00	SA
2.3 The instructor possessed hands-on experience in ship inspection, maintenance, and repair.	4.00	SA	4.00	SA
2.4 The instructor was knowledgeable about the MARPOL convention.	4.00	SA	4.00	SA
2.5 The instructor was well-versed in the technical aspects of the MARPOL convention.	3.90	SA	3.90	SA
Aggregated Mean	**3.98**	**SA**	**3.98**	**SA**

Statements	P		C	
	x̄	VD	x̄	VD
2.1 The instructor has a professional license in a relevant field such as Marine Transportation, Marine Engineering, or Naval Architecture and Marine Engineering.	3.33	SA	3.00	A
2.2 The instructor was equipped with an educational background in environmental science or related fields, essential for understanding the MARPOL convention.	3.27	SA	3.10	A
2.3 The instructor possessed hands-on experience in ship inspection, maintenance, and repair.	3.33	SA	3.20	A
2.4 The instructor was knowledgeable about the MARPOL convention.	3.40	SA	3.10	A
2.5 The instructor was well-versed in the technical aspects of the MARPOL convention.	3.40	SA	2.90	A
Aggregated Mean	**3.55**	**SA**	**3.06**	**A**

Course Delivery

Course delivery received mixed reviews, as presented in Table 7, highlighting areas for improvement in teaching methods and engagement strategies. Surveyors rated course delivery highest, with strong satisfaction regarding lectures and practical exercises. Other groups provided lower ratings, indicating a need for enhancements in delivery methods.

Table 7. Evaluation of Course Delivery

Statements	S		I	
	x̄	VD	x̄	VD
3.1 The course structure was well-organized.	4.00	SA	3.30	SA
3.2 The delivery methods kept me engaged throughout the course.	3.90	SA	2.40	D
3.3 The course encouraged active participation from me.	3.89	SA	2.40	D
3.4 The pace was appropriate, allowing time to absorb the information.	3.90	SA	2.20	D
3.5 A variety of teaching methods were used to suit different learning preferences.	4.00	SA	2.30	D
Aggregated Mean	**3.94**	**SA**	**2.52**	**A**

Statements	P		C	
	x̄	VD	x̄	VD
3.1 The course structure was well-organized.	3.33	SA	2.90	A
3.2 The delivery methods kept me engaged throughout the course.	3.27	SA	2.30	D
3.3 The course encouraged active participation from me.	3.27	SA	2.30	D
3.4 The pace was appropriate, allowing time to absorb the information.	3.27	SA	2.20	D
3.5 A variety of teaching methods were used to suit different learning preferences.	3.40	SA	2.40	D
Aggregated Mean	**3.31**	**SA**	**2.42**	**D**

Teaching Materials

The evaluation of teaching materials used in the MARPOL Surveyor Training Course, shown in Table 8, reveals a generally positive reception, with surveyors (S) rating the materials highest with an aggregated mean of 4.00 (Strongly Agree), indicating their strong agreement on the materials' value. Instructors (I)

and Philippine Coast Guard officers (P) also found the materials beneficial, with means of 3.18 (Agree) and 3.33 (Strongly Agree), respectively, though instructors noted some room for improvement when it comes to the MARPOL Surveyors Kit, giving it a rate of 2.50 (Disagree). Classification Society representatives (C) rated the materials lowest, with an aggregated mean of 2.78 (Agree), suggesting that while they acknowledge the materials' usefulness, enhancements are needed, particularly in the MARPOL surveyors kit and course notes, rated with 2.30 (Disagree) and 2.70 (Agree) respectively.

Table 8. Evaluation of Teaching Materials

Statements	S		I	
	x̄	VD	x̄	VD
4.1 The provision of actual survey forms was essential in offering hands-on practice in conducting MARPOL surveys.	4.00	SA	3.60	SA
4.2 Access to an actual Oil Pollution Prevention Certification (OPPC) document provided invaluable insight into the legal aspects of oil pollution prevention under MARPOL.	4.00	SA	3.50	SA
4.3 The availability of an actual Sewage Pollution Prevention Certification (SPPC) document helped me understand the specific requirements for sewage discharge compliance.	4.00	SA	3.50	SA
4.4 The MARPOL surveyors kit played a crucial role in preparing me for practical surveying tasks in the field.	4.00	SA	2.50	D
4.5 The comprehensive MARPOL Surveyors course notes served as an excellent reference material.	4.00	SA	2.80	A
Aggregated Mean	**4.00**	**SA**	**3.18**	**A**

