THE INFLUENCE OF THE CONDITION OF AIRSIDE PARAMETER FENCE FACILITIES ON FLIGHT SECURITY AND SAFETY AT KUPANG EL TARI INTERNATIONAL AIRPORT

Alvin Alvariz[1*] , Didi Hariyanto[2] , Ahmad Musadek[3]

[1,2,3)] *Civil Aviation Polytechnic Surabaya*
[*] *Corresponding author. Email: Aku.alvin53@poltekbangsby.ac.id*

ABSTRACT
In addressing the evolving issues, it is important to have effective and standardized security measures in place in the face of increasing security challenges to protect airport facilities and prevent threats to aviation safety and security. Airside security facilities such as perimeter fences with conditions in accordance with Ministerial Regulation 167/2015 update of Ministerial Regulation 33/2015 are required to demarcate airport areas and protect airside airport activities such as aircraft takeoffs and landings. A correlational method with a quantitative approach was used in this study. The data of this study came from observation data and questionnaire distribution. Respondents in this study were Aviation Security (AVSEC) and Apron Movement Control (AMC) personnel. From the respondents' responses, the data will be processed using the IBM SPSS Statistic 27 For Windows application program. The results of the calculation state that the condition of the parameter fence facility (variable X) correlates with aviation security and safety (variable Y). The condition of the parameter fence facilities at El Tari Kupang International Airport is stated to be still not in accordance with Ministerial Regulation 167/2015 update of Ministerial Regulation 33/2015 which can be seen on the observation sheet. While the strength of the relationship between the condition of the parameter fence facilities and aviation security and safety is proven by the hypothesis correlation test with the help of the IBM SPSS Statistic 27 For Windows application program with the result of 0.735 which means a strong relationship.

Keywords : Condition, Facility, Fence, Parameter, Safety, Security, El Tari Kupang International Airport.

1. INTRODUCTION

El Tari International Airport in Kupang is one of the airports located in the province of East Nusa Tenggara, specifically in the Penfui Subdistrict, Maulafa District, Kupang City. The airport began operations in 1928 during the Dutch colonial period, with the first flight conducted by Lamij Johnson from the United States. Previously known as Penfui Airfield, the name "Penfui" is derived from the Timor language, where "Pen" means corn and "Fui" means forest. Therefore, Penfui refers to a forest area that is cultivated with corn plants. The name El Tari was officially adopted in 1988, symbolically commemorating the service of General TNI (Anumerta) El Tari, who served as the Governor from 1966 to 1978.

El Tari International Airport, managed by PT. Angkasa Pura I, has a runway measuring 2,500 meters or 8,202 feet in length along direction 08/26. With these runway specifications, El Tari International Airport serves 17 domestic flights and 1 international flight. The airport accommodates not only domestic airlines, such as Susi Air, Nam Air, Batik Air, Sriwijaya Air, Lion Air, Wings Air, and Garuda Indonesia, but also international airlines like Air Asia. Some of the popular flight destinations from El Tari International Airport include Bali, Jakarta, Maumere, Labuan, and Surabaya, while the only international routes are to Darwin and Dili. However, international flights are currently not in operation due to the impact of COVID-19 in recent years, with plans to resume operations in the coming months.

El Tari International Airport has undergone several developments, including renovations and expansions of its terminal facilities. The terminal, which initially had an area of 7,642 square meters and a passenger capacity of 1.3 million per year, has been expanded to two floors with an area of 8,758 square meters and a total passenger capacity of 3 million. Therefore, the terminal at El Tari Airport now has a total

area of 16,400 square meters. These developments and expansions were carried out due to the increasing number of passengers each year, making El Tari International Airport an integrated destination. In addition to facilities on the land side, the airside also needs development and renovation, one of which is the perimeter fence facility.

A perimeter fence is essential for an airport. The role of the perimeter fence, besides serving as a boundary for areas under airport jurisdiction to prevent disturbances that could endanger airport operations, also protects airside activities such as aircraft takeoffs and landings. Therefore, Aviation Security (AVSEC) personnel must frequently conduct patrols or inspections to ensure that the perimeter fence meets the standards set by Presidential Decree 601 of 2015 concerning the Standards for Fences in Security Restricted Areas at Airports.

The condition of the perimeter fence at El Tari International Airport in Kupang, which does not meet the standards—such as having holes or gaps that are not properly sealed—can lead to incidents and accidents. Intruders and animals may enter the airport's airside area, which is supposed to be restricted, due to these gaps in the perimeter fence. This not only disrupts operational activities but can also lead to unwanted incidents or even result in loss of life. Therefore, the airport must repair the perimeter fence to maintain the airport's image and ensure the safety and comfort of both flights and passengers.

In addition to gaps, the absence of lighting on the perimeter fence at El Tari International Airport in Kupang also fails to meet the regulations. As stated in Presidential Decree 326 of 2019 concerning Technical and Operational Safety Regulations, Chapter 9.11, "Fences or barriers provided at an airport to maintain the security of international aviation and its facilities must be equipped with lighting at a minimum illumination level. The airport operator must conduct a study to determine the location of the lights so that the ground areas on both sides of the fence or barrier, particularly access routes, are well-lit." In reality, several spots on the perimeter fence are not equipped with lighting. Lighting must be provided in these spots to minimize the risk of intruders or wild animals entering.

