ANALYSIS OF APRON MOVEMENT CONTROL (AMC) PERSONNEL SUPERVISION ON THE QUALITY OF GROUND SUPPORT EQUIPMENT (GSE) SERVICES AT SULTAN BABULLAH AIRPORT, TERNATE

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ABSTRACT
Effective supervision by Apron Movement Control (AMC) personnel is essential to ensure smooth and safe Ground Support Equipment (GSE) operations at airports. At Sultan Babullah Airport, Ternate, limited AMC staffing and improper GSE placement have led to operational inefficiencies, extended ground times, and flight delays. Referring to SKEP 140/VI/1999, Directorate General of Civil Aviation Regulation No. 21/2015, and CASR Part 121, this study aims to analyze the influence of AMC supervision on GSE service quality and evaluate compliance with operational standards. A quantitative method was employed using surveys, observations, documentation, and literature review. Questionnaires were distributed to 80 respondents, including AMC officers, ground handling staff, and airline personnel. Data validity and reliability tests were conducted, and analysis was performed using simple linear regression and descriptive statistics. The results show that AMC supervision has a significant and positive effect on GSE service quality, with a determination coefficient (R^2) of 0.881, correlation coefficient (r) of 0.939, and significance level (p) of 0.001. However, improvements are required in personnel discipline and GSE arrangement to optimize apron operations. Strengthening AMC oversight is recommended to enhance ground handling efficiency and ensure on-time flight performance.

Keywords: Apron Movement Control, Ground Support Equipment, supervision, service quality, ground handling, airport.

1. INTRODUCTION

Sultan Babullah Airport in Ternate serves as a primary air transportation gateway in North Maluku, connecting various cities across eastern and western Indonesia. With an average of 16 aircraft movements per day, the airport plays a crucial role in supporting passenger mobility, cargo distribution, and regional connectivity. Ensuring safe and efficient airside operations, particularly in ground handling, is vital to maintaining punctuality and operational standards. Apron Movement Control (AMC) personnel are responsible for regulating and supervising all vehicle and equipment movements in the apron to guarantee orderly and safe ground operations.

However, the airport faces operational challenges due to limited AMC staffing and the high intensity of Ground Support Equipment (GSE) activities. These issues often result in improper GSE parking, exceeding equipment limits stipulated in SKEP 140/VI/1999, and lack of coordination among ground handling units. For example, on 26 February 2025, Lion Air flight JT917 experienced a delay of approximately 1 hour and 52 minutes—far beyond the ideal turnaround time of 35–45 minutes for narrow-body aircraft—due in part to disorganized GSE placement and inadequate supervision.

Such inefficiencies indicate that existing oversight mechanisms are insufficient to ensure optimal GSE service quality. According to IATA's Ground Handling Manual and the Civil Aviation Safety Regulation (CASR) Part 121, strict AMC supervision is essential to maintain operational safety and service efficiency. Therefore, this study aims to (1) analyze the influence of AMC personnel supervision on GSE service quality, and (2) evaluate the extent to which supervision complies with applicable regulations, with the goal of providing recommendations to improve apron operational performance.

2. LITERATURE REVIEW

2.1 Supervision in Airport Operations

Supervision is a systematic process to monitor and control activities, ensuring they comply with established plans, standards, and procedures. In the airport context, Apron Movement Control (AMC) personnel are tasked with overseeing airside operations, particularly the movement and positioning of Ground Support Equipment (GSE), to maintain safety, efficiency, and order. According to (SKEP 140 th 1999, n.d.) and PM 37/2021, AMC officers must be capable of enforcing apron traffic regulations, coordinating aircraft parking, and ensuring facilities are in good operational condition.

2.2 Apron Movement Control (AMC)

AMC is a specialized airport unit authorized to manage and supervise all activities within the apron area, including aircraft parking, vehicle movement, and GSE operations. Responsibilities include maintaining apron cleanliness, preventing Foreign Object Debris (FOD), coordinating with Air Traffic Control (ATC) for parking assignments, and ensuring adherence to safety regulations. Effective AMC supervision is critical in preventing operational delays and safety hazards. (Melani et al., 2023)

2.3 Ground Support Equipment (GSE)

GSE refers to all vehicles and equipment supporting aircraft ground operations, including motorized units such as Baggage Towing Tractors (BTT), Ground Power Units (GPU), and Passenger Boarding Stairs, as well as non-motorized units like baggage carts and container dollies (Jurnal et al., 2022). Proper use, placement, and maintenance of GSE are essential to achieving efficient ground handling. Inadequate supervision can lead to safety incidents, apron congestion, and extended turnaround times.

2.4 Service Quality in Ground Handling

Service quality in aviation ground handling can be assessed through five dimensions: Reliability, Responsiveness, Assurance, Empathy, and Tangibles (Parasuraman et al., 1988). These dimensions measure operational accuracy, responsiveness to operational needs, personnel competence, attentiveness to stakeholder requirements, and the physical condition of facilities and equipment. High-quality ground handling services contribute to on-time performance and passenger satisfaction.

2.5 Previous Studies

Prior research by Kiki Kusumawardani (2020) examined AMC's role in monitoring GSE usage at Kalimarau Airport, concluding that increased flight operations require stricter supervision to ensure GSE compliance with safety and operational standards. Similarly, Dian Bella Tandibua and Djoko Widagdo (2024) analyzed AMC supervision at Hang Nadim International Airport, finding that weak oversight contributed to inefficient GSE operations. These findings support the premise that AMC supervision significantly impacts ground handling service quality.

