THE INFLUENCE OF THE APRON MOVEMENT CONTROL (AMC) UNIT SURVEILLANCE ON AIRSIDE SAFETY AT TJILIK RIWUT PALANGKA RAYA AIRPORT

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ABSTRACT
The monitoring of order and safety in the apron area of Tjilik Riwut Airport in Palangka Raya, which is the responsibility of the Apron Movement Control (AMC) unit, has become increasingly critical as the number of flights rises, leading to a higher potential for accidents and incidents. This descriptive quantitative research employed observation and questionnaires, using simple linear regression analysis and t-tests to test the hypothesis, along with Likert scale techniques for data analysis. The findings indicate that the oversight carried out by AMC personnel has a strong and significant correlation with airside safety, with a correlation coefficient of 0.780, suggesting that enhancing supervision by AMC and Airside Operators will significantly contribute to improving safety on the airside.

Keywords: *monitoring, apron, Apron Movement Control,*

1. INTRODUCTION

Indonesia, being an archipelago, has diverse regions where inter-regional transportation is essential. Due to the geographical challenges, particularly in areas that are difficult to reach by land or sea, air transportation becomes a vital option for the public. To facilitate effective and efficient air transportation across the country, airports have been constructed throughout Indonesia. According to Law No. 1 of 2009, an airport is a designated area on land or water that serves as a place for aircraft to land, take off, load and unload passengers and cargo, and as a transfer point between different modes of transportation. This area is equipped with safety, security, and essential support facilities for aviation operations.

PT Angkasa Pura II (Persero), a state-owned enterprise, is tasked with managing and providing airport services in Indonesia. The company is entrusted by the Indonesian government to optimize the management of airport operations, ensuring good corporate governance practices. To maintain high standards in airport operations, PT Angkasa Pura II (Persero) must implement effective management, regulation, and monitoring of activities in both the airside and landside areas of airports. This includes monitoring and controlling operations to ensure safety and security for all users of airport services.

One of the airports managed by PT Angkasa Pura II (Persero) is Tjilik Riwut Airport in Palangka Raya, Central Kalimantan. The airport's airside, covering approximately 2,500 hectares with an

apron area of 238m x 110m, is under the surveillance of Apron Movement Control (AMC) personnel. The AMC unit is responsible for managing aircraft and vehicle movements on the airside, monitoring fuel spills, coordinating airside facilities, and guiding aircraft in emergencies. They also conduct airside inspections, such as educating Ground Support Equipment (GSE) operators and managing aircraft parking stands.

The performance of the AMC unit is crucial in providing safe and efficient airport operations. The AMC personnel are responsible for ensuring safety, security, regulatory compliance, and service quality on the airside. Their duties are supported by various facilities, including surveillance through CCTV. Effective airside operations depend on a well-equipped AMC unit, which utilizes systems like the Airport Operation System and CCTV for monitoring activities on the apron.

On August 30, 2023, at 13:44 local time, AMC personnel received a report from the Air Task Force about a baggage cart incident that struck ahelicopter (PK-VPD) parked at stand D1. The incident was reviewed through CCTV footage, revealing that the baggage carts had detached and collided with the helicopter's tail at 12:32 local time. This incident highlights the critical role of CCTV in assisting AMC personnel in monitoring aircraft, vehicles, and personnel movements on theairside.

Despite the importance of CCTV, Tjilik Riwut Airport still faces challenges due to inadequate coverage, with blind spots on the apron and limited CCTV deployment. These limitations hinder the AMC's ability to effectively monitor the airside. Considering these issues, the focus of this study is on evaluating the impact of AMC supervision on airside safety at Tjilik Riwut Airport, Palangka Raya.

The following research topics are derived from the previously given introduction.

1. How does the supervision of the Apron Movement Control (AMC) unit impact airside safety at Tjilik Riwut Airport in Palangka Raya?
2. What is the availability and quality of CCTV systems used to assist in airside supervision?

