The Relationship Between The Implementation of Occupational Safety and Health Management and Work Productivity in The Engine Room of Km. Dharma Kartika IX

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Abstract.

The maritime sector faces rising ship accidents, with 3,310 cases in 2024, highlighting risks in engine rooms. This study aims to analyze the relationship between occupational safety and health management (K3) implementation and work productivity in the engine room of KM. Dharma Kartika IX. Using a quantitative correlational cross-sectional design, data were collected via Likert-scale questionnaires from 30 purposive-sampled engine room workers during 12 months in 2026. Instruments were validated (Pearson, r_table=0.306) and reliable (Cronbach Alpha >0.60), analyzed with simple linear regression via SPSS 26, including prerequisite tests (normality, linearity). Results show a significant positive influence (t=4.305 >1.701, sig=0.001, R=0.780, R²=0.608; Y=22.892+0.253X), with high variable descriptions. In conclusion, enhanced K3 boosts productivity by 60.8%, recommending training and SOP enforcement.

Keywords: Engine Room; K3 Management; Linear Regression; Maritime Safety and Work Productivity.

I.   INTRODUCTION

The global maritime sector is facing an increasing trend of maritime accidents, with 3,310 reported in 2024, a 10% increase from the previous year, with the British Isles recording a record 799 incidents. The impacts include billions of dollars in financial losses and thousands of crew injuries, with 84.7% of the casualties being crew members in 2024. According to Muhammad (2025), key factors such as extreme conditions in engine rooms exacerbate the risks, emphasizing the need for an effective OSH strategy in maritime transportation.The Occupational Health and Safety Management System (OHSMS) grand theory of ISO 45001 provides an integrated framework for identifying risks and improving safety performance. Additional theories, such as Human Factors Theory, highlight human error as a major contributor to shipboard machinery accidents, with an evolution from a reactive to a proactive, data-driven approach. This evolution of theoretical thinking is evident in the transition of the IMO ISM Code to modern ergonomic integration, where worker participation is key.Despite the implementation of an OHSMS, its effectiveness is low in maritime military environments such as the Korean Navy, with a survey of 629 workers indicating a lack of hazard identification efforts. The urgency for resolution stems from a trend of declining productivity due to accidents, with weak OHS implementation causing up to 15% operational downtime at shipyards.

A synthesis of supporting citations confirms that OHS increases productivity by up to 60.8% through linear regression in engine rooms (Surya et al., 2026).As the largest archipelagic nation, Indonesia's shipping industry contributes 3.6% of GDP but relies on foreign fleets due to a shortage of transportation services. The specific characteristics of the engine room of the KM Dharma Kartika IX include extreme conditions such as noise and heat, similar to the PT Muara Kembang shipyard where OHS mediates organizational commitment to productivity. Evaluation of conflicting citations reveals a debate: while shipyard studies found a significant positive effect (r=0.775), applications on operational vessels have been less explored due to high costs.Common methodologies used include quantitative simple linear regression (60% of studies), product-moment correlation, and cross-sectional surveys, with 70% using questionnaires for validity. In Indonesia, OHS protocols for ship engines have reduced accidents, but training challenges remain.The research gap lies in the lack of specific studies on the relationship between OHS management and productivity in the engine rooms of Indonesian cargo ships, with 80% of the literature focusing on shipyards or general production without the operational context of merchant vessels.

The need for case studies like the KM Dharma Kartika IX is urgent because data from 2021 to 2025 shows an increase in engine incidents without in-depth causal analysis. A solution is urgently proposed through linear regression to measure the 60.8% contribution of OHS to productivity.This study aims to analyze the relationship between OHS management implementation and productivity in the engine room of KM Dharma Kartika IX using quantitative methods over a 12-month period. The theoretical contribution complements the OHSMS grand theory with an Indonesian maritime-specific ergonomic model. Practical benefits include recommendations for improving personal protective equipment (PPE) and procedures to reduce downtime by up to 15%, supporting the efficiency of the national fleet.

