



## The Effect of Shore Leave Crew on Watch Duty on Passenger Ships

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### Abstract

The shipping industry plays a vital role in supporting passenger mobility and goods distribution in Indonesia. However, one of the challenges faced is the management of crew working hours and rest periods, particularly in relation to shore leave activities. This study aims to analyze the effect of crew shore leave on the effectiveness of watchkeeping duties on passenger ships and the impact of crew shore leave on the readiness and performance of watchkeeping crews. The research method used is a quantitative approach with an instrument in the form of a questionnaire distributed to 35 passenger ship crew members on duty at PT Pelni Makassar. The data were analyzed using descriptive statistics, regression tests, and ANOVA. The results of the study indicate that shore leave crew has a significant effect on the quality of watchkeeping, particularly in terms of physical readiness, mental readiness, and reduction of fatigue risk. These findings emphasize the importance of good shore leave schedule management to support shipping safety.

**Keywords:** Shore leave, crew performance, watchkeeping, ship passengers.

### 1. INTRODUCTION

The shipping industry plays a strategic role in supporting human mobility and the distribution of goods at both the national and international levels. In the passenger shipping sector, the main priorities are safety and comfort. One important element in ensuring operational safety and efficiency is the implementation of watchkeeping duties by the ship's crew. Watchkeeping duties include vital tasks such as navigation supervision, engine operation, and passenger safety maintenance. However, the performance of the ship's crew is often influenced by human factors, including fatigue, stress levels, and suboptimal work time management [1], [2]. In passenger ship operations, the shipping company is responsible for ensuring that the crew can perform their duties optimally. One commonly used approach is the crew rotation or cruise system, which involves the periodic replacement of crew members to ensure adequate rest time after intensive work periods. This system also aims to maintain the continuity of ship operations. However, the implementation of this system often faces obstacles, especially in terms of planning and coordination. Poor planning or coordination can affect the smooth running of watch duties and, ultimately, threaten the safety of the voyage [3]. International standards have established a strict framework to mitigate the risk of fatigue through the STCW 1978 Manila Amendments 2010, which regulates the minimum rest hours for ship crews to ensure alertness during watchkeeping duties. These provisions are further reinforced by the latest IMO (International Maritime Organization) guidelines in the Guidelines on Fatigue, which emphasize that fatigue management is a vital element in maintaining maritime safety. Effective implementation of rest periods, including through shore leave policies, is crucial for maintaining the mental and physical readiness of the crew to remain focused and disciplined in accordance with applicable operational standards [4], [5].

As one of Indonesia's maritime centers, shipping companies in Makassar play an important role in supporting the national passenger shipping industry. High shipping activity in this region requires an efficient crew management system, including cruise crew scheduling. However, challenges such as a limited number of experienced crew members, inconsistent rotation schedules, and high workloads often pose obstacles. These conditions can have a significant impact on the quality of watchkeeping, especially in situations that require high alertness, such as navigation in shipping lanes with heavy traffic [6]. Previous studies have shown that well-managed crew rotation can improve operational efficiency and maritime safety. According to the



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International Chamber of Shipping, crew members who get adequate rest are better able to perform their duties with high concentration, thereby reducing the risk of human error. Conversely, irregular work schedules tend to cause fatigue, which can impair decision-making during watch duty [7]. Therefore, an effective cruise crew management system is one of the key elements in human resource management strategies in the shipping sector. In addition, the duty roster on passenger ships has unique characteristics compared to other types of ships. Passenger ships not only act as a mode of transportation, but also provide services that require direct interaction with passengers [8]. This requires crew members to carry out their technical responsibilities while providing quality service to passengers. High workloads, especially on routes with high sailing intensity, often cause significant time pressure. In these conditions, a suboptimal crew rotation system can worsen the work situation, potentially reduce service quality and sailing safety [9].

In the context of shipping companies in Makassar, it is important to analyze the influence of the crew rotation system on the implementation of watchkeeping duties on passenger ships. Makassar is a strategic hub in the national shipping network with high shipping activity. This study aims to evaluate how the crew rotation system affects the effectiveness of watchkeeping duties and to provide practical recommendations that can help shipping companies improve the quality of crew management. Using a quantitative approach, this study is expected to make a significant contribution to the development of more effective crew management strategies. Based on the above considerations, this study is designed to analyze the influence of the crew rotation system on the implementation of watchkeeping duties on passenger ships at one of the shipping companies in Makassar. The findings are expected to be useful not only for shipping companies in this region but also as a reference for the shipping industry more broadly in implementing efficient and sustainable crew management.