Figure 1. Perimeter Fence at El Tari International Airport in Kupang That Does Not Meet Standards
Source: Researcher's Analysis (2024)

Figure 2. Condition of the Barbed Wire on the Perimeter Fence at El Tari International Airport in Kupang
Source: Researcher's Analysis (2024)

In addition to the above-mentioned issues, the perimeter fence at El Tari International Airport in Kupang is not equipped with Closed-Circuit Television (CCTV), and there are plants growing along the fence. This study aims to examine the condition of security facilities, particularly the perimeter fence, in relation to the safety and security of flights at El Tari International Airport.

To further explore the issues outlined, the researcher will conduct a study titled **"The Impact of Perimeter Fence Conditions on Aviation Safety and Security at El Tari International Airport, Kupang."** Based on the background provided, the research questions for this study are as follows: First, how does the condition of the perimeter fence at El Tari International Airport, Kupang, affect aviation safety and security? Second, what is the level of compliance of the perimeter fence at El Tari International Airport, Kupang, with the standards outlined in KM 39 of 2024 regarding the National Aviation Security Program?

2. METHOD
2.1 Research Method

According to Sugiyono (2010), research methods are scientific approaches used to obtain data for specific purposes and uses. Therefore, it is essential to consider four key elements: 1) scientific method; 2) data; 3) purpose; and 4) ease of use. Additionally, the definition of research methods is also presented by Sofia (2017), who states that research methods are procedures or steps in conducting research that involve how researchers collect data, analyze data, and present data with scientific characteristics such as: 1) rational; 2) empirical; and 3) systematic.

From the explanation above, it can be concluded that research methods are approaches used to obtain data,

which will later be used according to the purpose of the research. In this case, the researcher uses quantitative research methods.

2.2 Research Design

A strategy employed by the researcher to connect each element within the research, including selecting the appropriate tools and methods to address potential problems that may arise during the study, is the definition of research design.

2.3 Research Variable

In this study, the researcher uses two variables, namely the independent variable (x) and the dependent variable (y). The independent variable is the variable that influences or causes the occurrence of the dependent variable, while the dependent variable is the variable that is influenced or is the result of the independent variable. The researcher has identified the condition of the perimeter fence facilities on the airside as the independent variable (x) and flight safety and security as the dependent variable (y). Further analysis will be conducted to determine whether there is an effect of the independent variable on the dependent variable.

2.4 Research Subject

There are various definitions of population, and for the purposes of this research, the researcher adopts the definition provided by Sugiyono (2010), which describes a population as a generalization consisting of objects or subjects that have certain qualities and characteristics determined by the researcher to be studied and from which conclusions are drawn. In this study, the population consists of 64 personnel from Aviation Security (AVSEC) and 17 personnel from Apron Movement Control (AMC) at El Tari International Airport, Kupang, bringing the total population to 81 individuals.

The personnel within this population hold various roles that are essential to the safety and operation of the airport, ranging from Senior Aviation Security officers to Basic Aviation Security personnel and various positions within the Apron Movement Control unit. These individuals are directly involved in maintaining airport security and managing apron operations, making them ideal subjects for this study.

According to Sugiyono (2010), a sample is a subset of the population that possesses the same characteristics as the population. When the population size is large and the researcher faces limitations such as time, funding, and manpower, a sample is used to represent the population. The conclusions drawn from the study of the sample can then be generalized to the entire population. Because the sample represents the population, it is crucial that the selected sample accurately reflects the population's characteristics.

Given the constraints of time and resources, the researcher selected a sample of 44 individuals from the total population of 81. This sample includes 32 personnel from Aviation Security (AVSEC) and 12 personnel from Apron Movement Control (AMC). This sample size was determined to be sufficient to provide a reliable representation of the entire population, allowing the researcher to conduct a thorough analysis and draw conclusions that can be applied to the broader group.

2.5 Data Collection Techniques and Research Instrumnets

According to Sugiarto (2006), data collection methods refer to the approaches used to obtain the necessary data. These methods are broadly categorized into primary data collection and secondary data collection. The data gathered through these methods are then processed by the researcher to meet the research objectives and draw conclusions that address the research questions. Based on this explanation, the researcher utilized observation and survey techniques for data collection.

As stated by Semiawan (2010), observation is an integral part of data collection. It involves gathering data directly from the field. The observation process begins with identifying the location to be studied. After the research location is identified, mapping is conducted to gain a general overview of the research target. Observation, in this context, refers to the direct observation and recording of research objects within the study area. In this research, the researcher conducted direct observation in the perimeter area of El Tari International Airport, Kupang, during the On The Job Training (OJT) period, which took place from December 11, 2023, to March 1, 2024. Through observation, the researcher was able to gather first-hand information about the current conditions of the perimeter fence, including its structural integrity, maintenance, and overall impact on airport security and safety.

