ANALYSIS OF THE ROLE OF THE APRON MOVEMENT CONTROL UNIT IN MAINTAINING THE CLEANLINESS OF THE APRON AREA AT ADI SOEMARMO BOYOLALI AIRPORT

Rizqy Akbar Nur Pratama[1], Dimas Arya Soeadyfa Fridyatama [2], Tekat Sukomardojo[3]

Politeknik Penerbangan Surabaya, Jemur Andayani I No.73,Kota Surabaya, JawaTimur, Indonesia 60236

Corresponding author. Email: rizqyakbarnp2003@gmail.com

ABSTRACT

Cleanliness in the airport apron area is one of the important aspects in ensuring the safety and efficiency of flight operations. This research aims to analyze the role of the Apron Movement Control (AMC) unit in maintaining the cleanliness of the apron area at Adi Soemarmo Boyolali Airport. The main focus of this research includes handling oil spills and Foreign Object Debris (FOD) in the apron area.

The research method used by the author uses a qualitative descriptive method. In this study the authors used data collection techniques through observation, interviews, and documentation studies. The author's data analysis technique uses data reduction, data presentation and conclusion drawing.

The results showed that the AMC unit has the responsibility of monitoring, reporting, and handling hygiene problems in the apron area. AMC personnel have a significant role in supporting the smooth operation of flights by maintaining the cleanliness of the apron area optimally and following Standard Operating Procedures (SOP).

Keywords: *Apron Movement Control, apron area cleanliness, oil spills, Foreign Object Debris, Adi Soemarmo Airport*.

1. INTRODUCTION

Airports are important hubs in the air transportation system that prioritize safety and operational efficiency. One area that is crucial in supporting smooth operations at airports is the apron. The apron is an airside area where aircraft park, refuel, board passengers, and undergo other ground handling processes. The apron area must always be free from obstructions, whether in the form of foreign materials or other obstacles that could endanger aircraft. According to KP 197 of 2017 on Technical Operational Safety Guidelines for Civil Aviation Section 139-08, point 4.2.4.13. (d) states that airport operators must ensure the apron is free from hazardous substances that could interfere with operational safety and foreign objects, such as aircraft components or specialized equipment; debris, such as sand, loose rocks, concrete, wood, plastic, or tire pieces.

Oil spills on airport aprons are one of the findings at Adi Soemarmo Boyolali Airport. Oil spilled on the apron surface can make the area slippery, increasing the risk of aircraft, operational vehicles, and airport personnel slipping. The apron surface affected by oil can also experience structural degradation, especially if the oil seeps into the asphalt or concrete, which over time can damage the runway and result in significant repair costs. Therefore, oil spills must be addressed immediately using the appropriate cleaning method, namely an oil spill kit, to ensure the apron area remains safe for use. The following is an image of oil spill residue found on the apron at Adi Soemarmo Boyolali Airport.

Figure 1. Oil spill residue on the apron
Source: Researcher

In addition to oil spills, another common hazard found on airport aprons is the presence of Foreign Object Debris (FOD). FOD refers to foreign objects that should not be present on the airport apron, such as bolts, nuts, metal fragments, and other debris. The presence of FOD on the apron is highly dangerous as it can be sucked into aircraft engines and cause damage to aircraft wheels, potentially disrupting flight operations. To support FOD control processes, there are special facilities called FOD bins, which are designated waste bins for collecting foreign objects found during inspections on the apron. However, in practice, misuse of FOD bins is still observed on-site, including using them as disposal sites for airline waste such as food scraps, plastic, used catering boxes, and oil cans. This situation is clearly inconsistent with the primary function of FOD bins, which should only contain foreign objects that pose a danger to aircraft movement. The following images show FOD findings and misuse of FOD bins at Adi Soemarmo Airport in Boyolali.

Figure 1.2 Metal Fragment on the Apron
Source: Researcher

Figure 1.3 Improper use of FOD bins
Source: Researcher

One of the units responsible for maintaining the cleanliness and suitability of the apron area is the Apron Movement Control (AMC) unit. The Apron Movement Control (AMC) unit is tasked with monitoring aircraft, vehicle, and equipment movements on the apron and ensuring cleanliness in the apron area. Given the importance of apron cleanliness, the role of the AMC unit is highly strategic in maintaining operational standards and aviation safety. By conducting routine inspections and addressing issues directly, the AMC unit serves as the frontline in preventing potential hazards on the airside, particularly in the apron area. However, the success of this task depends on the availability of facilities and the awareness of ground handling teams, who are the on-site implementers, regarding applicable regulations.