## 2. METHODS

This type of research is quantitative descriptive research that aims to measure the extent of influence or relationship between two variables. In this study, there are two variables, namely the influence of Shore Leave Crew (independent variable) and the implementation of guard duty (dependent variable) on board the ship. This research activity was carried out in accordance with the theme of the Makassar Maritime Polytechnic research roadmap, namely point 4 concerning Marine Engineering, which is in line with the Focus Area of each Engineering Study Program in point 37 on Contributing to the Safety of Personnel and Ships. This research was conducted on passenger ships operating in the port of Makassar and operated by PT. Pelni Makassar. The research period was 1 year, starting in January to December 2025. The data collection method used was a questionnaire, consisting of structured questions prepared in advance by the researcher, as well as observations of each item on the structured questionnaire and observations of items to validate the factual conditions of the respondents [10], [11].

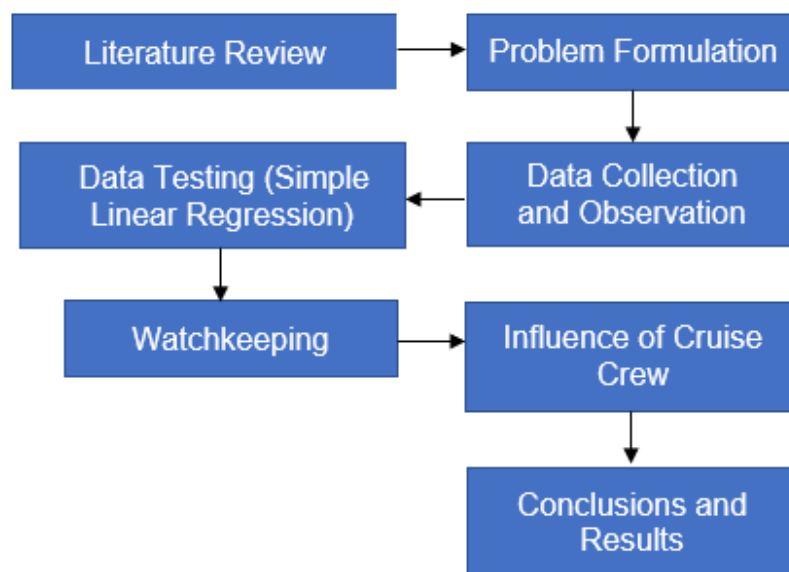


Figure 1. Research Framework



In data analysis techniques, data obtained from field observations and primary and secondary data will be processed. Statistical data testing uses regression analysis to measure the extent of the influence of independent variables (shore leave crew) on dependent variables (quality of guard duty). The type of regression analysis that will be used is Simple Linear Regression, which is used to measure the effect of crew rotation duration on the effectiveness of watchkeeping. This will show whether the variable of crew rotation management affects the effectiveness of watchkeeping. This approach is relevant to the literature on seafarer fatigue and rotation management [12]. In the writing of this study, the author pours out the main ideas into a framework that is arranged in a discussion flow chart in Figure 1.

To ensure the accuracy and consistency of the data collected from the 35 crew members of PT Pelni Makassar, the research instrument underwent rigorous statistical testing before the hypothesis testing (Simple Linear Regression and ANOVA) was conducted. The validity test was conducted to determine whether the 10 questions in the questionnaire could measure the variables—Shore Leave Crew and Watchkeeping Effectiveness—accurately. Using the Pearson Product Moment correlation with a significant level of 5% and  $N = 35$ , the  $r_{table}$  value is 0.334. Every question item in the instrument is declared Valid, meaning the instrument accurately measures the intended variables.

Reliability testing was performed to measure the internal consistency of the instrument. An instrument is considered reliable and can be used as a stable data collection tool if the Cronbach's Alpha coefficient is  $> 0.60$ .

Table 1. Reliability Test Results

Variable	Cronbach's Alpha	Status
Shore Leave Crew (X)	0.892	Highly Reliable
Quality of Watchkeeping (Y)	0.875	Highly Reliable

Cronbach's Alpha values for both variables are above 0.80, indicating a very high level of reliability. Conclusion: The questionnaire is Reliable, ensuring that if the research were repeated under similar conditions, the results would remain consistent.