Statements	P		C	
	x̄	VD	x̄	VD
4.1 The provision of actual survey forms was essential in offering hands-on practice in conducting MARPOL surveys.	3.33	SA	3.10	A
4.2 Access to an actual Oil Pollution Prevention Certification (OPPC) document provided invaluable insight into the legal aspects of oil pollution prevention under MARPOL.	3.27	SA	2.90	A
4.3 The availability of an actual Sewage Pollution Prevention Certification (SPPC) document helped me understand the specific requirements for sewage discharge compliance.	3.47	SA	2.90	A
4.4 The MARPOL surveyors kit played a crucial role in preparing me for practical surveying tasks in the field.	3.27	SA	2.30	D
4.5 The comprehensive MARPOL Surveyors course notes served as an excellent reference material.	3.33	SA	2.70	A
Aggregated Mean	**3.33**	**SA**	**2.78**	**A**

Assessment of Learning

The evaluation of the assessment of learning in the MARPOL Surveyor Training Course shown in Table 9 presents a generally positive reception, with notable variations among different respondent groups. Surveyors (S) rated the assessments highly with an aggregated mean of 3.84 (Strongly Agree), indicating strong alignment with course objectives, proficiency in documenting MARPOL compliance, and helpful feedback. Instructors (I) provided a mean of 3.16 (Agree), suggesting that while they found the assessments beneficial, there is room for improvement, particularly in using a range of assessment methods (2.40, Disagree). Philippine Coast Guard officers (P) had a similar positive view with a mean of 3.31 (Strongly Agree), recognizing the assessments' alignment and helpful feedback. However, Classification Society representatives (C) gave a lower

rating with an aggregated mean of 2.46 (Disagree), highlighting significant concerns, especially regarding the variety of assessment methods and the usefulness of exercises in completing survey forms (2.00, Disagree).

Table 9. Evaluation of Assessment of Learning

Statements	S		I	
	x̄	VD	x̄	VD
5.1 The assessments aligned well with the course objectives.	3.80	SA	3.60	SA
5.2 A range of assessment methods was used to evaluate different competencies.	3.70	SA	2.40	D
5.3 Exercises in completing actual survey forms were integral to the assessments, ensuring proficiency in documenting MARPOL compliance.	4.00	SA	2.80	A
5.4 Feedback provided on assessments was helpful for improvement.	3.80	SA	3.60	SA
5.5 The assessments helped me identify areas for further development of my skills.	3.90	SA	3.40	SA
Aggregated Mean	**3.84**	**SA**	**3.16**	**A**

Statements	P		C	
	x̄	VD	x̄	VD
5.1 The assessments aligned well with the course objectives.	3.20	A	2.90	A
5.2 A range of assessment methods was used to evaluate different competencies.	3.40	SA	2.00	D
5.3 Exercises in completing actual survey forms were integral to the assessments, ensuring proficiency in documenting MARPOL compliance.	3.33	SA	2.00	D
5.4 Feedback provided on assessments was helpful for improvement.	3.27	SA	2.80	A
5.5 The assessments helped me identify areas for further development of my skills.	3.33	SA	2.60	A
Aggregated Mean	**3.31**	**SA**	**2.46**	**D**

Duration of the Training Program

The evaluation of the training program duration for the MARPOL Surveyor Training Course shown in Table 10 highlights differing perspectives among respondent groups. Surveyors (S) rated the duration highly with an aggregated mean of 3.78 (Strongly Agree), indicating that they found the course length sufficient, well-paced, and accommodating to their schedules. Philippine Coast Guard officers (P) also provided a positive view with a mean of 3.29 (Strongly Agree), appreciating the balance between learning and practical application. However, instructors (I) rated the duration lower with an aggregated mean of 2.54 (Agree), suggesting that while they found it adequate, there is room for improvement in allowing time for in-depth discussions and practical exercises. Classification Society representatives (C) gave the lowest rating with an aggregated mean of 2.12 (Disagree), highlighting significant concerns regarding the course's pace, depth, and scheduling conflicts.