This study was conducted to analyze in depth the role of the AMC unit in maintaining apron area cleanliness at Adi Soemarmo Airport in Boyolali. The results of this study are expected to provide recommendations for improving work efficiency and cleanliness standards in the apron area, thereby ensuring the continued safety and smooth operation of aviation activities. Based on the above, the researcher intends to create a study titled "ANALYSIS OF THE ROLE OF THE APRON MOVEMENT CONTROL UNIT IN MAINTAINING THE CLEANLINESS OF THE APRON AREA AT ADI SOEMARMO AIRPORT IN BOYOLALI."

Airports serve as vital infrastructure in the aviation transportation system. As defined by the International Civil Aviation Organization (ICAO) in Annex 14, an airport is a designated area on land or water (including buildings, facilities, and equipment) that is wholly or partly intended for the arrival, departure, and surface movement of aircraft. This definition emphasizes the multifunctional nature of airport areas, particularly in their role supporting aircraft operations. Nationally, the Indonesian Law No. 1 of 2009 on Aviation expands this notion by stating that an airport is a zone on land and/or water with designated boundaries used for aircraft to land, take off, board passengers, load and unload cargo, and serve as a transfer point between transport modes, equipped with aviation safety and security facilities, along with supporting services. In the context of operational safety and service quality, the Ministerial Regulation PM 92 of 2016 concerning Airport Facility Standardization and Certification mandates that all airport facilities—both within and beyond the airside—must meet safety, comfort, and service standards. This includes facilities directly affecting aircraft operations and passenger services, which must be maintained to prevent hazards and delays.

A critical section of the airport is the airside, which includes areas not accessible to the general public and requires strict access control. According to Mafaza & Haryati (2022), the airside is reserved for personnel authorized to manage and support flight operations. This area encompasses the apron, taxiways, and runways—each playing a crucial role in the flow and safety of aircraft. The apron functions as a space where aircraft are parked for boarding, fueling, and ground services. The taxiway connects the apron to the runway, enabling aircraft to move safely between operational points. The runway itself is the strip where aircraft perform takeoffs

and landings, making it a zone that requires the highest standards of surface integrity and cleanliness.

Within this operational ecosystem, the Apron Movement Control (AMC) unit plays a central role. AMC personnel are tasked with supervising the movement of aircraft, vehicles, and equipment in the apron area, ensuring that all activities adhere to safety regulations. As stipulated in KP 326 of 2019 (MOS 139 VOL I AERODROME), AMC officers are responsible for maintaining order, ensuring the cleanliness and functionality of apron facilities, managing aircraft parking arrangements during regular and emergency operations, and reporting or investigating any incidents occurring in the apron zone. They are also required to conduct visual inspections and coordinate closely with other airport departments to uphold apron safety.

In practice, AMC services include controlling aircraft movement, assigning parking stands, managing aviobridge operations, and performing cleanliness inspections. This includes the collection and reporting of flight data, which are crucial for operational transparency and planning. Structurally, AMC operations at Adi Soemarmo Airport are organized under the Airside Department, with each shift staffed by a supervisor and a data entry officer who also operates the aviobridge. Two key cleanliness challenges in the apron are the presence of Foreign Object Debris (FOD) and oil spills. FOD refers to any object in the airside environment that may harm aircraft, such as loose hardware, debris, or misplaced tools. As regulated in KP 197 of 2017, airport authorities are required to conduct routine inspections to remove FOD and maintain safe movement areas. AMC personnel are expected to document such findings in logbooks and coordinate with relevant units to ensure immediate removal. According to PM-SOC-V.AO-P.OR-04, inspections must be conducted twice daily and three times during peak operations such as Hajj flights.