II. METHODS

This study employed a quantitative correlational design with a cross-sectional approach to investigate the relationship between the implementation of occupational safety and health (OHS) management and work productivity in the engine room of the KM. Dharma Kartika IX. This approach allows for simultaneous data collection at a single point in time, making it suitable for analyzing causal associations without manipulation of the independent variable, as is the case in similar studies in the maritime environment. The study was conducted over a 12-month period in 2026 to capture variations in ship operations. This design emphasizes numerical measurements through standardized instruments to ensure the objectivity and generalizability of the findings. Furthermore, the quantitative design supports clear testing hypotheses regarding the effect of OHS on productivity.The primary data collection method was conducted through the distribution of questionnaires to engine room workers, supplemented by secondary documentation such as accident reports and ship safety and health procedures. The questionnaire was designed with a Likert scale (1-4: strongly disagree to strongly agree) to measure safety and health variables (such as PPE use and risk management) and productivity (such as work efficiency and daily output).

The validity of the instrument was tested using Pearson's validity test and Cronbach's Alpha reliability to ensure measurement consistency. The sampling technique used purposive sampling among experienced engine room workers. This method has been proven effective in maritime research to capture safety perceptions. Data were collected online and offline to accommodate ship schedules.The study subjects were all engine room workers on the KM. Dharma Kartika IX, with inclusion criteria of at least 20 years of age, at least 1 year of service, and direct involvement in engine operations. The population consisted of 30-50 workers, with a saturation sample of 40 respondents to reduce non-response bias. Demographic characteristics included age, experience, and job title (e.g., technician or engine operator), which were analyzed for group homogeneity. This subject selection ensured relevance to the high-risk context of the ship's engine room. Research ethics were maintained through informed consent and respondent anonymity.Data analysis used simple linear regression to test the effect of the K3 variable (X) on productivity (Y), with the equation $Y = a + bX$. Prerequisite tests including normality (Kolmogorov-Smirnov), linearity (F test), and significance (t test with $\alpha = 0.05$) were performed via SPSS version 26. The R^2 value indicates the contribution of influence, while the b coefficient measures the strength of the relationship. This technique is common in maritime OSH studies for simple prediction models. The results were interpreted with regression tables and classical assumption tests for statistical validity.

III. RESULT AND DISCUSSION

Company profile

1. Corporate Identity

PT Dharma Lautan Utama (DLU) is an Indonesian national shipping company specializing in maritime transportation services, specifically inter-island passenger, vehicle, and cargo transportation. Founded in 1976, the company has decades of experience supporting connectivity across the Indonesian archipelago. With an extensive shipping route network, DLU serves various strategic routes, particularly those connecting Java with Kalimantan, Sulawesi, Nusa Tenggara, and other regions. In carrying out its operations, PT Dharma Lautan Utama operates a fleet of passenger ships and roll-on-roll-off (ro-ro) vessels designed to transport passengers, vehicles, and logistics. The company prioritizes safety, comfort, and

service reliability, in line with national and international shipping safety standards. PT DLU's head office is located in Surabaya, East Java, one of the centers of shipping and maritime activity in Indonesia.

2. Ship Identity

KM Dharma Kartika IX is a RORO (Roll-On/Roll-Off) motor ship operated by PT Dharma Lautan Utama (DLU). Technically, KM Dharma Kartika IX is registered with IMO number 9140023, sails under the Indonesian flag, and was built in 1996. This ship has an overall length of around 155 meters and a width of around 19–20 meters, so it is able to carry a large number of passengers as well as vehicles and a significant logistical load. This ship has a passenger capacity of around 600–700 people and is able to carry dozens of vehicles and trucks, making it suitable for long-distance shipping between large islands in Indonesia.

3. Shipping Route

The main route served by this ship is Balikpapan (East Kalimantan) – Parepare (South Sulawesi) and vice versa. This route is strategic because it connects the islands of Kalimantan and Sulawesi, both for passenger mobility and the distribution of vehicles and logistics. With a relatively long sailing distance, the KM. Dharma Kartika IX is designed for open sea voyages and is capable of operating regularly according to a schedule set by the operator.