3. METHOD

3.1 Research Design

This study employed a quantitative research approach using a survey method to examine the influence of Apron Movement Control (AMC) personnel supervision on the quality of Ground Support Equipment (GSE) services. The research design incorporated field observations, documentation, literature review, and questionnaires to collect primary and secondary data.

3.2 Variables

The independent variable (X) is AMC personnel supervision, measured through indicators such as adherence to regulations, coordination, discipline, and oversight of GSE operations. The dependent variable (Y) is GSE service quality, measured through service quality dimensions: Reliability, Responsiveness, Assurance, Empathy, and Tangibles.

3.3 Population and Sample

The population consisted of AMC officers, ground handling staff, and airline personnel operating at Sultan Babullah Airport, totaling 100 individuals. Using Slovin's formula with a 5% margin of error, a sample of 80 respondents was selected through purposive sampling to ensure relevance to the study objectives.

3.4 Data Collection Instruments

Data were collected using:

1. **Observation** – Monitoring apron operations and GSE activities.
2. **Documentation** – Gathering operational records, delay reports, and regulatory documents.
3. **Questionnaires** – Structured statements using a Likert scale to assess perceptions of AMC supervision and GSE service quality.
4. **Literature Review** – Reviewing relevant regulations, manuals, and previous studies.

The questionnaire underwent validity testing using Pearson's correlation coefficient and reliability testing using Cronbach's Alpha, ensuring the instrument's accuracy and consistency.

3.5 Data Analysis

Data were analyzed using **simple linear regression** to determine the influence of AMC supervision (X) on GSE service quality (Y). The coefficient of determination (R^2), correlation coefficient (r), and significance level (p)

were calculated. Descriptive statistics were used to categorize the level of AMC supervision and GSE service quality based on mean scores.

3.6 Research Location and Time

The study was conducted at Sultan Babullah Airport, Ternate, from April to June 2025, during the researcher's On-the-Job Training (OJT) period.

4. RESULT AND DISCUSSION

4.1 Results

4.1.1 Validity and Reliability Tests

All questionnaire items for both variables met the validity requirement, with Pearson correlation values exceeding the r-table threshold of 0.220. The reliability test using Cronbach's Alpha produced coefficients above 0.60, indicating that the instrument was consistent and dependable for measuring both AMC supervision and GSE service quality.

4.1.2 Simple Linear Regression

The regression analysis yielded a coefficient of determination (**R^2**) of **0.881**, meaning that 88.1% of the variation in GSE service quality can be explained by AMC personnel supervision, while the remaining 11.9% is influenced by other factors outside the model. The correlation coefficient (**r**) was **0.939**, indicating a very strong positive relationship between the two variables. The significance level (**p**) of 0.001 (< 0.05) confirmed that AMC supervision has a statistically significant effect on GSE service quality.

4.1.3 Descriptive Statistics

The mean score for AMC supervision was **11.24**, categorized as "Good" according to the predefined scoring scale, though there is potential for improvement toward the "Very Good" category. The mean score for GSE service quality was **10.98**, also within the "Good" category, reflecting satisfactory performance but with identified areas for enhancement, particularly in equipment arrangement and personnel discipline.

4.2 Discussion

The findings confirm that effective AMC supervision significantly improves the quality of GSE services at Sultan Babullah Airport. The high R^2 value demonstrates that supervision is a primary determinant of operational efficiency in ground handling. This aligns with previous studies (Kusumawardani, 2020; Tandibua & Widagdo, 2024), which found that AMC oversight plays a critical role in ensuring safety, efficiency, and punctuality in apron operations.

Operational issues such as improper GSE parking, exceeding the regulatory limit of three baggage carts, and insufficient discipline among ground handling staff contribute to extended ground times and flight delays. The Lion Air JT917 delay incident illustrates the operational consequences of inadequate oversight. Strengthening AMC supervision, enforcing adherence to SKEP 140/VI/1999 and CASR Part 121, and improving inter-unit coordination are essential to optimizing apron performance.

These results highlight the need for targeted improvements in personnel discipline, structured GSE placement, and adherence to standardized procedures to maintain and enhance service quality.

5. CONSCILUSION

This study demonstrates that Apron Movement Control (AMC) personnel supervision has a significant and positive impact on the quality of Ground Support Equipment (GSE) services at Sultan Babullah Airport, Ternate. The coefficient of determination (R^2) of 0.881 and correlation coefficient (r) of 0.939 indicate a very strong relationship between supervision and service quality, with statistical significance ($p = 0.001$).

Although both AMC supervision and GSE service quality were rated in the "Good" category, several operational issues remain, including improper GSE arrangement and insufficient discipline among ground handling personnel. Strengthening AMC oversight, enforcing adherence to applicable regulations, and improving coordination between AMC, ground handling, and airline units are necessary to enhance operational efficiency, ensure on-time performance, and maintain safety standards.

Recommendations include increasing AMC staffing levels, providing regular training on apron regulations, implementing stricter GSE parking controls, and adopting technology-based monitoring systems to improve supervision effectiveness.

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