Meanwhile, oil spills—often originating from aircraft maintenance or fueling operations—pose serious risks, as they can create slippery surfaces and degrade the apron's structural integrity. Based on PM-SOC-V.AO-P.OR-18, oil spill handling must be conducted promptly using appropriate oil spill kits, and the area must be declared visually clean. In reality, however, the absence of proper documentation, limited enforcement, and non-standard cleaning methods (using dishwashing soap) have been identified as recurrent issues in apron maintenance. Given these conditions, this study aims to analyze the role of the AMC unit at Adi Soemarmo Airport in maintaining apron cleanliness, with particular focus on the handling of FOD and oil spills, inspection implementation, and inter-unit coordination. The results are expected to provide insight into how AMC operational practices align with regulatory standards and what improvements are necessary to enhance the effectiveness of apron cleanliness management.

2. METHOD

2.1 Research Method

This research uses a qualitative method to explore the role of the Apron Movement Control (AMC) unit in maintaining apron cleanliness at Adi Soemarmo Airport, Boyolali. The study aims to describe and analyze activities related to inspection routines, FOD handling, oil spill response, and inter-unit coordination from the perspective of AMC personel.

2.2 Research Design

The research design is qualitative descriptive, focusing on describing actual phenomena in the field without manipulating variables. The researcher seeks to understand how AMC personnel perform their duties, the challenges they face, and the extent to which their actions align with regulatory standards and airport SOPs. Data were interpreted using data reduction, data presentation, and drawing conclusions as proposed by Miles & Huberman.

The descriptive approach in this study allows the data collected to be in the form of words, sentences, or images, with the aim of providing an in-depth description of the phenomenon being studied. Thus, this study not only reveals facts explicitly but also analyzes the meaning contained in each finding, thereby providing a more comprehensive understanding of the role of the Apron Movement Control (AMC) unit in maintaining the cleanliness of the apron area at Adi Soemarmo Airport.

The research design is a plan that covers the process of collecting, processing, analyzing, and presenting data systematically and objectively to solve the problems being studied. In qualitative descriptive research, the research design is flexible and can evolve along with the findings obtained in the field. In this study, a qualitative descriptive approach is used to describe the phenomenon in depth based on existing conditions. This research design serves as a guideline in determining the optimal research steps to obtain data relevant to the issues raised. Thus, this study is designed to provide a comprehensive understanding of the contribution of Apron Movement Control officers in maintaining the cleanliness of the apron area.

2.3 Research Subject

2.3.1. Population

According to Roflin (2021) population is the total possible values obtained from calculations, both quantitative and qualitative, related to specific characteristics of a clearly defined group that is to be studied. Sugiyono (2010) states that a population includes a large group consisting of objects or individuals selected based on specific characteristics before further analysis is conducted. In this study, the researcher took the population from all Apron Movement Control (AMC) officers, totaling 6 people, consisting of 3 Supervisors and 3 Data Entry Officers & Aviobridge Operators. The selected population included all individuals in the AMC

unit who were directly involved in monitoring cleanliness in the airport apron area.

2.3.2. Sample

Sugiyono (2010) states that a sample is a part of the population selected based on specific characteristics. In this study, the sample was taken as a representation of the broader population. The selection of an appropriate sample is crucial to ensure a clear distribution of interviews and obtain relevant data.

In the study on the role of Apron Movement Control (AMC) officers in maintaining apron area cleanliness, the researcher selected participants based on specific criteria deemed relevant and expert in the field. In this case, the researcher selected a sample consisting of 2 Supervisors and 1 member of the Apron Movement Control team.

2.4 Research Object

The object of this research focuses on the role of the Apron Movement Control (AMC) unit in maintaining the cleanliness of the apron area at Adi Soemarmo Airport, Boyolali. This study specifically examines how AMC personnel implement routine inspections, handle oil spills and Foreign Object Debris (FOD), and coordinate with other operational units within the airport environment. The apron is a critical operational area where aircraft park and where ground handling activities occur, thus requiring constant monitoring to ensure it remains free from hazardous objects or substances. The role of AMC is observed not only in terms of task execution, but also in terms of their compliance with airport regulations, ability to respond to cleanliness issues, and their coordination mechanisms with related units such as ground handling teams, Facility, Safety, and PKP-PK (airport rescue and firefighting services). The research object is studied with the intent to evaluate whether the existing practices are aligned with the established standards and procedures mandated by the airport authority.

