

AWARENESS ABOUT THE EFFECTS OF SHIPBUILDING OPERATION TOWARDS MANGROVE ECOSYSTEM: A CASE STUDY OF BACHELOR OF MARITIME OPERATION (BMO) AT UNIKL MIMET

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ABSTRACT

The shipbuilding activity destroys the mangrove habitat since the activity is aimed to keep the ship in good shape but has a negative effect on the environment, which is the mangrove ecosystem. One of the shipbuilding operations activities that might have an impact on the mangrove ecosystem is paint, oil, and so on, which can cause the mangrove growth ecosystem to be stunned and lead to further degradation. The aim of this study was to determine the level of awareness among Bachelor of Maritime Operation students at UniKL MIMET about the effect of shipbuilding operation towards mangrove ecosystem and to study the action that should have been taken in order to raise awareness among Bachelor of Maritime Operation students at UniKL MIMET on the declining of mangrove ecosystem as a result of shipbuilding. By using survey questionnaire, data from the student of 3rd and 4th year, BMO student at UniKL MIMET has been collected and analysed. The questionnaire collects students' demographic sections which are gender, study in year and semester, after that continued with Objective 1 and Objective 2 question. A total of 76 questionnaires or data are collected and the data are analysed by using the Statistical Package for the Science Social (SPSS) to determine the level of awareness and the action should be taken. The results of this study found that the level of awareness of students in BMO at UniKL MIMET is high and the actions should be taken to raise awareness among BMO students at UniKL MIMET, such as seminars, campaigns, workshops, training, and social media by the UniKL MIMET community, which can be used to increase awareness, and students can also be aware that shipbuilding has destroyed mangrove ecosystems.

Keywords: *Mangrove Ecosystem, Shipbuilding, Student Awareness, UniKL MIMET*

1.0 INTRODUCTION

Mangroves are salt tolerant and sheltered intertidal forest covering most tropical and subtropical coasts with approximately 137,760 km²–152,360 km² of the world's surface. [1] Unfortunately, over the past few decades, mangroves have been disappearing rapidly due to shipbuilding activities. As mangroves continue to decline annually, the development poses a potential threat to wildlife components. Ship-based pollution such as propeller oil, grease, and anchors leading to the emission of greenhouse gases. [3] Furthermore, the materials employed in shipbuilding not only have environmental implications during their production and usage in the construction process but also during the repair, operation, and recycling of the ship. However, little is currently known about the shipbuilding industry's actual environmental impact towards the mangrove habitat. The ship building process can eventually make the mangrove growth ecosystem stunned and lead to further degradation. According to [2], Mangroves thrive where the water meets the subtropical and tropical latitudes, where the soil is anaerobic and there are extreme tides, strong winds, high salinities, high temperatures, and muddy conditions. The mangrove ecology is becoming extinct because of today's widespread oil spill [4]-[5]. As everyone is aware, the oil spill is caused by a variety of issues,

including shipbuilding and the ship itself.

The primary concern to be addressed is the level of awareness among Bachelor of Maritime students at UniKL MIMET regarding the impact of shipbuilding operations on the mangrove ecosystem. This study is vital for raising student awareness because UniKL MIMET is known for producing high-quality Marine students. Shipbuilding requires high product quality by maintaining in this condition and ensure that the ship operates safely. This research can contribute greater awareness among these students about the importance of the mangrove's ecosystem and the effects of shipbuilding on mangroves ecosystem. Awareness among 3rd and 4th year BMO students at UniKL MIMET is much needed to tackle the deterioration of mangrove ecosystem due to shipbuilding activities.

1.1 Shipbuilding Activities

Shipbuilding required high product quality by maintaining in this condition and ensure that the ship operates safely [5]. Throughout the nation, there are about 300 shipbuilding yards and workshops that meet domestic demand for water transportation [6]. Furthermore, according to [7], Shipyards are permanent facilities with drydocks and fabrication equipment that can create a ship. Ship construction, repair, conversion, and alteration, the creation of prefabricated ship and barge components, and specialized services like ship scale are all activities carried out by the shipyard. According to [8], shipyards play a significant role in carrying out these tasks, particularly those that specialize in reparations because these tasks are carried out more frequently than the building of new ships when it comes to ship repair, maintenance, and maintenance work. The tasks necessary to keep management and equipment in a particular state of repair are referred to as ship maintenance. This reaction is explained by [9] where reaction is ship maintenance, in its broadest sense, refers to any type of activity designed to keep a ship in good seaworthy condition and capable of operating for sea transportation at all times.

Furthermore, according to [10], shipbuilding and harbours specialize in vessel refurbishing (modification and repair) activities, which include tasks like removing abrasive fillers and paints or spray painting with antifouling coatings, primers, and topcoats. Repairing steel that has been corroded by saltwater or removing wildlife that has been entangled with the hull are two examples of maintenance procedures.