2. METHODS

Research methodology explains how research should be conducted using careful and comprehensive scientific techniques to collect, process, and analyze data, as well as systematically and objectively draw conclusions to solve problems or test hypotheses in order to obtain knowledge beneficial to human life Research methods are the scientific approach to collecting data with specific goals and objectives

2.1 Research Design

Research design refers to the planning process based on activities, time, and research questions, providing a framework to explore relationships between variables. This study employs a descriptive quantitative approach, using evaluation methods to assess the supervision of Apron Movement Control (AMC) personnel in maintaining airside safety at Tjilik Riwut Airport, Palangka Raya. The research design follows a structured process involving planning, data collection, and analysis, as outlined by Cooper & Schindler.[1]

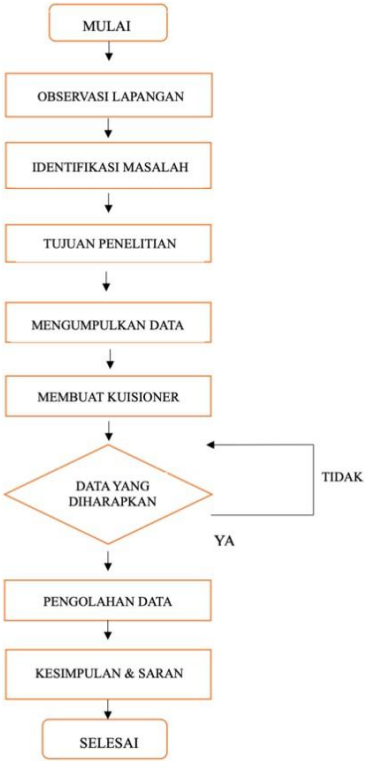

Figure 1 Outantive Research Design

2.2 Research Variables

The study involves two types of variables: independent and dependent. The independent variable (X) is the supervision by AMC personnel and Airside Operators, while the dependent variable (Y) is the airside safety at Tjilik Riwut Airport. These variables are analyzed to understand the impact of AMC's supervision on safety outcomes.[2]

Figure 2 Research Variable

2.3 Data Collection Techniques

Data collection methods include observation, questionnaires, and documentation. Observations are conducted directly in the field, while questionnaires are distributed to AMC personnel to gather information about their supervision activities. Documentation involves collecting and analyzing existing records and reports relevant to the study.[3][4]

2.4 Data Collection Techniques

Research instruments include closed-ended questionnaires designed to measure respondents' perceptions using a Likert scale. These instruments are validated and tested for reliability using Cronbach's Alpha to ensure consistency and accuracy in data collection.[5] [6]

Table 1.1 Likert Scale

Number	Symbol	Description	Score
1.	SA	Strongly Agree	5
2.	A	Agree	4
3.	N	Neutral	3
4.	D	Disagree	2
5.	SD	Strongly Disagree	1

2.5 Data Collection Techniques

Data analysis involves quantitative methods, including validity and reliability testing, normality tests, and correlation analysis. Spearman's Rank Correlation is used to assess the relationship between the independent and dependent variables. The analysis is further supported by regression analysis to determine the strength and direction of the relationship between AMC supervision and airside safety.[7]

2.5.1 Validity Test

To verify whether the data is valid or not. Meanwhile, Tests with low validity will produce data that is not related to the measurement purpose

2.5.2 Reliability Test

This reliability test is used to determine the consistency of the measuring instrument, whether the measuring instrument used is reliable and remains consistent if the measurement is repeated.

2.5.2 Normality Test

The Normality Test is a test to see if the residuals obtained have a normal distribution.

2.5.2 Corellation Test

The Spearman Rank Correlation is used to determine the level of association or test the significance of associative hypotheses when each variable related to the data is ordinal, and the data sources between variables do not have to be the same.

Table 1.2 Likert Scale Response Index

Percentage	Description
0% - 19.99%	Strongly Agree
20% - 39.99%	Agree
40% - 59.99%	Neutral
60% - 79.99%	Disagree
80% - 100%	Strongly Disagree

2.5.2 Simple Linear Regression Analysis

To see the relationship between variable X (Apron Movement Control (AMC) Unit Supervision) and variable Y (Airside Safety) at Tjilik Riwut Palangka Raya Airport

3. RESULTS AND DISCUSSION

This research, conducted at Tjilik Riwut Airport in Palangka Raya, focused onevaluating the impact of supervision by the Apron Movement Control (AMC) unit on airside safety. The study involved 35 respondents from the AMC unit who participated in the On-the-Job Training program. Data were collected using structured questionnaires, which were meticulously analyzed through a series of statistical tests to explore the relationship between AMC supervision (independent variable) and airside safety (dependent variable). The research aimedto provide insights into how effective supervision could enhance operational safety atthe airport.