Table 10. Evaluation of Training Program Duration

Statements	S		I	
	x̄	VD	x̄	VD
6.1 The length of the course was sufficient to cover all the topics.	3.70	SA	3.00	A
6.2 The course allowed time for in-depth discussion of important topics.	3.80	SA	2.40	D
6.3 The schedule was well-paced, balancing learning with practical application.	3.90	SA	2.30	D
6.4 The duration did not interfere with my other commitments.	3.50	SA	3.00	A
6.5 The course provided adequate time for both learning and practicing key concepts.	4.00	SA	2.00	D
Aggregated Mean	**3.78**	**SA**	**2.54**	**A**

Statements	P		C	
	x̄	VD	x̄	VD
6.1 The length of the course was sufficient to cover all the topics.	3.20	A	2.10	D
6.2 The course allowed time for in-depth discussion of important topics.	3.20	A	2.00	D
6.3 The schedule was well-paced, balancing learning with practical application.	3.53	SA	1.90	D
6.4 The duration did not interfere with my other commitments.	3.20	A	2.90	A
6.5 The course provided adequate time for both learning and practicing key concepts.	3.33	SA	1.70	SD
Aggregated Mean	**3.29**	**SA**	**2.12**	**D**

Effectiveness of the MARPOL 73/78 Surveyor's Course

The course's effectiveness was assessed in terms of post-training evaluation, knowledge acquisition, and behavioral changes. Participants indicated high satisfaction with the training program, appreciating the relevance of the content and the competence of the instructors.

Post-Training Evaluation

The post-training evaluation of the MARPOL Surveyor Training Course shown in Table 11 indicates a generally positive outcome with an average weighted mean of 3.13, corresponding to Agree (A).

Table 11. Post-Training Scores

Statements	T	
	x̄	VD
1. The course content was relevant and well-structured.	3.30	SA
2. The instructors were knowledgeable and effective in their teaching.	3.20	A
3. The course delivery methods (lectures, hands-on activities, etc.) were engaging.	3.10	A
4. The Teaching Materials used during the course were adequate.	2.90	A
5. The assessment methods were clear and fair.	3.00	A
6. The duration of the training was sufficient to cover all necessary material.	3.00	A
7. I feel more confident in my ability to apply MARPOL regulations in my work.	3.20	A
8. The training has improved my surveying techniques and methodologies.	3.10	A
9. I am likely to recommend this training course to other maritime professionals.	3.20	A
10. This training has prepared me well for handling real-world maritime compliance challenges.	3.30	SA
Aggregated Mean	**3.13**	**A**

Acquired Learnings from the Course

The results of the 50-item written test given to 30 participants after completing the MARPOL 73/78 Surveyor Training Course demonstrate the training's impact. All participants achieved scores above the minimum passing threshold of 25 points, with individual scores ranging from 25 to 50. The lowest score of 25 indicates that every participant met the baseline requirements, showcasing their understanding of the essential concepts covered in the training. The mean score, shown in Table 12, was 35.53, the median was 36.5, and the scores displayed a range of 25 points, reflecting a broad spectrum of knowledge acquisition among participants.

Table 12. Descriptive Statistics of Assessment Test Scores.

Measure	Value
Number of Respondents	30
Mean Score	35.53
Median Score	36.5
Mode	None
Range	25 (25 - 50)
Standard Deviation	7.41
Minimum Score	25
Maximum Score	50
25th Percentile	29.25

The test scores of the 30 respondents from the MARPOL 73/78 Surveyor Training Course shown in Table 13 reveals a wide distribution of performance levels. The highest score was 50, achieved by one respondent, while the lowest score was 25, reached by two respondents.

Table 13. Summary of Trainee Scores

Respondent	Test Score
R1	41
R2	32
R3	39
R4	29
R5	27
R6	31
R7	30
R8	40
R9	28
R10	25
R11	35
R12	50
R13	38
R14	43
R15	26
R16	42
R17	45
R18	44
R19	46
R20	36
R21	47
R22	37
R23	33

Respondent	Test Score
R24	49
R24	48
R26	26
R27	30
R28	28
R29	25
R30	41

The frequency distribution of scores for the MARPOL 73/78 Surveyor Training Course shown in Table 14 provides insight into the overall performance of the 30 participants. The most common score range was 36-40, with 8 participants (26.67%) scoring within this range, indicating a strong understanding of the material. The next most frequent ranges were 41-45 and 25-30, each with 5 participants (16.67%) scoring within these ranges. This distribution shows a notable portion of participants achieving high scores, but also a significant number scoring closer to the minimum passing threshold.