According to Rijal, Barkey, Nursaputra, Ahmad, and Abkar (2019), a survey is a method of collecting information aimed at identifying, describing, and analyzing data. One common survey technique is the use of questionnaires. Suhartanto, Amalia, Najib, and Arsawan (2023) define a questionnaire as a method employed to collect data during a survey or observation to obtain structured quantitative data. The questionnaire consists of statements, either verbal or written, to which respondents provide their answers. In this research, the questionnaire was designed to collect data on the analysis of the condition of the perimeter fence facilities on the airside and their impact on aviation safety and security at El Tari International Airport, Kupang. The questionnaire covered various aspects, including the height and condition of the fence, the presence of security features like lighting and Closed Circuit Television (CCTV), and the frequency of maintenance checks.

Indra P. and Cahyaningrum (2019) describe a literature review as a descriptive study conducted by researchers to gather information relevant to the topic or problem being studied, with the literature serving as the primary source. In this research, the literature review was conducted using relevant studies and regulations as sources of information. The literature provided a theoretical foundation and contextual background that guided the research process. This approach ensured that the research was grounded in existing knowledge and

aligned with current regulations, particularly those related to aviation security and perimeter fence standards.

Kurniawan (2021) defines a research instrument as a tool used by researchers to collect data, measure phenomena, and analyze data related to the problem being studied on the subject or sample observed. In this study, the researcher used a questionnaire as the primary tool to gather responses from the respondents. The questionnaire was carefully designed to elicit relevant information regarding the respondents' perceptions and experiences related to the perimeter fence's condition at the airport.

According to Sukendra, Atmaja, and Surya (2020), an observation sheet is used to collect information on relevant variables with the highest possible validity and reliability. The observation sheet utilized in this study included a checklist and scoring system tailored to the objects being observed. The checklist covered various aspects of the perimeter fence, such as whether it met the required standards, the presence of security features like CCTV, and the adequacy of lighting. This structured approach ensured that the data collected during the observation phase was comprehensive and could be systematically analyzed.

The observation sheet was used during the on-site inspections at El Tari International Airport to document the current state of the perimeter fence. The data collected included observations on the physical condition of the fence, the presence of any gaps or weak points, the effectiveness of the lighting system, and the coverage provided by CCTV cameras. These observations were crucial in assessing whether the perimeter fence met the standards set by the relevant aviation security regulations.

The instrument used for the survey was a questionnaire. In this research, respondents were not given alternative answers to choose from; instead, they were asked to respond to a series of statements categorized into different levels of agreement, such as Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), and Strongly Disagree (SD). This method aimed to obtain structured and relevant information about the perceptions and assessments of personnel from Apron Movement Control (AMC) and Aviation Security (AVSEC) regarding the impact of the perimeter fence's condition on safety and security at El Tari International Airport, Kupang.

The questionnaire employed a Likert scale to measure the responses of AMC and AVSEC personnel. This scale allowed the researcher to quantify attitudes, opinions, and perceptions on the effectiveness of the perimeter fence in preventing unauthorized access and ensuring the safety of aircraft operations. Respondents were asked to rate various aspects of the perimeter fence, including its height, maintenance, lighting, and the presence of CCTV. The responses were then analyzed to determine the overall effectiveness of the perimeter fence and identify any areas that required improvement.

The Likert scale, as suggested by Sugiyono (2010), is one of the methods to measure attitudes, opinions, and perceptions of individuals or groups towards a social phenomenon. The Likert scale used in this research helped in evaluating the overall consensus among respondents regarding the perimeter fence's effectiveness. Each response was assigned a score, with Strongly Agree (SA) receiving the highest score of 5, and Strongly Disagree (SD) receiving the lowest score of 1. These scores were then summed to determine the total score for each item, which was further analyzed to identify trends and insights into the perceptions of the respondents.

The analysis of the Likert scale responses provided insights into the overall sentiment among AMC and AVSEC personnel regarding the perimeter fence. By applying this method, the researcher was able to determine whether the fence met the required security standards, how effective it was in preventing unauthorized access, and the overall level of satisfaction among personnel with the current security measures in place.

The final step in the analysis involved calculating the index percentage to interpret the data. The index percentage was derived by dividing the total score by the maximum possible score, then multiplying by 100. This percentage was used to categorize the respondents' answers into different levels of agreement, ranging from Strongly Disagree to Strongly Agree. The results were then processed further to determine the overall effectiveness of the perimeter fence and identify areas where improvements could be made.

By employing these comprehensive data collection techniques and research instruments, the researcher was able to gather detailed and reliable data that provided valuable insights into the condition of the perimeter fence at El Tari International Airport and its impact on aviation safety and security. The findings of this research will be used to inform recommendations for enhancing the security measures at the airport, ensuring that it meets the highest standards of safety and security.

2.6 Data Analysis Techniques

In this study, the data analysis techniques used include three main stages: validity testing, reliability testing, and hypothesis testing. Each stage plays a crucial role in ensuring the validity, reliability, and strength of the relationships between the variables studied.