2.5 Data Collection Techniques

Data collection techniques are procedures used to obtain relevant and necessary information in a study Sugiyono, (2010). The data collected aims to answer the questions formulated in the research problem. Data collection techniques can be carried out through interviews, observations, and documentation.

2.5.1. Observations

Observations are conducted by directly observing field conditions to determine whether they meet applicable standards. According to Sugiyono (2010), observation is a data collection technique that involves systematically observing phenomena to obtain valid and objective information. In this study, observation was used to examine the operational realities of the AMC Unit in the apron area, including the challenges they face in maintaining cleanliness, such as FOD management, oil spills, and the use of FOD bins on-site.

2.5.2. Interviews

Interviews were conducted to obtain more in-depth information from AMC personnel regarding the management of airport apron cleanliness. According to Sugiyono (2010), interviews are a data collection method through direct interaction between the researcher and the respondent to obtain relevant information. In this study, interviews were conducted with two supervisors and one AMC member. The purpose of these interviews was to understand the role of AMC officers in maintaining cleanliness, the challenges they face, and efforts to improve the effectiveness of cleanliness management at Adi Soemarmo Airport. The following is the interview sheet used in this study.

2.5.3. Documentation

Documentation was used to collect data in the form of AMC staff work reports, standard operating procedures (SOPs) related to apron cleanliness, as well as photos or notes regarding the cleanliness conditions of the apron area at Adi Soemarmo Airport. According to Sugiyono (2010), documentation is a data collection technique sourced from various written and visual records that support the research. In this study, documentation includes cleanliness inspection reports, FOD management policies in the apron area, and records of violations or challenges encountered in maintaining cleanliness. These evidences are used to strengthen the analysis of the effectiveness of AMC staff in maintaining the cleanliness of the airport apron area.

2.6 Data Analysis Techniques

The data analysis process in this study was conducted through several interconnected stages—namely data collection, data reduction, data display, and conclusion drawing—following a qualitative research approach aimed at producing comprehensive insights.

The first step was data collection, which involved the systematic gathering of information through direct observation, in-depth interviews, and documentation review. These three methods were employed concurrently and formed the basis of a triangulation strategy, which combines multiple sources and techniques to increase the reliability and validity of findings (Sugiyono, 2010).

Once data were collected, the second step was data reduction. This phase focused on summarizing, filtering, and categorizing the raw data obtained from field observations and interview transcripts. Only the most relevant and meaningful information was retained, while extraneous or redundant data were eliminated. The goal of this process was to sharpen the analytic focus and facilitate the organization of data for the next stage of analysis (Miles & Huberman, 1994).

The third step was data display, where the reduced data were structured and presented in a clear and interpretable form. In qualitative research, data can be

displayed using short descriptive texts, matrices, flowcharts, or other visual aids that help reveal patterns and relationships between categories. In this study, the data were organized to provide a comprehensive picture of the research findings—beginning with the research location, namely Adi Soemarmo Airport, followed by observed conditions in the field, and finally the detailed data gathered during the research period.

The final stage was drawing conclusions, which involved interpreting the analyzed data to uncover new insights or explanations related to the research phenomenon. These conclusions may take the form of emerging themes, patterns, or conceptual relationships that were not previously understood. To ensure their validity, all conclusions were verified through a process of cross-checking with the original data, reinforcing the credibility and trustworthiness of the study.

2.7 Research Instrument

The instruments used in this study were designed to capture accurate and relevant qualitative data regarding the activities of the AMC unit. Observation sheets were employed to directly record conditions in the apron area, such as the presence of FOD, oil spill incidents, the use of FOD bins, and how AMC personnel respond to those findings in real time. Observations were carried out during scheduled inspection times to capture authentic operational behavior.

In addition, interview guides were developed to conduct semi-structured interviews with key informants from the AMC unit. The interviews explored their understanding of SOPs, the challenges they face in maintaining apron cleanliness, their coordination efforts, and their level of compliance with safety regulations.

Furthermore, the study utilized documentation checklists to collect supporting evidence such as logbooks of daily inspections, photographic documentation of findings in the field, and regulatory documents. These documentation sources served to validate the field data, ensuring that all observations and responses were grounded in actual procedures and recorded incidents.