Table 14. Frequency Distribution of Scores

Score Range	Frequency	Percentage
25-30	5	16.67%
31-35	5	16.67%
36-40	8	26.67%
41-45	7	23.33%
46-50	5	16.67%

Behavioural Changes Observed in Surveyors and Supervisors' Feedback

The evaluation of MARPOL 73/78 surveyors' behaviours, conducted through data mining, reveals significant improvements from 2018 to 2024 as perceived by PCG officers, as shown in Table 15. The mean scores for surveyors' accuracy in surveying practices (Statement 1), communication skills (Statement 7), reaction time (Statement 10), mentoring approach (Statement 19), and systematic reporting (Statement 20) increased from "Moderately Effective" (ME) in 2018 to "Highly Effective" (HE) in 2024.

Table 15. MARPOL 73/78 Surveyors' Behaviours Perceived by PCG Officers

Statements	2018		2024	
	$\bar{x}$	VD	$\bar{x}$	VD
1. The surveyor has demonstrated improved accuracy in their surveying practices since completing the course.	2.80	ME	3.27	HE
2. The course influenced the surveyor's adherence to MARPOL regulations in their work.	2.70	ME	3.20	ME
3. The surveyor has actively shared the knowledge gained from this course with colleagues or team members.	2.65	ME	3.13	ME
4. The course has positively impacted the surveyor's ability to efficiently resolve surveying challenges.	2.65	ME	3.13	ME
5. The course has enhanced the surveyor's productivity as a MARPOL surveyor.	2.60	ME	3.13	ME
6. The surveyor has incorporated new surveying techniques or methodologies learned in the course into their work.	2.55	ME	3.07	ME
7. The surveyor developed clearer communication skills for surveying purposes.	2.80	ME	3.27	HE

Statements	2018		2024	
	x̄	VD	x̄	VD
8. The course has increased the surveyor's focus on environmental sustainability in surveying practices.	2.60	ME	3.13	ME
9. The course has improved the surveyor's accuracy in interpreting MARPOL regulations.	2.60	ME	3.13	ME
10. The course has enhanced the surveyor's reaction time in making informed decisions during surveying activities.	2.75	ME	3.27	HE
11. The course has enhanced the surveyor's problem-solving skills in addressing MARPOL-related issues.	2.65	ME	3.13	ME
12. The surveyor has shown greater initiative in ensuring compliance with MARPOL regulations.	2.60	ME	3.13	ME
13. The course has strengthened the surveyor's confidence in conducting thorough surveys.	2.70	ME	3.20	ME
14. The surveyor has integrated best practices for pollution prevention into their surveying routine.	2.70	ME	3.21	ME
15. The course has broadened the surveyor's understanding of the global impact of maritime pollution.	2.65	ME	3.20	ME
16. The surveyor has demonstrated improved collaboration with other maritime professionals for MARPOL compliance.	2.65	ME	3.20	ME
17. The surveyor has stayed updated with the latest developments in MARPOL regulations.	2.75	ME	3.27	HE
18. The surveyor has increased their focus on safety in surveying activities.	2.75	ME	3.27	HE
19. The course has influenced the surveyor's approach to mentoring junior surveyors.	2.80	ME	3.33	HE
20. The surveyor has adopted a more systematic approach to reporting in surveying.	2.80	ME	3.33	HE
Aggregated Mean	**2.70**	**ME**	**3.20**	**ME**

Client Satisfaction

The evaluation of clients' satisfaction with MARPOL 73/78 surveyors indicates a high level of satisfaction, as shown in Table 16, with an average weighted mean of 3.47, rated as "Very Satisfied" (VS). They noted improved efficiency and adherence to environmental regulations, reflecting the training's positive impact.

Table 16. Clients' Satisfaction with MARPOL 73/78 Surveyors.

Statements	x̄	VD
1. The surveyor's level of expertise in MARPOL regulations.	3.70	VS
2. The surveyor's promptness in responding to inquiries during the survey.	3.50	VS
3. The effectiveness of the surveyor's communication of findings.	3.60	VS
4. The surveyor's adherence to the agreed-upon schedule.	3.50	VS
5. The clarity of the reports provided by the surveyor.	3.50	VS
6. The surveyor's understanding of environmental sustainability in surveying practices.	3.40	VS
7. How efficiently the surveyor addressed the surveying challenges.	3.30	VS
8. The surveyor's consistency in following safety protocols during the survey.	3.50	VS
9. The surveyor's professional demeanor throughout the survey process.	3.50	VS
10. The MARPOL compliance alignment of the surveyor's recommendations.	3.40	VS
11. The surveyor's accuracy in identifying potential sources of pollution.	3.30	VS