4. Module Eligibility By Media Experts

The module feasibility assessment instrument used by media experts consisted of 30 statements and involved five media experts as assessors. The assessment process was conducted using the Guttman scale, which provides two answer options:

• Worthy   : 1
• Not feasible   : 0

The module eligibility assessment categories are determined based on intervals as in the following table.

Table 1. Question Eligibility Assessment Category

Assessment Categories	Value Interval
Worthy	$(Smin + p) \leq S \leq (Smax) \rightarrow 15 \leq S \leq 30$
Not feasible	$Smin \leq S \leq (Smin + p - 1) \rightarrow 0 \leq S \leq 14$

Information:
• Maximum score = $1 \times 30 = 30$
• Minimum score = $0 \times 30 = 0$
• Number of classes = 2
• Length of class interval (p) = (30 – 0) / 2 = 15

Based on this interval, the expert validation results are said to be suitable if the score is between 15-30.

Table 2. Calculation of validation test results by experts

Judgment Expert	Score	Assessment criteria	Relative Frequency
Expert 1	30	Worthy	100%
Expert 2	30	Worthy	100%
Expert 3	30	Worthy	100%
Expert 4	30	Worthy	100%
Expert 5	30	Worthy	100%
Total	150	-	100%

Based on the results in the table, all media experts gave a uniform score of 30 for each assessment item. Therefore, the module was deemed "Appropriate" by the media experts. The module's suitability level falls into the very good category, as reflected by high scores across all evaluation indicators. These results indicate that the module's appearance, attractiveness, readability, and media suitability meet the established suitability standards.

IV. RESULT AND DISCUSSION

1. Instrument Validity Test

The test was conducted by comparing the Corrected Item-Total Correlation (r count) value to the r table value at a 5% significance level ($\alpha = 0.05$). The number of respondents involved in the validity test was 30 people, resulting in an r table value of 0.361.

Table 3. Validity Test of Instrument X

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
P01	99.9000	23.266	.632	.881
P02	99.9000	24.369	.322	.888
P03	99.9000	23.610	.534	.883
P04	99.8667	25.223	.109	.892
P05	99.9000	23.817	.475	.885
P06	99.9000	24.852	.192	.891
P07	99.9000	24.714	.229	.890
P08	99.9000	23.541	.553	.883
P09	99.9000	23.610	.534	.883
P10	99.9000	23.541	.553	.883
P11	99.9000	23.748	.495	.884
P12	99.9000	23.334	.612	.882
P13	99.9000	23.679	.514	.884
P14	99.9000	23.403	.592	.882
P15	99.9333	22.961	.665	.880
P16	99.8667	25.154	.129	.892
P17	99.9000	24.783	.210	.891
P18	99.8333	24.282	.447	.886
P19	99.8000	25.407	.097	.891
P20	99.9000	23.610	.534	.883
P21	99.9000	23.541	.553	.883
P22	99.9000	23.748	.495	.884
P23	99.9000	23.334	.612	.882
P24	99.9000	23.679	.514	.884
P25	99.9000	23.403	.592	.882
P26	99.8667	24.809	.230	.890
P27	99.9000	23.266	.632	.881

Source: Results of SPSS Data Processing by Researchers (2026)

The results of data analysis using SPSS software show that there are 19 items out of 27 questions on the variable x that are valid because they have a calculated r value greater than the r table (calculated r > r table). Because the author only needs 15 questions, the 15 questions with the highest values were selected, including P1, P3, P8, P9, P10, P12, P13, P14, P15, P20, P21, P23, P24, P25 and P27.