Variabel	Indikator	Rhitung	> Rtabel	Sig.	< 0,05	Ket
Variabel X	X1	0,803	0,344	0,00	0,05	Valid
	X2	0,889	0,344	0,00	0,05	Valid
	X3	0,788	0,344	0,00	0,05	Valid
	X4	0,875	0,344	0,00	0,05	Valid
	X5	0,694	0,344	0,00	0,05	Valid
	X6	0,722	0,344	0,00	0,05	Valid

Sumber : Peneliti (2024)

Figure 3 Validity Test Results (Variable X)

Variabel	Indikator	Rhitung	> Rtabel	Sig.	< 0,05	Ket
Variabel Y	Y1	0,853	0,344	0,00	0,05	Valid
	Y2	0,852	0,344	0,00	0,05	Valid
	Y3	0,913	0,344	0,00	0,05	Valid
	Y4	0,663	0,344	0,00	0,05	Valid
	Y5	0,875	0,344	0,00	0,05	Valid
	Y6	0,883	0,344	0,00	0,05	Valid

Sumber : Peneliti (2024)

Figure 4 Validity Test Results (Variable Y)

Supervision by the AMC unit is a critical component in ensuring the safety of the airside operations at Tjilik Riwut Airport. Effective supervision is essential for minimizing risks associated with aircraft movements, ground support equipment (GSE) operations, and personnel activities in the airside area. The study demonstrated that proper monitoring and control by AMC personnel could significantly reduce the likelihood of accidents and incidents.[8] To validate these findings, the study employed various statistical analyses, including validity and reliability tests, as well as more advanced techniques such as correlation, regression, and t-tests, to quantify the influence of AMC supervision on airside safety.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.885	0.884	6

Figure 5 Results of the Variable Relationality Test X Cronbach's Alpha

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.917	0.916	6

Figure 6 Results of Cronbach's Alpha Y Variable Relationality Test

The study's validity test, conducted using Pearson correlation, confirmed that all the indicators employed in the research were statistically valid. The correlation coefficients for each indicator were higher than the critical value (r-table), suggesting that the instruments used effectively measured the intended variables. Additionally, the reliability of thedata was assessed through Cronbach's Alpha, with results exceeding the threshold of 0.60. This indicates that the data collected were consistent across different respondents, reinforcing the credibility of the findings. The combination of these tests ensured that the study's data were both valid and reliable, providing a solid foundation for subsequent analysis.

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		35
Normal Parameters[a,b]	Mean	0
	Std. Deviation	1
Most Extreme Differences	Absolute	.190
	Positive	.190
	Negative	-.127
Kolmogorov-Smirnov Z		1.123
Asymp. Sig. (2-tailed)		.160

a. Test distribution is Normal.
b. User-Specified

Figure 7 Kolmogrov-Smirnov Normality Test Results

The data's normality was tested using the Kolmogorov-Smirnov method, which revealed that the data followed a normal distribution, with a significance level of 0.160, well above the 0.05 threshold. This finding justified the use of parametric tests in the analysis.

Correlations

			PENGAWASAN	KESELAMATAN
Spearman's rho	PENGAWASAN	Correlation Coefficient	1.000	.780**
		Sig. (2-tailed)		0.000
		N	35	35
	KESELAMATAN	Correlation Coefficient	.780**	1.000
		Sig. (2-tailed)	0.000	
		N	35	35

Figure 8 Corellation Result

The Spearman Rank Correlation test was then employed to determine the strength of the relationship between AMC supervision and airside safety. The analysis revealed a strong positive correlation, with a coefficient of 0.780, indicating that effective AMC supervision is closely associated with higher levels of airside safety. This correlation suggests that improvements in AMC supervision could directly enhance safety outcomes.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.700	2.774		.973	.338
	XTOTAL	.890	.106	.826	8.421	.000

a. Dependent Variable: YTOTAL

Figure 9 Regression Analysis

To further explore the impact of AMC supervision on airside safety, a simple linear regression analysis was conducted. The regression model provided the equation Y = 2.700 + 0.890X, where Y represents airside safety and X represents AMC supervision. This equation indicates that for every unit increase in AMC supervision, airside safety improves by 0.890 units. The regression analysis also calculated the coefficient of determination (R^2) at 0.608, meaning that approximately 60.8% of the variability in airside safety can be explained by the level of AMC supervision. This significant proportion underscores the importance of effective supervision in maintaining and enhancing safety standards in the airside operations at the airport.