Statements	x̄	VD
12. The surveyor's effectiveness in using appropriate surveying techniques.	3.30	VS
13. The surveyor's proactive approach in identifying non-compliance issues.	3.60	VS
14. The actionability of the recommendations included in the surveyor's reports.	3.50	VS
15. The thoroughness of the documentation provided by the surveyor.	3.30	VS
16. The surveyor's problem-solving skills in dealing with complex survey scenarios.	3.40	VS
17. The surveyor's open communication with the ship's crew and management.	3.40	VS
18. The comprehensiveness of the surveyor's review of the ship's records.	3.60	VS
19. The valuable guidance provided by the surveyor on pollution prevention best practices.	3.60	VS
20. The overall positive contribution of the surveyor's performance to our organization's MARPOL compliance efforts.	3.40	VS
Aggregated Mean	**3.47**	**VS**

Comparative Analysis

The MARPOL Surveyors Course by Oceanwide Maritime Services Corp. was compared to similar courses offered by other providers. The course was found to be highly effective in terms of content and instructor qualifications. However, areas for improvement were identified in course delivery and teaching materials, suggesting the need for ongoing updates and enhancements.

Frequency of Course Offering

The frequency with which the MARPOL 73/78 Surveyors Course is offered varies significantly among the training providers, as shown in Table 17. Oceanwide Maritime Services Corp. offers the course quarterly, similar to ALS Maritime Training Center. Marine Training and Certification Center provides the course on demand, while Maxwell Maritime and Lloyd's Maritime Academy offer it bi-annually. Larsens Marine Surveyors & Consultants offers the course monthly, providing the highest frequency among the providers.

Table 17. Comparison of Course Offering Frequency

Training Provider	Frequency
Oceanwide Maritime (OW)	Quarterly
Marine Training and Certification Center (MT)	On demand
ALS Maritime Training (AL)	Quarterly
Maxwell Maritime (MM)	Bi-annually
Larsens Marine Surveyors & Consultants (LA)	Monthly
Lloyd's Maritime Academy (LL)	Bi-annually

Average Number of Participants

The average number of participants per course offering, which is presented in Table 18, ranged from 8 at Marine Training and Certification Center to 25 at Larsens Marine Surveyors and Consultants. Oceanwide had an average of 15 participants per course, which is comparable to ALS Maritime and Maxwell Maritime.

Table 18. Comparison of Average Number of Participants

Training Provider	Average No. of Participants
OW	15
MT	8
AL	18
MM	15
LA	25
LL	18

Course Duration

The duration of the courses varied significantly, as shown in Table 19, from 2 days at Marine Training and Certification Center to 4 weeks at Maxwell Maritime. Oceanwide's course duration of 3 days is among the shortest. Longer courses, like those at Maxwell Maritime, might offer more in-depth training and extensive hands-on experience, leading to better retention of knowledge and skills. Shorter courses, like those at Oceanwide, may be more intensive and compact, catering to participants who prefer a quicker learning process.

Table 19. Comparison of Course Duration

Training Provider	Course Duration (Days)
OW	3
MT	2
AL	5
MM	28
LA	10
LL	7

Hands-on Training Percentage

The percentage of hands-on training, as presented in Table 20, varied from 20% at Marine Training and Certification Center to 50% at Oceanwide, ALS Maritime, and Larsens Marine Surveyors and Consultants. This indicates a strong emphasis on practical training across most providers, although Marine Training and Certification Center has a notably lower emphasis.

Table 20. Comparison of Hands-On Training Percentage

Training Provider	Hands-On Training (%)
OW	40%
MT	20%
AL	35%
MM	25%
LA	40%
LL	35%

Instructors' Qualifications

Instructors' qualifications also varied, as illustrated in Table 21. Oceanwide and other centers required a bachelor's degree for instructors, while Maxwell Maritime, Larsens Marine Surveyors & Consultants, and Lloyd's Maritime Academy required a master's degree. The required licenses ranged from Licensed Marine Engineer at Oceanwide to Licensed Chief Engineer at Maxwell Maritime. The minimum experience as MARPOL Surveyors ranged from 5 years at Oceanwide to up to 10 years at other centers.

Table 21. Comparison of Instructors' Qualifications

Training Provider	Education	License
OW	Bachelor's	Licensed Marine Engineer
MT	Bachelor's	Licensed Marine Officer
AL	Bachelor's	Licensed Marine Engineer
MM	Master's	Licensed Chief Engineer
LA	Master's	Management Level License
LL	Master's	Certified Marine Surveyor

Training Provider	MARPOL Survey Experience (Yrs)	Maritime Related Experience (Yrs)
OW	3	4
MT	3	8
AL	4	7
MM	8	8
LA	7	12
LL	7	8

Course Delivery Methods

The delivery methods, compared in Table 22, included classroom lectures, interactive workshops, simulation exercises, online modules, and field visits. Oceanwide uses classroom lectures and interactive workshops, while other providers, like Maxwell Maritime, also use simulation exercises and live webinars.