Validity testing is the first step taken to assess the extent to which the measurement instruments used in this study can accurately measure what they are supposed to measure. According to Darma (2021), validity is the result of a validation process, where researchers collect empirical data to support the conclusions generated by the instrument scores. Validity testing aims to measure how accurately a test performs its function, ensuring that the measurement tool designed truly measures the intended variable. In this study, the researcher applied the Corrected Item-Total Correlation formula using the IBM SPSS Statistic 27 for Windows application. The correlation results obtained from this test are displayed in the Item-Total Statistic output under the Corrected Item-Total Correlation column. These correlation values are then compared to the r-table values at a 0.05 significance level to determine the validity of the instrument.

The next step is reliability testing, which aims to ensure that the measurement instruments used can provide consistent and trustworthy results. According to Darma (2021), reliability refers to the extent to which the

results of a measurement are stable, reliable, and free from measurement errors. Reliability testing of the instruments is conducted to determine whether the data produced is dependable and robust. In this test, the Cronbach's alpha value is used as an indicator of reliability, which is then compared to a certain significance level, such as 0.5, 0.6, or 0.7, depending on the study's needs. The criteria used in this test are as follows: if the Cronbach's alpha value is greater than the specified significance level, the instrument is considered reliable. Conversely, if the Cronbach's alpha value is less than the significance level, the instrument is considered unreliable. In this study, the researcher set a Cronbach's alpha value > 0.6 as the threshold for determining the instrument's reliability.

The final stage in the data analysis techniques is hypothesis testing, a systematic and structured procedure used to decide whether to accept or reject the proposed hypothesis. According to Santoso (2019), hypothesis testing aims to determine whether there is a relationship or correlation between the variables studied. In this test, several assessment criteria are used as benchmarks in formulating conclusions. One of the main criteria used is the interval of the correlation coefficient values, which indicates the strength of the relationship between the variables. This relationship strength is assessed at several levels, ranging from "no" relationship (KK = 0.00), "very low or very weak" relationship ($0.00 < KK < 0.20$), "low or weak, but definite" ($0.20 < KK < 0.40$), "moderate or significant" ($0.40 < KK < 0.70$), "high or strong" ($0.70 < KK < 0.90$), to "very high or very strong, reliable" ($0.90 < KK < 1.00$). If the correlation coefficient reaches 1.00, the relationship is considered "perfect." Based on the interval table of correlation coefficient values presented by Misbahuddin & Hasan (2013), the researcher will analyze the hypothesis testing results to determine the extent to which the independent variable influences the dependent variable in this study.

By combining validity, reliability, and hypothesis testing, the researcher can ensure that the measurement instruments used are not only accurate and reliable but also capable of revealing significant relationships between the studied variables. The results of this analysis will provide a solid foundation for the researcher to draw valid conclusions about the relationship between the condition of the perimeter fence facilities on the airside and flight safety and security at El Tari International Airport.

2.7 Research Location and Time

The research location refers to the place where the data for the study is obtained. The selection of this research location is based on the researcher's participation in On The Job Training (OJT) with the Aviation Security (AVSEC) Unit, specifically focusing on the perimeter fence facilities on the airside of El Tari International Airport, Kupang. The reason for choosing this location is that the necessary data is readily accessible, which facilitates the researcher in conducting the study effectively.

The research was conducted during the period of On The Job Training (OJT), which took place from December 11, 2023, to March 1, 2024.

3. RESULT AND DISCUSSION
Observation Results

Personnel from Aviation Security (AVSEC) conduct daily patrols in the security area, particularly focusing on the perimeter fence facilities at El Tari International Airport, Kupang. These routine patrols take place every day at 10 a.m., with AVSEC personnel using patrol vehicles to drive around the perimeter fence. However, these patrols are not comprehensive, covering only a portion of the perimeter fence facilities. During participation in these patrols, the researcher observed several conditions of the perimeter fence that do not comply with the regulations outlined in PM 167 of 2015, an update to PM 33 of 2015 regarding Access Control to Security Restricted Areas at Airports. The observations include:

1. Inadequate Perimeter Fence Height

The researcher identified sections of the perimeter fence that do not meet the minimum height requirement of 2.44 meters as stipulated in the regulations. This shortcoming poses a significant risk, as it could potentially allow unauthorized individuals to breach the Security Restricted Area (SRA) with relative ease.

2. Barbed Wire with Gaps

It was observed that some areas of the perimeter fence had gaps in the barbed wire. The barbed wire is intended to prevent the entry of unauthorized individuals and wildlife into the SRA. However, these gaps compromise the fence's effectiveness, making it easier for breaches to occur.

3. Obstructed Visibility

The researcher noted that visibility along some sections of the perimeter fence is obstructed by vegetation growing along the fence line. According to KM 39 of 2024 on the Security Program, the perimeter fence should maintain a clear zone with a visibility range of 3 meters. The current condition does not comply with this requirement, potentially hindering surveillance and monitoring efforts.

4. Vegetation Growth on the Perimeter Fence

The perimeter fence was found to be overgrown with vegetation along its length. This overgrowth could provide a means for individuals or animals to climb the fence, thereby reducing the overall security and safety of the airport. The presence of such vegetation directly

contradicts the standards set forth in the security regulations, which require the fence to remain free of any obstructions.