1.2 Heavy Metal

A variety of activities, including those related to ports, shipbuilding, industries, and other activities, lead to the accumulation of heavy metals. As described by [11] that heavy metals are particularly harmful because of their toxicity, persistence, and bioaccumulation issues, making them one of the most problematic types of pollutants released from such activities. [12] said that sediments usually have higher concentrations of heavy metals than water, and the concentration of these metals in water and sediments has a negative effect on both plants and animals, including around mangrove ecosystems.

As a result, sedimentation has a negative impact on lagoon ecosystems, leading to a decline in mangrove diversity and density, the death of organisms in the lagoon, soil deposition and sedimentation, ecological endurance disorders, and the stunting of mangroves [13]

1.3 Water or oil pollution

Oil spills brought on by shipbuilding and other pollutants are the main cause of this water pollution. This causes significant damage to mangroves and may result in the plant's death. Increasing salinity concentration has a significant effect on mangrove seedlings, delaying root initiation and slowing seedling establishment. Because of the low survival rate, seedlings at higher salinity failed to establish and died [14].

Additionally, [15] said that when shipbuilding activities are conducted, a significant number of solvents, paints, oils, and other pollutants may seep into the groundwater or be directly washed into surface waters, which may have an impact on soil fertility. Antifouling paint contains metals and chemicals that can restrict lower growth, such as mangrove ecosystems.

1.4 Mangrove Ecosystem

As stated by [16], Mangroves are found in over 50 different species around the world. The department enforces laws that govern the alteration and trimming of mangroves. Mangroves are three species of tropical wetland trees that grow along the shorelines of many estuaries in central and southern Florida. Red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Rhizophora mangle*) are native to Florida (*Laguncularia racemosa*). [17] said that despite offering a variety of ecosystem services, the Setiu Wetlands ecosystem has come under threat from overuse, drainage, silt, pollution, and land conversion. The deterioration of mangroves and the reduction of ecosystem service delivery are two issues affecting student well-being. Students have this issue as well, say [18], because important stakeholders are lacking in knowledge, understanding, and appreciation. Students' lack of awareness contributes to the deterioration of mangroves and the reduction of mangrove reduction of ecosystem services, habitats are being destroyed, degraded, and neglected.

1.5 Impact Shipbuilding towards Mangrove Ecosystems

As stated by [19], mangrove forest ecosystems are mostly found in tropical and subtropical regions and are an important intertidal zone in safe estuarine coasts. A lot of the world's mangrove zones are decreasing or disappearing due to contamination because they are also very delicate ecosystems. This is because shipyard areas, such as shipbuilding operations, are generally located around rivers and estuaries for obvious convenience in carrying out such activities [20].

1.6 UniKL MIMET as a Marine Institute

In order to produce highly competent personnel for the global marine and maritime industry, UniKL MIMET offers maritime engineering technology programmes tailored to the needs of the industry. The programmes at UniKL MIMET are also recognized/accredited by international professional and regulatory bodies such as the Institute of Marine Engineering, Science and Technology (IMarEST), RINA, The Chartered Institute of Logistics and Transport (CILT), and Jabatan Laut Malaysia. Naval architecture, marine engineering, marine electrical & electronics, and maritime management are among the subjects covered in the courses. The programmes' innovative integration of theoretical instruction with real-world application exposes students to real-world situations [21].

2.0 RESEARCH METHODOLOGY

Survey method questionnaires were used by researchers to collect the key data. This study was conducted among the targeted respondents of the third and fourth year, Bachelor of Maritime Operation students in UniKL MIMET. UniKL MIMET has an average of 65 third-year students and a total of 53 fourth-year students. In total, there are 118 BMO students in their third and fourth years at UniKL MIMET.

The data collected from the survey was converted into reliable information and provided significant research results. The primary source was the main method utilized to gather information from the intended respondent. The data collected through this approach was the primary reference point in the data analysis process. A Likert-type scale as seen in Table 1, was utilized to measure the respondents' level of awareness among the third- and fourth-year students, specifically UniKL MIMET's Bachelor of Maritime Operations students, on the impact of shipbuilding operations on the mangrove ecosystem.

Table 1: Likert Scale Table

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

2.1 Data Analysis

SPSS stands for the Statistical Package for the Social Sciences, which is a comprehensive data analysis system. This tool enables users to produce reports, charts, plots, descriptive statistical analyses, and complex statistical analyses using data from any file type. With its advanced features, SPSS is ideal for analyzing statistical data sets and samples, and it can be useful in assisting researchers to achieve their research goals by providing valuable insights into data collection and analysis.