### 3. RESULTS AND DISCUSSION

This study focuses on analyzing the influence of the crew shore leave system on the implementation of watchkeeping duties on passenger ships operating under the management of PT. Pelni Makassar. By observing passenger ships that regularly dock at the port of Makassar, this study attempts to provide a comprehensive overview of the relationship between shore leave arrangements and crew readiness in maintaining sailing safety. The three passenger ships used as research objects are KM. Ciremai, KM. Bukit Siguntang, and KM. Binaiya. All three represent the characteristics of large-capacity national passenger ships with long sailing routes and high operational complexity. The ship profile data is further described as the basis for analyzing the relationship between crew management factors and the quality of watchkeeping.

#### 3.1. Data Shore Leave Crew

After collecting data in the field, researchers obtained crew data from three passenger ships that were the subjects of the study. The specific data can be seen in the image below:

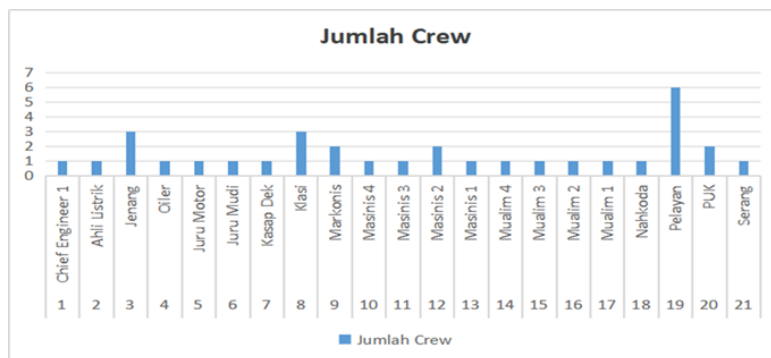


Figure 2. Crew positions on three passenger ships



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Based on the image above, it is known that the total number of samples found is 35 Shore Leave Crew members from different positions and different types of ships. The number of Shore Leave Crew members depends on the conditions and situation of passenger ships docked at the PT. Pelni port when the data was collected. The largest number of positions sampled for the study were waiters, with a total of 6 people. Meanwhile, the number of people in other positions varied, with an average of 1 to 3 people. The number of Shore Leave Crew described here corresponds to the passenger ships that were the subject of the study, namely KM. Ciremai, KM. Bukit Siguntang, and KM. Binaiya. The age data of the Shore Leave Crew on passenger ships can be seen in the chart below:

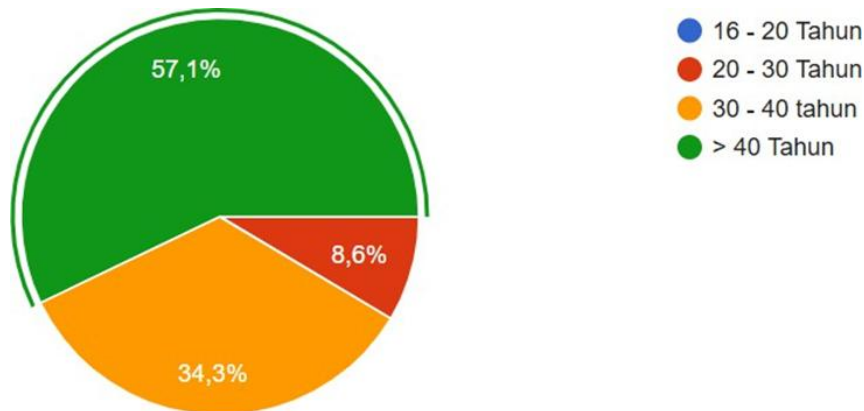


Figure 3. Shore Leave Crew Age Data

The average age of the crew on board is over 40 years old, which indicates maturity and experience. This data helps researchers determine the level of readiness and performance of the watch crew on passenger ships. There are no crew members under the age of 20, and only about 8% of the crew are between the ages of 20 and 30. This is expected to be a major factor in improving the performance of the watch crew.

### 3.2. Length of service at the company

In addition to data on the positions and ages of shore leave crew, the length of the crew's work experience also needs to be known to support this study. The following is an explanation of how the length of work experience on a ship affects the quality of watchkeeping, based on recent studies and literature:

#### a. The Effect of Length of Service (Time on Board)

Actigraphy studies on watchkeepers show a correlation between the length of time on board and an increase in sleepiness and acute drowsiness—the cumulative effect becomes more pronounced as the length of assignment increases (>5 months). Observations state that “working periods below 5 months seem reasonable,” meaning that when assignments exceed 5 months, the risk of fatigue increases.