Table 22. Comparison of Course Delivery Methods

Training Provider	Delivery Methods
OW	Classroom, Interactive Workshops
MT	Online modules, Field visits
AL	Simulation, Workshops, Classroom, Field
MM	Online modules, Simulations, Webinars
LA	Classroom, Workshops, Simulations
LL	Workshops, Simulations, Classroom, Field

Assessment Methods

Assessment methods, shown in Table 23, included written exams, practical demonstrations, oral presentations, and project assignments. Oceanwide uses written exams and oral presentations, while other providers, like Maxwell Maritime, also include virtual simulations and project assignments. The diversity in assessment methods ensures comprehensive evaluation of trainees' knowledge and skills. Differences in assessment methods suggest that some centers use more varied and potentially more effective assessment techniques.

Table 23. Comparison of Assessment Methods

Training Provider	Assessment Methods
OW	Written exams, Practical demo
MT	Written exams, Practical demo
AL	Written exams, Practical demo
MM	Written exams, Practical demo, Simulations
LA	Written exams, Practical demo
LL	Written exams, Practical demo

Recommendations for Enhanced Course Framework

Based on the findings, several recommendations were made to enhance the MARPOL Surveyor Training Course. Firstly, it is important to regularly update course content to keep pace with evolving regulations and industry practices. Increasing hands-on training through more practical exercises and real-world scenarios will enhance practical skills. Upgrading facilities and equipment to ensure they are modern and well-maintained is also crucial. Diversifying delivery methods by incorporating a mix of lectures, workshops, and online modules can cater to different learning styles. Additionally, enhancing assessment techniques using various methods can better evaluate trainee competencies. Finally, extending the course duration will provide more time for in-depth coverage of complex topics. These enhancements aim to ensure the continuous improvement of the training program, contributing to the development of highly competent MARPOL surveyors capable of upholding environmental standards in the maritime industry.

Conclusion

The research evaluated the effectiveness of the MARPOL 73/78 Surveyor Training Course provided by Oceanwide Maritime Services Corp., focusing on various aspects including course content, instructor qualifications, course delivery, and the practical application of the training. The study's findings indicate that the course is highly effective in imparting essential knowledge and skills related to MARPOL regulations, as evidenced by the high satisfaction levels among surveyors, instructors, and clients.

The main conclusions drawn from this study are:

1. Comprehensive Course Content: The MARPOL 73/78 Surveyor Training Course is well-structured and covers all essential topics comprehensively. This ensures that participants gain a thorough understanding of MARPOL regulations and their practical applications. The high ratings from surveyors and instructors reflect the course's effectiveness in addressing the critical components of marine pollution prevention.
2. Qualified Instructors: The qualifications and expertise of the instructors are crucial to the success of the training program. The study found that instructors are highly knowledgeable and possess significant hands-on experience, which enhances the learning experience for participants. However, there is a need for continuous professional development to ensure instructors stay updated with the latest industry practices and technical knowledge.
3. Effective Course Delivery: While the course delivery was generally well-received, there are areas for improvement, particularly in engaging participants and diversifying teaching methods. Incorporating a mix of lectures, practical exercises, workshops, and online modules can cater to different learning styles and enhance the overall effectiveness of the training.
4. Significant Knowledge and Behavioural Gains: Participants reported substantial knowledge gains and improvements in their professional behaviour and performance post-training. The feedback from supervisors and clients indicates that the training effectively equips surveyors with the necessary skills to perform their duties efficiently and adhere to environmental regulations.
5. High Client Satisfaction: Clients expressed high satisfaction with the performance of MARPOL surveyors trained by Oceanwide Maritime Services Corp. This reflects the practical impact of the training on the maritime industry, particularly in enhancing compliance with environmental regulations and improving operational efficiency.
6. Recommendations for Improvement: To further enhance the effectiveness of the training program, several recommendations were made, including regular updates to course content, increased hands-on training, upgraded facilities and equipment, diversified delivery methods, enhanced assessment techniques, and extended course duration. These improvements will ensure that the training remains relevant and continues to meet the evolving needs of the maritime industry.