3.0 RESULTS AND DISCUSSION

A pilot survey was conducted using the Cronbach Alpha method, a survey consisting of 15 questions was developed to assess the awareness of the impact of shipbuilding operations on mangrove ecosystems amongst the third and fourth year Bachelor of Maritime Operation students at UniKL MIMET. The survey was conducted with six respondents from the Bachelor of Marine Engineering (BME) program at UniKL MIMET as a pilot test. Upon conducting the Cronbach's Alpha test, the reliability statistics of the questionnaire data was 0.885. This score indicates that the surveys are dependable and suitable for usage.

Table 2: Demographic

Content		Frequency	Percent	Cumulative percent
Gender	Male	44	57.9	57.9
	Female	32	42.1	100
Study in year	3 rd year	27	35.5	35.5
	4 th year	49	64.5	100
Semester	Sem 5	8	10.5	10.5
	Sem 6	19	25.0	35.5
	Sem 7	49	64.5	100
Valid N	76			

Based on Table 2 above, it shows the percentage of the respondent's gender. This shows that the number of respondents of male are higher than the number of female respondents. The frequency for male is 44 respondents which is equal to 57.89%, meanwhile the frequency for female is 32 respondents which is equal to 42.11%.

Secondly, the percentage of third and fourth-year students who responded to the survey is shown in Table 4 above. A high percentage of the questionnaires were completed by fourth-year students, 76 to 49 students, representing 64.47% of the total number of students, compared with only 27, 35.53% of third-year students.

Thirdly, as shown in Table 4, the majority of the above results BMO semester 7 students represented 64.47% of those who responded to this survey. Meanwhile, BMO semester 6 students were the second highest with 19 responses at 25%, followed by BMO semester 5 students with 8 respondents at 10.53%.

3.1 Mean Score Analysis

Table 3: Mean Score

Mean score	Interpretation
1.00 – 1.89	Very low
1.90 – 2.69	Low
2.70 – 3.49	Neutral
3.50 – 4.29	High
4.30 – 5.00	Very high

Table 4: Grand Mean

	N	Minimum	Maximum	Mean	Std. Deviation
Summean1	76	3	5	3.63	.618
Valid N (listwise)	76				

As can be seen in Table 3, it shows the interpretation of the mean for each score. Meanwhile Table 4 shows the analysis to determine the level of awareness among the third and fourth year, Bachelor of Maritime Operation students at UniKL MIMET about the effect of shipbuilding operation towards mangrove ecosystem. According to Table 4, the mean is 3.63. Based on Table 5, the mean analysis interprets as high. Thus, this concludes that the BMO students in the third and fourth year are aware that the impact of shipbuilding operations on the mangrove ecosystem can lead to the deterioration of the mangrove ecosystem. As a result, being aware of the impact of shipbuilding operations on the mangrove ecosystem provides BMO students with the knowledge to establish mitigation and conservation strategies.

Table 7 focuses to study the action that should have been taken to raise awareness among 3rd and 4th year, Bachelor of Maritime Operation students at UniKL MIMET on the declining of mangrove ecosystem as a result of shipbuilding.

Table 7: Top Three Highest Mean Score

Actions	Mean
Seminars, campaign, workshops, and trainings can be used to improve 3rd and 4th year BMO student knowledge of the importance of safeguarding mangrove ecosystems from shipbuilding activities.	3.91
BMO students should learn about the significance of mangrove ecosystems and how they are being destroyed, especially as a consequence of shipbuilding activities.	3.91
Social media by UniKL MIMET community can be used to increase awareness and teach students about how shipbuilding affects the environment, including mangrove ecosystems.	3.87

From the highest mean in Table 7, shows the actions should be taken to raise awareness among the third and fourth year of BMO students at UniKL MIMET, such as seminars, campaigns, workshops, training, and social media by the UniKL MIMET community, which can be used to increase awareness, and students can also be aware that shipbuilding has destroyed mangrove ecosystems.

4.0 CONCLUSION

The study revealed that third and fourth-year students enrolled in the Bachelor of Maritime Operations program at UniKL MIMET possess an understanding of the impact of shipbuilding on the mangrove ecosystem. The study underscores the significance of evaluating students' comprehension of how shipbuilding activities can affect mangrove ecosystems. To raise awareness of the negative impact of shipbuilding on mangrove ecosystems, a comprehensive approach is necessary for implementation among the Bachelor of Maritime Operations students in their third and fourth year at UniKL MIMET. The following recommendations can be implemented to achieve student awareness and the actions that UniKL MIMET needs to take to address this issue in the future. First, in collaboration with the UniKL MIMET and the shipping industry can organise seminars and awareness campaigns to educate students about the importance of protecting mangrove ecosystems and the role that shipbuilding contributes to their conservation. Furthermore, UniKL MIMET and the state government are collaborating to promote programmes to develop awareness among BMO students in third and fourth year about the impact of shipbuilding on the mangrove ecosystem. These are ideas or suggestions that can be used or implemented for a good cause to ensure that third and fourth BMO students are aware of shipbuilding activities that influence the mangrove ecosystem.

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