5. Lack of Closed Circuit Television (CCTV) Coverage and Lighting

The researcher also observed that certain areas of the perimeter fence lack adequate CCTV coverage and sufficient lighting. The absence of proper lighting poses a significant risk during nighttime operations, as it could facilitate unauthorized access. Similarly, insufficient CCTV coverage reduces the efficiency of monitoring and surveillance efforts, making it challenging to detect and respond to potential security breaches.

The above observations were systematically recorded using an observation sheet, which included various indicators based on the requirements outlined in KM 39 of 2024 regarding the Security Program. The recorded data is summarized in a table that compares the current condition of the perimeter fence against the regulatory standards.

The summary of these observations indicates that the current condition of the perimeter fence facilities does not fully comply with the established security standards. While the fence itself serves as a physical barrier, issues such as gaps in the barbed wire, inadequate lighting, and insufficient CCTV coverage indicate significant deviations from the standards. Moreover, the presence of vegetation and the lack of proper maintenance further exacerbate the security risks associated with the perimeter fence.

The discrepancies in the perimeter fence facilities at El Tari International Airport highlight the need for immediate corrective actions to bring these facilities into compliance with relevant security regulations. Ensuring that the fence meets all stipulated requirements, including proper height, integrity, visibility, and maintenance, is crucial for maintaining the safety and security of the airport and its operations.

Questionnaire

In this study, the researcher used a questionnaire to obtain data related to the impact of perimeter fence facility conditions on aviation security and safety at El Tari International Airport in Kupang. The questionnaire was distributed to 44 respondents, consisting of 32 Aviation Security (AVSEC) personnel and 12 Apron Movement Control (AMC) personnel. To process the data obtained from the questionnaire, the researcher used a Likert scale and calculated the total index of two variables, x and y.

The questionnaire included several statements, such as whether the perimeter fence height meets the minimum standard of 2.44 meters and is equipped with barbed wire on top; whether the facility is equipped with adequate lighting to facilitate night-time surveillance; and whether a Barcode Scanner (Vehicle PAS) is in place to minimize intrusion attempts. Other statements addressed the installation of surveillance cameras (CCTV) to monitor the area around the perimeter fence, the provision of grilles on fence gaps from top to bottom to minimize intrusion, and whether the perimeter fence condition complies with KP 601 of 2015 regarding Standard Fences for Security Restricted Areas at airports, which can enhance aviation security and safety.

Additionally, the questionnaire inquired about gaps or holes in the perimeter fence that could allow animals to enter the runway area, which could endanger aviation safety, the effectiveness of the perimeter fence in restricting unauthorized access to the airside at El Tari International Airport in Kupang, and the fence's effectiveness in preventing unlawful acts. Finally, the questionnaire also included a statement about whether routine patrols by Aviation Security (AVSEC) personnel along the perimeter fence can enhance aviation security and safety. All the collected data was processed and analyzed by the researcher to obtain valid and reliable results.

Data collection and processing in this study were carried out using a questionnaire as the research instrument, which was distributed via the Google Forms platform. The questionnaire was distributed online to 32 Aviation Security (AVSEC) personnel and 12 Apron Movement Control (AMC) personnel at El Tari Kupang International Airport. Each respondent was allowed to provide only one response to each statement, with five statements per variable. Each statement in this questionnaire had an equal weighting, as shown in the Likert Scale table.

The data obtained from the questionnaires were then processed to calculate the percentage index value for each statement. For example, for the first statement, which stated that the perimeter fence height met the minimum standard of 2.44 meters and was equipped with barbed wire on top, 21 respondents strongly agreed, 6 respondents agreed, and 17 respondents were neutral. No respondents disagreed or strongly disagreed. With a total score of 180, this statement received a percentage index of 90%, indicating that the majority of respondents strongly agreed.

Next, for the second statement regarding adequate lighting to facilitate nighttime surveillance, 3 respondents strongly agreed, 22 respondents agreed, and 19 respondents were neutral, with a total score of 160 and a percentage index of 72%, showing that respondents generally agreed with this statement.

The third statement, which asked about the presence of a Barcode Scanner (Vehicle PAS) to minimize infiltration attempts, received approval from 3 respondents who strongly agreed, 24 respondents who agreed, and 17 respondents who were neutral. With a total score of 162, this statement received a percentage index of 73%, indicating that most respondents agreed.

For the fourth statement about the installation of surveillance cameras (CCTV) to monitor the area around the perimeter fence, 31 respondents strongly agreed, 2 respondents agreed, and 11 respondents were neutral, with a total score of 196 and a percentage index of 89%, indicating that the majority of respondents strongly agreed.

The fifth statement regarding the installation of grilles on the fence from top to bottom to minimize infiltration received approval from 25 respondents who strongly agreed, 2 respondents who agreed, and 17 respondents who were neutral. With a total score of 184, this statement received a percentage index of 83%, indicating that most respondents strongly agreed.