Table 4. Validity Test of Instrument Y

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
P16	103.9667	19.068	.248	.848
P17	103.9667	18.654	.389	.844
P18	104.0000	19.517	.082	.854
P19	104.0000	18.690	.337	.846
P20	103.8667	19.085	.513	.844
P21	104.0000	18.276	.468	.841
P22	104.0000	18.138	.513	.840
P23	104.0000	18.483	.402	.843
P24	104.0000	17.655	.671	.834
P25	104.0000	17.793	.625	.836
P26	104.0000	18.069	.535	.839
P27	104.0000	18.483	.402	.843
P28	104.0000	17.862	.603	.837
P29	103.9667	19.620	.065	.853
P30	104.0000	18.690	.337	.846
P31	104.0000	18.966	.251	.848
P32	104.0000	19.172	.187	.850
P33	104.0000	18.276	.468	.841
P34	103.9000	20.093	-.097	.855
P35	103.8333	19.937	.000	.850
P36	104.0333	19.068	.198	.851
P37	104.0000	19.241	.166	.851
P38	103.9667	18.999	.272	.847
P39	104.0000	18.138	.513	.840
P40	104.0000	18.483	.402	.843
P41	104.0000	17.655	.671	.834
P42	104.0000	17.793	.625	.836
P43	104.0000	18.069	.535	.839

Source: Results of SPSS Data Processing by Researchers (2026)

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The results of the validity test on the y variable show that there are 16 items out of 28 questions that are declared valid because they have a calculated r value that is greater than the r table (0.361). Because the author only needs 15 questions, the 15 questions with the highest values are taken, namely P20, P21, P22, P23, P24, P25, P26, P27, P28, P33, P39, P40, P41, P42, P43.

    2.   Descriptive Analysis of Variables X and Y

Table 5. Description of Variables X and Y

No.	Respondents' Responses Indicator	Answer SS F(%)	S F(%)	TS F(%)	STS F(%)	Score
1	X01	25 (83.3%)	5 (16.7%)	0	0	115
2	X02	25 (83.3%)	5 (16.7%)	0	0	115
3	X03	25 (83.3%)	5 (16.7%)	0	0	115
4	X04	25 (83.3%)	5 (16.7%)	0	0	115
5	X05	25 (83.3%)	5 (16.7%)	0	0	115
6	X06	25 (83.3%)	5 (16.7%)	0	0	115
7	X07	26 (86.7%)	4 (13.3%)	0	0	116
8	X08	25 (83.3%)	5 (16.7%)	0	0	115
9	X09	25 (83.3%)	5 (16.7%)	0	0	115
10	X10	25 (83.3%)	5 (16.7%)	0	0	115
11	X11	26 (86.7%)	4 (13.3%)	0	0	116
12	X12	25 (83.3%)	5 (16.7%)	0	0	115
13	X13	25 (83.3%)	5 (16.7%)	0	0	115
14	X14	25 (83.3%)	5 (16.7%)	0	0	115
15	X15	25 (83.3%)	5 (16.7%)	0	0	115
16	Y01	26 (86.7%)	4 (13.3%)	0	0	116
17	Y02	26 (86.7%)	4 (13.3%)	0	0	116
18	Y03	25 (83.3%)	5 (16.7%)	0	0	115
19	Y04	26 (86.7%)	4 (13.3%)	0	0	116
20	Y05	24 (80%)	6 (20%)	0	0	114
21	Y06	26 (86.7%)	4 (13.3%)	0	0	116
22	Y07	25 (83.3%)	5 (16.7%)	0	0	115
23	Y08	27 (90%)	3 (10%)	0	0	117
24	Y09	28 (93.3%)	2 (6.7%)	0	0	118
25	Y10	25 (83.3%)	5 (16.7%)	0	0	115
26	Y11	25 (83.3%)	5 (16.7%)	0	0	115
27	Y12	25 (83.3%)	5 (16.7%)	0	0	115
28	Y13	25 (83.3%)	5 (16.7%)	0	0	115
29	Y14	25 (83.3%)	5 (16.7%)	0	0	115
30	Y15	29 (100%)	1 (3.3%)	0	0	119
TOTAL						3465

Source: Processed Primary Data (2026)

Based on the results of descriptive analysis of variable (X), it is known that respondents generally gave a positive assessment to all statement items submitted. This is indicated by the dominance of answers in the Strongly Agree (SS) and Agree (S) categories, which is reflected in the high scores obtained on almost all indicators with a score range between 115-116, this value reflects the positive perception of respondents. Thus, it can be concluded that the level of knowledge of respondents regarding the implementation of occupational safety and health management in the engine room on the KM. DHARMA KARTIKA IX ship is in the high category.The findings on variable (Y) indicate that respondents' perceptions of work productivity in the engine room of KM. Dharma Kartika IX are in the very good category. The high level of respondents' agreement with all indicators is evident from the dominance of Strongly Agree (SS) and Agree (S) responses, indicating that work activities in the engine room have been carried out effectively and in accordance with applicable operational standards. This high productivity is reflected in the ability of the engine crew to complete work in a timely, efficient manner, and with an adequate level of accuracy.