The importance and relevance of these conclusions lie in their potential to influence future training programs and policies related to maritime environmental protection. By addressing the identified areas for improvement, training providers can develop more robust programs that not only comply with international regulations but also significantly contribute to the global effort in marine pollution prevention. The continuous development of highly competent MARPOL surveyors is crucial for safeguarding marine environments and ensuring sustainable maritime operations.

Acknowledgement

The researcher extends his gratitude to his advisor, Dr. Marianne G. Arias, and Dean Nissa Espiritu for their invaluable guidance, patience, and support. Appreciation is also given to the panel members, Prof. Diana Factuar, Capt. Vincent Brian Conde, and Atty. Lazaro Valdez, for their insightful comments and inputs.

The researcher thanks his colleagues in the Philippine Coast Guard, Classification Society, MARPOL Survey Instructors, and MARPOL Surveyors for their participation and contributions to this study. Special thanks to his wife, Niña Sevilla, for her patience and motivation throughout this journey.

Acknowledgement is also given to the Philippine Merchant Marine Academy (PMMA) and Oceanwide Maritime Services Corp. for their support and cooperation. Finally, the researcher expresses gratitude to all maritime professionals and organizations who participated in this study, providing valuable insights and experiences.

References

Abend, G. (2008). The meaning of theory. Sociological Theory, 26(2). https://doi.org/10.1111/j.1467-9558.2008.00324.x

Almanie, A.M. (2018). Evaluation of an Educational Planning Training Course for Supervisors of Educational Planning in the Ministry of Education. IIUM Journal of Educational Studies. Retrieved from https://journals.iium.edu.my/ejournal/index.php/iiumjournal/article/view/2018.

Cabrera, E., & Su, Y. (2020). Maritime safety and environmental management in the Philippines: A policy and practical reflection. Marine Policy, 117, 103954. https://doi.org/10.1016/j.marpol.2020.103954

Chircop, A., & Lister, J. (2018). MARPOL compliance in the global shipping industry. Springer. https://doi.org/10.1007/978-3-319-89767-4

Creswell, J., Plano Clark, V., Gutmann, M., & Hanson, W. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), Handbook of Mixed Methods in Social and Behavioral Research. Thousand Oaks, CA: Sage. https://us.sagepub.com/en-us/nam/handbook-of-mixed-methods-in-social-behavioral-research/book233818

DNV. (2024). MARPOL survey and certification service. Retrieved from https://brandcentral.dnv.com/fileroot7/gallery/DNVGL/files/original/e5a6d121d4774c7cbe47286c898085b7.doc

Ezezika, O., & Johnston, N. (2022). Development and Implementation of a Reflective Writing Assignment for Undergraduate Students in a Large Public Health Biology Course. Pedagogy in Health Promotion. https://doi.org/10.1177/23733799211056587

Farjad, S. (2012). The evaluation effectiveness of training courses in university by Kirkpatrick Model (Case Study: Islamshahr University). Procedia - Social and Behavioral Sciences, 46, 2837-2841. https://doi.org/10.1016/j.sbspro.2012.05.573

Frank, W. (2019). Marine Pollution Control: Legal and Managerial Frameworks. Lloyd's Practical Shipping Guides. https://www.routledge.com/Marine-Pollution-Control-Legal-and-Managerial-Frameworks/Frank/p/book/9780367026853

Frost, J. (n.d.). What is the mean in Statistics? Statistics by Jim. https://statisticsbyjim.com/basics/mean_average/

International Association of Classification Societies (IACS). (n.d.). Common Structural Rules (CSR) and Procedural Requirements (PRs). Retrieved from https://iacs.org.uk

International Association of Classification Societies (IACS). (n.d.). IACS UR E26 and E27 Press Release. Retrieved from https://iacs.org.uk/news/iacs-ur-e26-and-e27-press-release

International Maritime Organization. (2019). International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC). Retrieved from https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-Oil-Pollution-Preparedness,-Response-and-Co-operation-(OPRC).aspx

International Maritime Organization. (2019). MARPOL Annex I – Regulations for the prevention of pollution by oil. Retrieved from https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx

International Maritime Organization. (2019). MARPOL Annex VI – Regulations for the prevention of air pollution from ships. Retrieved from https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx

International Maritime Organization. (2021). MARPOL training and information. Retrieved from http://www.imo.org

Johnson, D., & Becker, B. (2015). Environmental policy and maritime training. Ocean & Coastal Management, 116, 341-347. https://doi.org/10.1016/j.ocecoaman.2015.07.021