The sixth statement, which said that the condition of the perimeter fence in accordance with KP 601 of 2015 concerning Standard Fences for Security Restricted Areas (Security Restricted Area) at airports could improve aviation security and safety, received approval from 3 respondents who strongly agreed and 41 respondents who agreed, with a total score of 179 and a percentage index of 81%, indicating that the majority of respondents strongly agreed.

Next, for the seventh statement about gaps or holes in the perimeter fence that could allow animals to penetrate and enter the runway area, endangering aviation safety, 32 respondents strongly agreed and 12 respondents agreed, with a total score of 188 and a percentage index of 85%, showing that most respondents strongly agreed.

The eighth statement, which said that the perimeter fence was very effective in limiting unauthorized access to the airside of El Tari Kupang International Airport, received approval from 6 respondents who strongly agreed and 38 respondents who agreed, with a total score of 182 and a percentage index of 82%, indicating that the majority of respondents strongly agreed.

For the ninth statement about the effectiveness of the perimeter fence on the airside in preventing unlawful acts, 27 respondents strongly agreed and 17 respondents agreed, with a total score of 203 and a percentage index of 92%, meaning most respondents strongly agreed.

Finally, for the tenth statement, which stated that routine patrols by Aviation Security (AVSEC) personnel along the perimeter fence could improve aviation security and safety, 28 respondents strongly agreed and 16 respondents agreed, with a total score of 204 and a percentage index of 92%, indicating that the majority of respondents strongly agreed with the statement.

Overall, the results of this data processing show that most respondents agreed or strongly agreed with the statements presented, indicating their satisfaction with the condition of the facilities and security at El Tari Kupang International Airport.

Literature Review Results

The literature review conducted by the researcher encompassed relevant regulations and statements aimed at reassessing factors that may have contributed to the issues identified, as well as providing guidance and references for understanding the concepts discussed in the context of the problem. In this case, the researcher utilized several key regulations as the basis for determining the general and specific specifications of the perimeter fence.

Firstly, the researcher referred to PM 167 of 2015, an update to PM 33 of 2015 concerning Access Control to Security Restricted Areas at Airports. This regulation served as a guideline for establishing the general specifications of the perimeter fence. Secondly, KP 601 of 2015 on Standards for Security Restricted Area Fences at Airports was used as a reference for more detailed specifications regarding perimeter fence facilities. Lastly, KM 39 of 2024 on the National Aviation Security Program was consulted to identify additional relevant indicators.

The findings from the literature review were systematically compared with the results of the field observations, as summarized in the following table. The table outlines the observed conditions of the perimeter fence against the established standards, highlighting areas where the fence met or failed to meet the required specifications.

For instance, the perimeter fence was found to be in line with the general requirement of being a physical barrier, as it is constructed of appropriate fencing materials, as per the guidelines of PM 167 of 2015. However, there were several deviations from the standards in other areas. For example, while the fence is meant to have no gaps from bottom to top, the observation revealed that there were gaps in the upper sections, which contradicts the security guidelines and poses a potential risk for unauthorized access.

Similarly, while the regulation mandates adequate lighting along the perimeter fence to ensure visibility and security, the observations indicated that lighting was only available at specific points, leading to insufficient coverage in other areas. This inadequacy in lighting does not fully comply with the required standards, thereby reducing the effectiveness of the perimeter security.

Furthermore, the availability of an inspection path along the perimeter fence was confirmed, and it was found to be in accordance with the established standards. Emergency exits were also present and in line with the requirements. However, the fence's height, while meeting the minimum standard of 2.44 meters as specified in KP 601 of 2015, still fell short in certain areas where additional security measures, such as barbed wire, were found to be damaged or missing. This inconsistency with the prescribed security measures further compromises the integrity of the fence.

Moreover, the presence of overgrown vegetation on and around the fence was identified as a significant issue. The vegetation could facilitate unauthorized access by providing a means for climbing

over the fence, which directly violates the standards set forth in the security regulations. The maintenance of the fence was also found to be lacking, with numerous sections requiring attention to ensure that the fence remains an effective security barrier.

The absence of consistent CCTV coverage and lighting across the perimeter was another major finding. The literature review confirmed that the security regulations require comprehensive surveillance and illumination to monitor and protect the restricted area effectively. However, the observations revealed that CCTV cameras were only installed at certain points, and several areas lacked adequate lighting, both of which are critical for maintaining the security of the perimeter.

In summary, the comparison between the observed conditions of the perimeter fence and the standards outlined in the relevant regulations underscores several areas of non-compliance. These discrepancies highlight the need for corrective measures to ensure that the perimeter fence at El Tari International Airport meets all necessary security requirements. Addressing these issues is crucial for enhancing the overall safety and security of the airport's restricted areas, thereby preventing potential breaches and ensuring the smooth operation of airport activities.

Data Analysis

Based on the results of the questionnaires, the next step involves conducting data tests, including validity tests, reliability tests, and hypothesis testing. The validity test aims to measure how accurately a test performs its function. The reliability test is conducted to determine whether the data generated can be relied upon or is robust. Hypothesis testing is used to decide whether to accept or reject the hypothesis.