#### b. Experience vs. Self-Awareness of Fatigue

Junior or less experienced crew members report higher fatigue levels in questionnaires, although objectively (pupillometry) there is no significant difference compared to senior crew members. This shows that experience helps with subjective awareness of one's own condition, which is important for mitigating fatigue factors.

#### c. The “Survivor Bias” Effect on Long-Term Crews

There is a “healthy worker survivor” effect: crews who are more resistant to pressure and fatigue remain, while those who tire easily tend to resign early. As a result, studies examining experienced crews may underestimate the impact of fatigue from long durations.

#### d. Experience vs. Watchkeeping Competence

Experienced crews are usually more adept at managing balanced situations (workload, navigation complexity) and using countermeasure strategies (coffee, micro-breaks, rotation). However, fatigue can still reduce alertness even among technically competent individuals.

#### e. Experience & Moderator Variables



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The level of experience interacts with factors such as assignment duration (months on board); psychological support/psychological capital; work strain (occupational stress). For example, research has found that in crews with high PsyCap, the negative effects of long durations can be mitigated. The data found in this study is the length of shore leave crew work experience on three passenger ships docked at the port of Makassar, as follows:

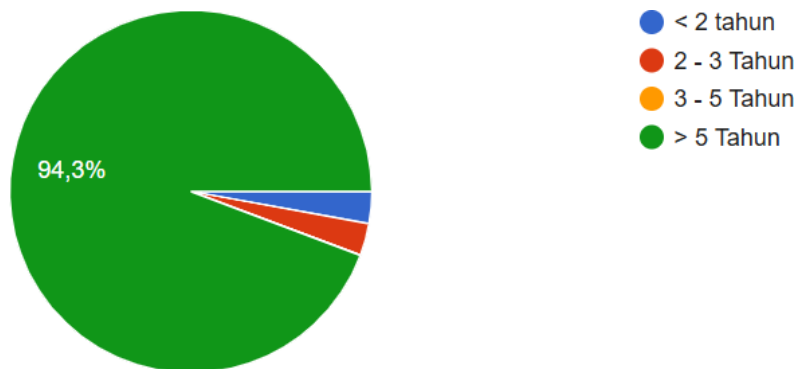


Figure 4. Length of Work Experience of Shore Leave Crew

Based on the image above, around 94% of the crew have been working for more than 5 years and only 2.9% of the crew have been working for less than 3 years. The significance of shore leaves policies in improving watchkeeping quality is substantially reinforced by the crew's professional background, with approximately 94.3% of respondents possessing more than five years of service. This extensive work experience acts as a critical supporting factor for performance, as senior crew members typically exhibit higher levels of maturity and self-awareness in identifying and mitigating fatigue. While fatigue remains a physical risk for all personnel, experienced crews are generally more adept at managing complex navigation workloads and employing effective countermeasure strategies during their duty. Consequently, the interaction between adequate rest periods provided by shore leaves and the crew's seasoned expertise creates a synergy that strengthens alertness and discipline, ensuring that maritime operational standards are consistently met.

### 3.3. The Effect of Shore Leave Crew on the Effectiveness of Guard Duty

This study used a questionnaire as an instrument containing 10 questions to determine the effect of shore leave crew on the effectiveness of watchkeeping duties on board ships. Based on the instrument distributed to 35 shores leaving crew members on passenger ships, the following data was obtained:

Table 2. Data Statistik Kuesioner (Descriptive Statistics)

	N	Minimum	Maximum	Mean	Std. Deviation
<i>shore leave crew</i>	35	17	60	52.29	9.566
<i>kualitas dinas jaga</i>	35	10	40	34.23	6.691
Valid N (listwise)	35				

Based on the descriptive statistics table shown, the following is an interpretation of the shore leave crew data. The number of respondents (N) was 35, with a minimum value of 17 and a maximum value of 60. The data shows a minimum value of 17 and a maximum of 60, with a mean of 52.29 and a standard deviation of 9.566. This relatively high average score indicates that most respondents have a positive perception of the implementation of shore leave. This means that the ship's crew feels that they have sufficient opportunity to rest, recreate, or engage in personal activities on land when the ship is docked.