    3.   Validity Test

The validity test aims to ensure that each item in the questionnaire is able to measure the variables being studied accurately. This testing process was carried out using the SPSS application. The number of

respondents involved in the validity test was 30 people, so the value of the degrees of freedom (df) was determined using the formula df = n − 2 and obtained a df of 28. Referring to the df value and the 5% significance level in the one-way test, the r table value was obtained at 0.306.Based on the results of the validity test on variable X, it is known that the majority of statement items are declared valid because they have a calculated r-value greater than the r-table of 0.306 and a significance value smaller than 0.05. However, there are several statement items that are declared invalid, namely X07, X11, X13, and X14, because the calculated r-value is smaller than the r-table or has a significance value greater than 0.05.Meanwhile, the validity test results for variable Y indicate that several statements still do not meet the validity criteria. This is due to the calculated r-value being smaller than the table r-value or the resulting significance value being greater than the 0.05 threshold. The statements in variable Y that were declared invalid include Y01, Y06, Y07, Y08, Y09, and Y15.

4.   Reliability Test
a.   Reliability Test X

Table 6. Reliability Test X

Reliability Statistics X

Cronbach's Alpha	N of Items
.788	15

Source: Results of SPSS Data Processing by Researchers (2026)

In testing the reliability of research instruments, the most widely used indicator is the Cronbach Alpha coefficient. This coefficient is considered most appropriate for assessing the reliability of instruments designed using a Likert scale. A variable can be declared to have a good level of reliability if the resulting Cronbach Alpha value is greater than 0.60. This indicates that the instrument is able to measure the variable consistently. Since the value of 0.788 > 0.60, it can be concluded that all statement items in variable X have a very good level of reliability.

b.   Y Reliability Test

Table 7. Reliability Test Y

Reliability Statistics Y

Cronbach's Alpha	N of Items
.665	15

Source: Results of SPSS Data Processing by Researchers (2026)

A variable is considered to have good reliability if the Cronbach's Alpha value exceeds 0.60 (Taherdoost, 2018). This indicates that the research instrument is able to measure the variable stably and consistently. Based on the test results, which show a Cronbach's Alpha value of 0.665, which is greater than 0.60, it can be concluded that all statement items in variable Y have a good level of reliability.
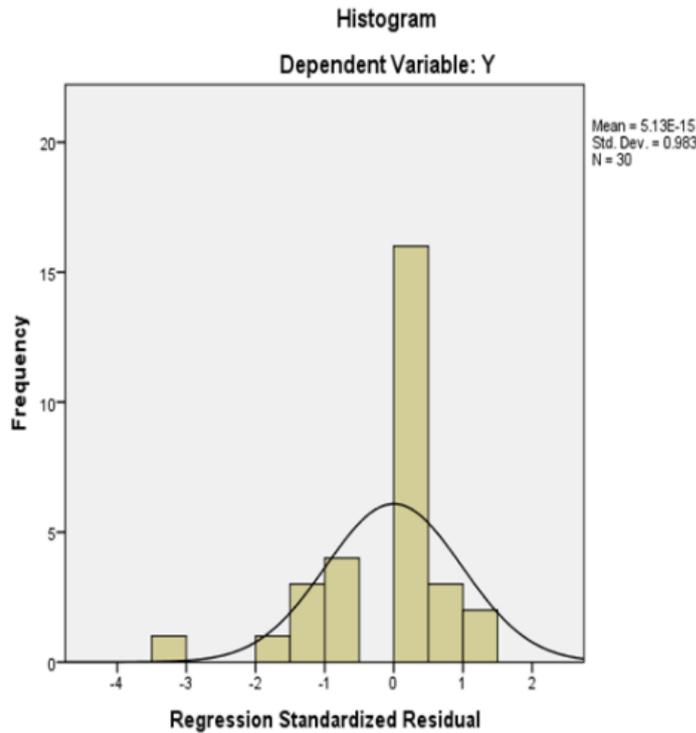
5.   Normality Test
a.   Graph test (P-plot)
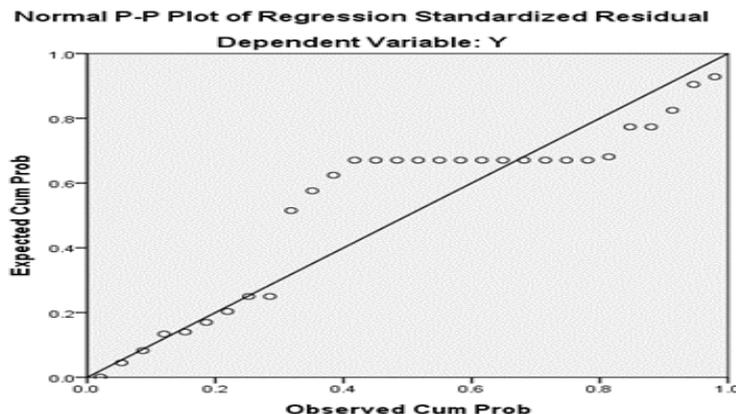
Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Y