Validity Test

The researcher used IBM SPSS Statistics 27 for Windows to conduct the validity test. An instrument is considered valid if the calculated value of r (r_calculated) is greater than the table value of r (r_table). Given that the researcher used 44 samples in the questionnaire distribution, the r_table value for 42 degrees of freedom (N-2) is 0.304.

From the tests conducted, the following results were obtained:

Table 1, Validity Test Results for Variable X

Instrumen	Skor	Nilai r_{tabel}
X1	0,888	0,304
X2	0,402	0,304
X3	0,623	0,304
X4	0,481	0,304
X5	0,863	0,304

Table 2. Validity Test Results for Variable Y

Instrumen	Skor	Nilai r_{tabel}
Y1	0,358	0,304
Y2	0.901	0,304
Y3	0,479	0,304
Y4	0,889	0,304
Y5	0,583	0,304

Based on the results, it can be concluded that all the instruments used by the researcher are valid and suitable for this study.

Reliability Test

The researcher used IBM SPSS Statistics 27 for Windows to conduct the reliability test. An instrument is considered reliable if the variable gives a Cronbach's Alpha value greater than 0.6.

Table 3. Reliability Test Results

Variabel	Nilai *Croncbach's Alpha*	Keterangan
X	0,685	Reabel
Y	0,685	Reabel

These results indicate that both variables are reliable and can be trusted for the study.

Hypothesis Testing

The hypothesis test was conducted using IBM SPSS Statistics 27 for Windows. This analysis is used to measure the strength of the relationship between variable X (Condition of the Perimeter Fence) and variable Y (Aviation Security and Safety).

Table 4. Hypothesis Test Results

Correlations

		KONDISI PAGAR PARAMETER	KEAMANAN DAN KESELAMATAN PENERBANGAN
KONDISI PAGAR PARAMETER	Pearson Correlation	1	.735**
	Sig. (2-tailed)		.000
	N	44	44
KEAMANAN DAN KESELAMATAN PENERBANGAN	Pearson Correlation	.735**	1
	Sig. (2-tailed)	.000	
	N	44	44

**. Correlation is significant at the 0.01 level (2-tailed).

The Pearson Correlation between the condition of the perimeter fence (X) and aviation security and safety (Y) is 0.735, with a significance level (Sig.) of 0.000.

The results show a correlation coefficient of 0.735 between the condition of the perimeter fence (X) and aviation security and safety (Y), indicating a strong relationship between the two variables. In other words, the condition of the perimeter fence significantly influences aviation security and safety.

Condition of Perimeter Fence Facilities

Based on the data obtained from the observation sheet, many sections of the perimeter fence at El Tari International Airport in Kupang do not comply with the regulations outlined in PM 167 of 2015, which is an update to PM 33 of 2015 regarding Access Control to Security Restricted Areas at Airports. As shown in Table 4.1, out of the 10 requirements, only three comply with the regulations set forth in PM 167 of 2015. From this explanation, it can be concluded that the condition of the perimeter fence facilities at El Tari International Airport in Kupang does not fully meet the standards established in PM 167 of 2015, which updates PM 33 of 2015 on Access Control to Security Restricted Areas at Airports.

The Impact of Perimeter Fence Standardization on Aviation Safety and Security

The researcher developed a questionnaire consisting of 10 statements, which was distributed to 44 personnel from Aviation Security (AVSEC) and Apron Movement Control (AMC). The results of the questionnaire were analyzed using the Likert scale and the IBM SPSS Statistics 27 for Windows application. These results were used to measure the impact of the condition of the perimeter fence facilities on aviation safety and security.

Based on the results already discussed, the hypothesis test showed that the strength of the relationship between the condition of the perimeter fence facilities and aviation safety and security is 0.735, which is considered a strong correlation. From this test, it can be concluded that the condition of the perimeter fence facilities has a significant impact on aviation safety and security at El Tari International Airport in Kupang.

4. CONCLUSION

Based on the discussion above, it can be concluded that the condition of the perimeter fence facilities has a significant impact on the security and safety of flights at El Tari Kupang International Airport. This is supported by the results of the correlation test between the condition of the perimeter fence and the level of security and safety, where a correlation value of 0.735 indicates a strong relationship between the two. However, the condition of the perimeter fence facilities at El Tari Kupang International Airport does not yet fully comply with the standards set out in KM 39 of 2024 concerning the National Aviation Security Program. Observations show that there are still requirements that have not been met regarding the condition of the perimeter fence facilities at the airport. Therefore, the researcher offers several suggestions for improvement at El Tari Kupang International Airport. First, regular maintenance and upkeep of the perimeter fence facilities are necessary, especially to address the issue of wild plants that grow and cause damage, which can become an entry path for living creatures into the Security Restricted Area, potentially leading to accidents. Second, it is recommended to install barbed wire evenly at all points of the perimeter fence facilities that do not yet meet standards, as an effective measure to prevent living creatures from entering the Security Restricted Area. Third, the installation of lighting and Closed Circuit Television (CCTV) should be done evenly across the perimeter fence facilities. Lighting and CCTV must function optimally, as if one of them is not working properly, the security system will weaken and become vulnerable to intrusion.