To assess the statistical significance of the relationship between AMC supervision and airside safety, a t-test was performed. The t-test results showed a t-value of 8.079, with a significance level of 0.000. These findings confirm that the impact of AMC supervision on airside safety is statistically significant. The hypothesis that AMC supervision positively affects airside safety is strongly supported by the data, indicating that increased supervision efforts by AMC personnel can lead to substantial improvements in safety outcomes. This conclusion reinforces the critical role of AMC units in airport safety management.

An F-test was conducted to evaluate the overall significance of the regression model used in the study. The results revealed an F-value of 65.276 with a significance level of 0.000, indicating that the regression model is highly significant and provides a reliable explanation of the relationship between AMC supervision and airside safety. The coefficient of determination (R^2), which was found to be 0.608, further supports the robustness of the model. This means that the model effectively captures the influence of AMC supervision on airside safety, accounting for a substantial portion of the variance observed in safety levels at the airport.

The study also involved a detailed examination of the availability and quality of CCTV systems used to assist in airside supervision at Tjilik Riwut Airport. Observations conducted between December 11, 2023, and February 28, 2024, revealed several shortcomings in the existing CCTV infrastructure. Key issues included blurred images after rainfall, insufficient coverage in critical areas, and inadequate image resolution when zoomed in for detailed analysis. These limitations significantly hindered the effectiveness of AMC supervision, especially in maintaining a comprehensive and continuous oversight of airside operations. The findings suggest that the current CCTV setup is not fully adequate for supporting optimal safety monitoring.[9]

The comprehensive analysis provided strong evidence that AMC supervision plays a pivotal role in ensuring airside safety at Tjilik Riwut Airport. The significant positive correlation and regression results underscorethe impact of effective supervision on reducingrisks and enhancing operational safety. However, the study also highlighted critical deficiencies in the airport's CCTV infrastructure, which currently limits the abilityof AMC personnel to monitor airside activities effectively. These findings suggest that while human supervision is crucial, it must be supported by robust technological tools to achieve the highest standards of safety.[10]

Given the study's findings, it is recommended that PT. Angkasa Pura II take immediate steps to upgrade the CCTV systems at Tjilik Riwut Airport. Enhancements should focus on improving camera quality, expanding coverage to eliminate blind spots, and ensuring that images remain clear under various environmental conditions. These upgrades will not only support the AMC unit's supervision efforts but also contribute to a safer and more secure airside environment. Investing in advanced CCTV technology is essential for maintaining the high safety standards required in modern airport operations.

The findings of this study have important implications for airport management and safety practices. They highlight the need for continuous investment in both human resources and technological infrastructure to ensure the highest levels of operational safety. In particular, the integration of high-quality CCTV systems with skilled supervision can create a safer environment for both aircraft and ground operations. This study suggests that airports should regularly review and upgrade their surveillance systems to keep pace with evolving safety

4. CONCLUSION

The following conclusions can be drawn from the study and discussions presented:

a. The correlation analysis revealed a significant positive relationship between AMC supervision (variable X) and airside safety (variable Y) at Tjilik Riwut Airport, with a correlation coefficient of 0.780. This indicates that effective supervision by the AMC unit has a considerable impact on improving airside safety. The hypothesis testing further supports this, with a t-value of 8.421, which is significantly higher than the t-table value of 2.035, and a p-value of 0.00, Therefore, it can be concluded that H0 is rejected and H1 is accepted
b. While the supervision by the AMC unit at Tjilik Riwut Airport has been generally effective in maintaining airside safety, there is still room for improvement. Continuous efforts are necessary to sustain and enhance safety measures, particularly by optimizing both human oversight and technological support systems, such as CCTV.
c. The study suggests that airside safety can be further improved by balancing direct supervision by AMC personnel with enhanced CCTV monitoring. Upgrades to the CCTV infrastructure are recommended, particularly in areas near restricted security zones, to address current issues such as poor video quality during zooming and after heavy rainfall. These enhancements will enable AMC personnel to monitor airside activities more effectively and ensure a higher standard of safety at the airport.

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