In human resource management theory, shore leave is seen as an important tool for reducing work fatigue and increasing crew job satisfaction. The IMO (2023) emphasizes that fatigue management is a vital element in maintaining shipping safety, and one mitigation effort is providing adequate rest time. The average score of 52.29 out of a maximum scale of 60 shows that crew members generally feel the tangible benefits of the shore leave policy implemented by the company. Meanwhile, the standard deviation of 9.566 illustrates that there is considerable variation among respondents' answers, although it is not extreme. This variation could be due to differences in position, length of work experience, or workload among crew members. For example, officers

who have navigation and safety responsibilities may feel a greater need for shore leave than galley crew or ratings. Furthermore, the results of the data analysis show the following:

Table 3. Significant Data on the Effectiveness of the Guard Service (ANOVA)

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1452.412	1	1452.412	687.070	.000 <sup>b</sup>
	Residual	69.759	33	2.114		
	Total	1522.171	34			

Description:

- a. Dependent Variable: quality of guard duty
- b. Predictors: (Constant), shore leave crew

The F test assesses whether the regression model as a whole is significant.  $F = 687.070$ ,  $\text{Sig} = 0.000$  means that because  $\text{Sig} < 0.05$ , the model is statistically significant. Shore Leave Crew collectively affects the quality of guard duty.

The model assesses how much of the variance in watchkeeping quality is explained by shore leave. R (Correlation Coefficient): Approximately 0.977. This indicates a very strong positive relationship between shore leave and watchkeeping quality.  $R^2$  (Coefficient of Determination) approximately 0.954 ( $1452.412 / 1522.171$ ), this means 95.4% of the variance in watchkeeping quality can be explained by the shore leave crew variable. Standard Error of the Estimate approximately 1.454 ( $\sqrt{2.114}$ ), indicating high precision in the model's predictions.

Based on the F-test and the means provided, the relationship follows a linear model:

$$Y = a + bX \quad (1)$$

Where Y represents the quality of watchkeeping duty and X denotes shore leave crew. Based on the regression results, the Shore Leave Crew variable significantly predicts the quality of watchkeeping duty, as indicated by a p-value (Sig.) of 0.000, which is lower than the significance threshold of 0.05. In addition, the ANOVA results show an F-value of 687.070 with a significance level of 0.000, confirming that the regression model is statistically significant. These findings indicate that the Shore Leave Crew variable has a meaningful and collective effect on the quality of watchkeeping duties.

### 3.4. The Impact of Shore Leave Crew on Watchkeeping Performance

This study used a questionnaire as an instrument containing 10 questions to determine the impact of shore leave crew on the readiness and performance of watch crews on board ships. Based on the instrument distributed to 35 shores leaving crew members on passenger ships, the following data was obtained:

Table 3. Questionnaire Statistics Data

	N	Minimum	Maximum	Mean	Std. Deviation
shore leave crew	35	17	60	52.29	9.566
kualitas dinas jaga	35	10	40	34.23	6.691
Valid N (listwise)	35				

Based on the descriptive statistics table shown, the number of respondents in this study was 35 crew members with a minimum value of 10 and a maximum of 40. The average (mean) value of watchkeeping quality was 34.23 with a standard deviation of 6.691. This figure shows that watchkeeping quality was in the highest category, because the average value was close to the maximum limit. In other words, most respondents gave a positive assessment of the implementation of watchkeeping on PT Pelni Makassar passenger ships. These results show that the crew has a relatively good perception of the standards of watchkeeping, including aspects of alertness, discipline, and compliance with applicable regulations. The high average indicates that watchkeeping activities on the bridge and in the engine, room are carried out responsibly in accordance with the provisions of STCW 1978 Manila Amendments 2010. The standard deviation of 6.691 indicates a moderate level of variation among respondents, which is not too large, so the data distribution is considered quite good. This shows that although there are slight differences in individual experiences, in general, the quality of watchkeeping is considered consistent and stable.