REFERENCES

[1] Annex 14 6th Edition. (2022). *Aerodromes.*

[2] Annex 17 6th Edition. (2022). *Aviation Security*

[3] Amruddin, Wahyudi, I., Damanik, D., Purba, E., A, M. U., Ruswandi , W. Yuliastuti, I. N. (2022). *Metodologi Penelitian Manajemen.* Padang: Global Eksekutif Teknologi.

[4] Badan Standarisasi Nasional . (2009). *Pengantar Standarisasi.* Jakarta: Badan Standarisasi Nasional.

[5] Darma, B. (2021). *Statistika Penelitian Menggunakan SPSS.* Jakarta: Guepedia.

[6] Dewan Perwakilan Rakyat. (2009). Penerbangan. *Undang Undang* .

[7] Dewi, A. M., Meylani, Y., Heryana, N., Alfathoni, M. A., Sriwahyuni, E., & Rida. (2023). *Pengantar Metodologi Penenelitian.* Padang: Get Press Indonesia.

[8] Hamid, A. (2019). *Penyusunan Tes Tertulis (Paper and Pencil Test).* Ponorogo: Uwais Insporasi Indonesia.

[9] Hastono, S. P. (2006). *Analisis Data.* Jakarta : Universitas Indonesia.

[10] Indonesia. 2024. *Peraturan Menteri Perhubungan Republik Indonesia No. 9 Tahun 2024 Tentang Kemanan Penerbangan Nasional*

[11] Indonesia. 2024. *Keputusan Menteri Perhubungan Republik Indonesia No. 39 Tahun 2024 Tentang Program Keamanan Nasional.*

[12] Indonesia. 2021. *Peraturan Menteri Perhubungan Republik Indonesia No. 28 Tahun 2021 Tentang Program Pendidikan dan Pelatihan Keamanan Penerbangan Nasional*

[13] Keputusan Menteri Nomor 601 (2015). *Standar Pagar Untuk Daerah Keamanan Terbatas (Security Restricted Area) Bandar Udara.*

[14] Keputusan Presiden 326. (2019). *Standar Teknis Dan Operasional Peraturan Keselamatan Penerbangan Sipil Bagian 139. Bab 9.10.*

[15] Kurniawan, H. (2021). *Pengantar Praktis Penyusunan Instrumen Penelitian.* Yogyakarta: Budi Utama.

[16] Misbahuddin, & Hasan, I. (2013). *Analisis Data Penelitian Dengan Statistik Edisi Ke-2.* Jakarta: Bumi Aksara.

[17] Peraturan Menteri Nomor 33. (2015). Pengendalian Jalan Masuk (*Access Control*) Ke Daerah Keamanan Terbatas Di Bandar Udara.

[18] Peraturan Menteri Nomor 167. (2015). *Perubahan Atas Peraturan MenteriPerhubungan Nomor Pm 33 Tahun 2015 Tentang Pengendalian JalanMasuk (Access Control) Ke Daerah Keamanan Terbatas Di Bandar Udara..*

[19] Indonesia. 2009. *Undang-Undang No. 1 Tahun 2009 Tentang Penerbangan*

[20] Rijal, S., Barkey, R. A., Nursaputra, M., Ahmad, B., & Abkar. (2019). *Survey dan Pemetaan Kehutanan.* Makassar: Fakultas Kehutanan Universitas Hasanuddin.

[21] Santoso, I. H. (2019). *Statistik II (Untuk Ilmu Sosial dan Ekonomi).* Surabaya: UWKS Press.

[22] Semiawan, C. R. (2010). *Metode Penelitian Kualitatif .* Jakarta: Grasindo.

[23] Sofia, A. (2017). *Metode Penulisan Karya Ilmiah .* Yogyakarta: Bursa Ilmu.

[24] Sudjana, N. (2016). *Penilaian Hasil Proses Belajar Mengajar.* Bandung: Remaja Rosdakarya .

[25] Sugiarto. (2022). *Metodologi Penelitian Bisnis.* Yogyakarta: ANDI.

[26] Sugiarto, D. S. (2006). *Metode Statistika Untuk Bisnis dan Ekonomi.* Jakarta: Gramedia Pustaka Utama.

[27] Sugiyono. (2010). *Statistika Untuk Penelitian.* Bandung: CV. ALFABETA.

[28] Suhartanto, D., Amalia, F. A., Najib, M., & Arsawan, I. W. (2023). *Metode Riset Bisnis : Dasar-dasar Mendesain dan Melakukan Riset di Konteks Bisnis.* Ponorogo: Uwais Inspirasi Indonesia.

[29] Sukmadinata, N. S. (1999). *Pengembangan Kurikulum.* Bandung: Remaja Rosdakarya.

[30] Susanto , P. C., Hartono, & Hermawan, M. A. (2019). Personel Aviation Security Menjaga Keamanan di Bandar Udara. *AVIASI Jurnal Ilmiah Kedirgantaraan*, 15