3. RESULT AND DISCUSSION

3.1 Overview of AMC's Routine Inspection Practice

Based on the observation, interviews, and supporting documentation such as the daily logbook, the AMC unit at Adi Soemarmo Airport carries out routine inspections twice a day, specifically at 06:00 and 12:00, in accordance with internal operating standards. The scope of inspection includes the apron area, GSE (Ground Support Equipment) parking area, service road, and cargo area. These activities are recorded in a Google Spreadsheet-based digital logbook, which helps maintain traceability of cleanliness status.

However, although inspections are conducted routinely, the study found that AMC's follow-up actions on findings such as oil spills and FOD are not yet supported by structured documentation or specific response forms, particularly regarding oil spill incidents. Preventive actions are also limited, with no formal campaign or routine educational efforts conducted to remind personnel of apron cleanliness protocols.

3.2 Handling of Foreign Object Debris (FOD)

FOD is one of the critical hazards in apron operations. From the observation and interviews, it was found that FOD is still frequently present in the apron and service road areas, including dangerous objects such as loose bolts, sharp metal fragments, and personal items like gloves. AMC's routine action is to visually identify and manually dispose of FOD into FOD bins. While this is part of their basic duty, the study revealed that there is no follow-up enforcement for identifying the responsible personnel.

Additionally, the FOD bins themselves are not used as intended. In many instances, the bins were found to be filled with non-FOD waste, such as airline operational trash, empty oil cans, and packaging materials. This shows a lack of awareness and discipline from other apron users, especially ground handling personnel. Although AMC has tried to educate these units through verbal reminders, there is no formal sanction mechanism or written warning system applied when such violations occur.

3.3 Response to Oil Spill Incidents

One of the most concerning findings from the observation is the presence of oil spill residues in various apron locations. These spills pose a high safety risk, especially for aircraft and ground vehicles, as they can lead to slippage or damage to aircraft tires. Based on field documentation and interviews, AMC lacks a dedicated form or procedure to record oil spill incidents in detail. Currently, they only report these events through general inspection notes in the logbook.

Moreover, oil spills are often cleaned improperly, with several cases showing the use of regular household detergents such as dishwashing soap, which contradicts the regulation PM-SOC-V.AO-P.OR-18 which mandates the use of oil spill kits. Interviews also confirmed that while AMC identifies the oil spill and requests the responsible ground handling unit to clean it, there is no follow-up if the cleaning is insufficient, unless AMC escalates the issue to the PKP-PK unit—often with additional charges involved.

3.4 Inter-Unit Coordination and Communication

Coordination between AMC and other units such as Facility, Safety, Ground Handling, and PKP-PK is essential in managing apron cleanliness. The study found that most coordination is done informally, either through handheld radios (HT) or direct communication in the field. While this allows for quick response, it also leads to a lack of documentation and tracking of actions taken after a cleanliness violation or hazard is found. Coordination is more reactive than preventive, and there is no integrated reporting or follow-up mechanism that

connects AMC findings with administrative consequences for the responsible units.

4. CONCLUSION

Based on the findings from observations, interviews, and document analysis, this study concludes that the Apron Movement Control (AMC) unit at Adi Soemarmo Airport has carried out its fundamental responsibilities in maintaining apron cleanliness, such as conducting routine inspections and recording observations in a structured logbook. However, several critical gaps remain in the implementation and effectiveness of their role.

Firstly, while inspections are conducted twice daily, the follow-up actions on findings—such as FOD presence and oil spills—are not supported by proper documentation systems. There is no specific reporting form for oil spill incidents, and many events are only noted in general log entries without structured action tracking.

Secondly, FOD management remains suboptimal. FOD bins are often misused by ground handling personnel for unrelated waste, and although AMC performs inspections and reminders, no formal disciplinary or enforcement measures are taken. Similarly, oil spill handling is often performed inadequately, with improper cleaning materials used and limited coordination with the PKP-PK team unless absolutely necessary.

Lastly, inter-unit coordination still relies heavily on informal communication methods, without follow-up documentation or feedback mechanisms. This weakens the chain of accountability and reduces the preventive power of AMC actions.

In summary, while the AMC unit demonstrates awareness and commitment to apron cleanliness, its effectiveness is limited by a lack of structured procedures, insufficient enforcement authority, poor documentation mechanisms, and limited operational capacity.

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