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This interpretation is significant because the quality of watchkeeping is not only influenced by technical factors such as navigation equipment or engines, but also by the mental and physical readiness of the crew. Crew members who have adequate shore leave tend to be fresher, more focused, and more alert in carrying out their watchkeeping duties. This condition is in line with the International Maritime Organization (2023) guidelines on fatigue management, which emphasize the importance of regulating rest time for crew members. Previous studies have also confirmed that chronic fatigue in sailors has a direct implication on decreased watch performance and increased risk of accidents. The high average score in this study can be interpreted as an indication that PT Peln's crew management system is relatively successful in maintaining a balance between working hours and rest periods. The practical implication is that the better the quality of shore leave provided, the higher the quality of watchkeeping achieved. This is also in line with previous research findings, which state that regular work schedules can reduce the risk of fatigue and increase alertness. Similarly, previous studies emphasize the effectiveness of rest periods in improving the readiness of passenger ship crews [13]. Overall, this data can be summarized by the conclusion that most respondents gave high ratings to shore leave crew and the quality of watchkeeping. This means that the higher the shore leave crew rating, the higher the quality of watchkeeping. In other words, the shore leave policy is not only a right of the crew, but also an integral part of the maritime safety management strategy.

The research results demonstrate that the implementation of shore leave has a positive and significant effect on the quality of watchkeeping duties on PT Peln Makassar passenger ships. Theoretically, these findings reinforce the concept of fatigue management, which posits that chronic exhaustion among seafarers has direct implications for decreased performance and increased accident risks. With a high average shore leave perception score of 52.29, the crew members feel they have sufficient opportunities for physical and mental recovery while the ship is docked. This aligns with human resource management theories suggesting that adequate rest periods are vital tools for reducing work fatigue and enhancing job satisfaction. Effective rest periods provided through shore leave policies have proven to support compliance with international maritime standards, specifically the STCW 1978 Manila Amendments 2010. The data indicates that watchkeeping quality is in a high category, with a mean value of 34.23, suggesting that aspects of alertness, discipline, and responsibility in the bridge and engine room are well-maintained. This confirms the theory that crew members who are well-rested tend to be fresher and more focused on their technical navigation and safety responsibilities. Consequently, shore leave is not merely a crew right but an integral strategy within a maritime safety management system to ensure operational standards are met.

Furthermore, the effectiveness of watchkeeping in this context is influenced by the interaction between rest management and the demographic profile of an experienced crew. Most respondents have more than five years of service (94.3%) and are over 40 years old (57.1%), indicating maturity and experience that support high performance. Theoretically, experience helps with subjective self-awareness of one's own condition, which is essential for mitigating fatigue factors. Supported by the ANOVA test results showing a statistically significant model ( $F = 687.070$ ,  $Sig = 0.000$ ), this study empirically proves that proper rotation and shore leave management can suppress the potential for human error often triggered by high workloads on passenger vessels.

#### 4. CONCLUSION

The conclusion that can be drawn from the results of the previous research and discussion is that based on the descriptive statistics table shown, there is a positive and significant effect of Shore Leave Crew on the quality of guard duty. Shore Leave Crew collectively has a positive effect on the quality of guard duty. Based on the descriptive statistics table shown, most respondents gave high ratings to "shore leave crew" and "quality of guard duty." This means that the higher the shore leave crew value, the higher the quality of guard duty. The suggestions that can be given from the results of the research and discussion in the previous chapter are that the results of this study are expected to be a reference for improving the Shore Leave Crew rules on passenger ships so that the quality of guard duty is maintained. Shore Leave Crew has a positive impact on the readiness and performance of the guard crew, therefore the researcher suggests maintaining the quality of guard duty.

#### 5. RESEARCH LIMITATIONS AND RECOMMENDATIONS

The study identifies several limitations that should be considered when interpreting the results. Geographically, the research is confined to passenger ships operated by PT Peln at the port of Makassar, with



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a relatively small sample size of 35 crew members. The methodology primarily relies on a quantitative approach using simple linear regression, which may not capture deeper qualitative dynamics or external variables influencing watchkeeping. Furthermore, a potential "survivor bias" exists because 94.3% of the respondents are senior crew members with over five years of service. This demographic skew suggests that the findings may underestimate the impact of fatigue on less experienced personnel who might be more susceptible to work-related stress.

For practical recommendations, shipping companies should implement a more structured and consistent shore leave scheduling system to maintain the physical and mental readiness of the crew. Given that approximately 95.4% of the variance in watchkeeping quality is explained by shore leave management, the company must treat rest periods as a core component of its maritime safety strategy. It is also recommended to improve planning and coordination during crew rotations to prevent operational disruptions that could jeopardize navigational safety. By prioritizing effective shore leave, companies can ensure compliance with international standards like the STCW 1978 Manila Amendments 2010 while simultaneously reducing the risk of human error caused by chronic fatigue.

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