Johnson, M., & Corbett, J. J. (2013). Maritime Emissions and Air Quality Modeling: A Review of Practices and Challenges. Environmental Science & Technology, 47(21), 12219-12228. https://doi.org/10.1021/es402938f

Kontovas, C. A., & Psaraftis, H. N. (2019). The economic implications of MARPOL Annex VI: An analysis of shipping markets. Transportation Research Part D: Transport and Environment, 70, 115-126. https://doi.org/10.1016/j.trd.2019.04.025

Manuel, M. (2017). Vocational and academic approaches to maritime education and training (MET): Trends, challenges, and opportunities. WMU Journal of Maritime Affairs, 16. https://doi.org/10.1007/s13437-017-0130-3

Maritime Industry Authority. (2018). Strengthening the implementation of MARPOL 73/78 in the Philippines. Retrieved from https://marina.gov.ph/wp-content/uploads/2019/03/MARINA-Accomplishment-Report-CY-2018.pdf

Moffett, J., & Mill, A. C. (2014). Evaluation of the flipped classroom approach in a veterinary professional skills course. Advances in Medical Education and Practice, 5, 415–425. https://doi.org/10.2147/AMEP.S70160

Oceanwide. (2023). MARPOL surveying services. Retrieved from https://www.oceanwide.com. Accessed on November 27, 2023.

Pettit, S., Beresford, A., & Wu, B. (2018). Maritime logistics: A guide to contemporary shipping and port management. Kogan Page Publishers. https://www.koganpage.com/product/maritime-logistics-9780749478747

Philippine Coast Guard. (2005). Memorandum Circular No. 01-2005. Retrieved from: https://coastguard.gov.ph/index.php/memorandums/memorandum-circulars

Philippine Coast Guard. (2005). Memorandum Circular No. 04-2005. Retrieved from: https://coastguard.gov.ph/index.php/memorandums/memorandum-circulars

Philippine Coast Guard. (2005). Memorandum Circular No. 06-2005. Retrieved from: https://coastguard.gov.ph/index.php/memorandums/memorandum-circulars

Philippine Coast Guard. (2006). Memorandum Circular No. 02-2006. Retrieved from:

https://coastguard.gov.ph/index.php/memorandums/memorandum-circulars

Philippine Coast Guard. (2006). Memorandum Circular No. 03-2006. Retrieved from: https://coastguard.gov.ph/index.php/memorandums/memorandum-circulars

Philippine Coast Guard. (2014). Memorandum Circular No. 10-14. Retrieved from: https://coastguard.gov.ph/index.php/memorandums/memorandum-circulars

Philippine Coast Guard. (2020). Republic Act No. 9993. Retrieved from https://lawphil.net/statutes/repacts/ra2010/ra_9993_2010.html

Philippine Coast Guard. (2022). Standard Operating Procedure 02-22: Guidelines and Procedures on the Training of MARPOL Surveyors. Retrieved from: https://coastguard.gov.ph/index.php/memorandums/memorandum-circulars

Psaraftis, H. N., & Kontovas, C. A. (2016). Greenhouse gas emissions from shipping: The Bunker Fuel Problem. Transportation Research Procedia, 14, 1295-1304. https://doi.org/10.1016/j.trpro.2016.05.198

Smith, T. (2017). Maritime transport and the environment. In The Routledge Handbook of Transport Economics (pp. 123-139). Routledge. https://doi.org/10.4324/9781315742218

Smith, T. W., & Jones, P. J. (2017). The International Legal Framework for the Prevention of Pollution from Ships. In Marine Pollution Control: Legal, Economic and Technical Aspects (pp. 45-67). Informa Law from Routledge. https://doi.org/10.4324/9781315115555

STCW. (2018). Retrieved from https://www.stcw.org. Accessed on November 27, 2023.

Tan, A. K. J. (2019). Maritime safety, security and piracy. Routledge. https://doi.org/10.4324/9780429505427

Tan, A. K. J. (2019). Maritime Safety: International Law and Policy Perspectives from Asia. Routledge. https://doi.org/10.4324/9781315188248

Tokyo Memorandum of Understanding on Port State Control. (2019). Retrieved from https://www.tokyo-mou.org/doc/ANN19-f.pdf

Vujičić, S., Hasanspahić, N., Gundić, A., & Maglić, L. (2022). Analysis of factors influencing the effectiveness of MET instructors. WMU Journal of Maritime Affairs, 21(4), 549–570. https://doi.org/10.1007/s13437-022-00271-5