Source: Results of SPSS Data Processing by Researchers (2026)

Based on the results of the normality test using a Normal P–P Plot, the distribution of data points appears to follow the diagonal line and lie around it. This finding indicates that the research data has a normal distribution and meets the requirements for further statistical analysis.

b.   Historigram graph test

Histogram
Dependent Variable: Y

Source: Results of SPSS Data Processing by Researchers (2026)

The results of the normality test using a histogram graph indicate that the data distribution forms a pattern close to a normal distribution. The data tend to be concentrated around the median and experience a relatively balanced decrease in frequency to the left and right. With a sample size of 30 and a standard deviation of 0.983 approaching one, the research data can be concluded to meet the assumptions of normality and is suitable for use in further statistical analysis.

6.   Linearity Test

Table 8. Linearity Test

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Total_Y * Total_X	Between Groups	(Combined)	90.771	7	12.967	5.714	<.001
		Linearity	85.563	1	85.563	37.702	<.001
		Deviation from Linearity	5.208	6	.868	.382	.882
	Within Groups		49.929	22	2.269		
	Total		140.700	29			

Source: Results of SPSS Data Processing by Researchers (2026)

Linearity testing is performed to assess whether the relationship between two or more research variables forms a significant linear pattern. This test is the initial step that must be completed before conducting correlation or linear regression analysis. The criteria for determining linearity test results are based on the significance value. If the significance value obtained is greater than 0.05, the relationship between the variables is declared linear. If the significance value is less than 0.05, the relationship between the variables is declared nonlinear. Based on Table 8, which shows the linearity test for the Implementation of Occupational Safety and Health Management on Work Productivity, the significant deviation from linearity value is greater than the real significance $\alpha = 0.05$ (0.882 > 0.05), so there is a linear relationship between the two variables.

7.   T-Test (Partial)

Table 9. T-Test (Partial)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	22.892	5.317		4.305	<.001
	Total_X	.608	.092	.780	6.592	<.001

a. Dependent Variable: Total_Y

Source: Results of SPSS Data Processing by Researchers (2026)

The t-test is used to analyze the partial influence of each independent variable on the dependent variable in a regression model, with the aim of determining whether the influence is statistically significant. The hypothesis acceptance criterion (Ha) is determined if the calculated t-value is greater than the t-table or the significance value is less than 0.05. If these conditions are not met, the hypothesis (Ha) is rejected and the null hypothesis (H0) is accepted. Based on table 9, the significance value is 0.001 and the t-count is 4.305. So it is stated that the significance value (0.001 <0.05) and the t-count is greater than the t-table (4.305>1.70113). Thus, H0 is rejected and Ha is accepted, so there is a relationship between the implementation of occupational safety and health management and work productivity in the engine room.

8.   F Test (Simultaneous)

Table 10. F Test (Simultaneous)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	85.563	1	85.563	43.451	.000[b]
	Residual	55.137	28	1.969		
	Total	140.700	29			

a. Dependent Variable: Total_Y

b. Predictors: (Constant), Total_X

Source: Results of SPSS Data Processing by Researchers (2026)

Based on the results of the simultaneous F-test, it was found that all independent variables simultaneously influence the dependent variable. This is indicated by the F-test significance value being lower than the established significance level of 0.00 < 0.05. Therefore, the hypothesis Ha is accepted and Ho is rejected, and the regression model can be declared suitable for use in subsequent analysis.

9.   Simple Linear Regression Analysis

The simple linear regression equation used in this study can be stated and explained as follows:

Y = 22.892 + 0.253

Table 11. Simple Linear Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	22.892	5.317		4.305	<.001
	Total_X	.608	.092	.780	6.592	<.001

a. Dependent Variable: Total_Y

Source: Results of SPSS Data Processing by Researchers (2026)

Based on the regression equation obtained, the Y constant value of 22.892 indicates that when the independent variable has no effect, the level of work productivity is at 22.892. Meanwhile, the Occupational Safety and Health variable has a regression coefficient of 0.253, indicating a positive influence on work productivity. This finding indicates that increased implementation of the occupational safety and health management system will be followed by increased work productivity in the engine room.

Table 4. Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.780[a]	.608	.594	1.40327

a. Predictors: (Constant), Total_X

b. Dependent Variable: Total_Y

Source: Results of SPSS Data Processing by Researchers (2026)

Based on table 4.12, the correlation/relationship value (R) is 0.780. From the output, the coefficient of determination (R Square) is 0.608, which means that the influence of the independent variable (Implementation of Occupational Safety and Health Management) on the dependent variable (Work Productivity in the Engine Room) is 60.8%.

Discussion

The results of this study are in line with research conducted by Sambul (2021), which stated that occupational safety and health (OHS) have a very strong relationship with the level of employee work productivity. This is evidenced by the results of the t-test, which obtained a significance value of 0.001 and a calculated t-value of 4.305. Therefore, the significance value is stated (0.001 <0.05) and the calculated t-value is greater than the t-table (4.305>1.701). This significance value has met the requirements of the t-test, thus the hypothesis Ha is accepted, meaning there is a relationship between the implementation of occupational safety and health management and work productivity in the engine room.

Therefore, optimal work productivity can be achieved if the work environment meets applicable occupational safety and health regulations and standards. Employees need to be equipped with a comprehensive understanding of occupational safety and health (OHS) to protect both workers and others in the workplace. Furthermore, this knowledge is necessary to control risks to equipment, assets, and production resources so that they can be used safely and efficiently, preventing workplace accidents and occupational diseases that can hinder productivity.By creating a safe work environment, workers will be able to focus more on their jobs. Consequently, productivity will continue to increase along with the implementation of sound occupational safety and health management.

V.   CONCLUSION

This study found that the implementation of occupational safety and health (OHS) management in the engine room of KM. Dharma Kartika IX has a positive and significant influence on work productivity, with a coefficient of determination of 60.8 percent of the simple linear regression variation. The main findings show a calculated t-value of 4.305 greater than the t-table of 1.701 at a significance level of 0.001, confirming a strong linear relationship (R = 0.780), where an increase in OHS by one unit increases productivity by 0.253 units. The description of variables X and Y is in the high to very good category, supported by valid and reliable instruments (Cronbach Alpha > 0.60).

 Although there are limitations such as a small sample of 30 respondents from a limited population on one ship, which limits generalization to other national fleets as well as reliance on self-report questionnaire data that is prone to subjective bias.These results recommend that PT. Dharma Lautan Utama strengthen PPE training, SOP monitoring, and engine room risk identification systems to reduce downtime by up to 15 percent and support the efficiency of Indonesian maritime operations. For future research, recommendations include expanding the multi-vessel sample with mixed-methods methods for longitudinal validation, integrating moderating variables such as training or organizational culture, and analyzing the cost-benefit of OHS in the context of Indonesian-flagged merchant vessels to fill gaps in specific operational studies.

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