Indonesian Journal of Multidiciplinary Research

Airport Development Planning

(Case Study: Mozes Kilangin International Airport)

Salsabila Miyazumi Amri, Muhammad Azhan Pagarsukma

Indonesia University of Education, Setiabudi No.229, Isola, City of Bandung, Indonesia
Correspondence: E-mail: yayanriyanto@upi.edu

A B S T R A C T S

The aim of this research is to calculating the volume requirements for runways, taxiways and aprons in future conditions based on the planned aircraft CN-235 type. In planning the development of an airport, one must estimate the traffic flow in the future. Therefore, this paper is based on research results. By analyzing the five-year data on the number of aircraft, passengers, luggage and cargo using regression analysis, it can be predicted that the traffic flow in the future so that airport development can be determined whether it is necessary to do or not. Based on primary data obtained from airports such as climatological data, aircraft characteristics data, land data, and existing airport data, it is used as a reference for planning airport development. Based on the results of calculations that refer to the standards of the International Civil Aviation Organization (ICAO) with the CN-235 plan aircraft, it takes a runway length of 3,949 meters and a runway width of 60 meters. The distance between the runway axis and the runway axis is 185 meters. The total width of the taxiway is 38 meters, and the required apron area is 750.5 × 164 = 123,082 m. Benefit of the Research is as material to consider for evaluating the function of airports in support of faster mobilization in the future

A R T I C L E I N F O

1. INTRODUCTION

In Papua Province, transportation by air currently plays an important role, where in some areas it is a drilling area for oil, coal and others, so it requires high mobility between regions, within and outside the province (Brill and Parsons, 2001; Yao *et al.,* 2018)). Thus, the function of air transportation for these activities is very vital. **Figure 1** shows In Timika, one of the districts in the province, there is Mozes Kilangin International Airport (Walo and Sudarmo, 2018). Today, Mozes Kilangin Airport is considered unable to accommodate the number of passengers. Because of this, it is necessary to plan the development for this Mozes Kilangin Airport.

The purpose and objective of this research is to plan the development of an airport in Timika City, Papua Province, namely Mozes Kilangin Airport, with CN-235 aircraft as the plan aircraft, and the results of the forecast for the number of airport visitors (Maniriho, 2019).

2. METHODS

Research in the form of qualitative and quantitative descriptive was carried out by collecting the required data. These data were taken from related agencies such as the UPT Ditjen Hubud, Mozes Kilangin Airport branch, the Office of the Meteorology, Climatology and Geophysics Agency and the Papua Central Statistics Agency office. The runway length planning is based on the plan plane and corrected by the runway elevation, temperature and slope factors. **Figure 2.** Flow Diagram Research.

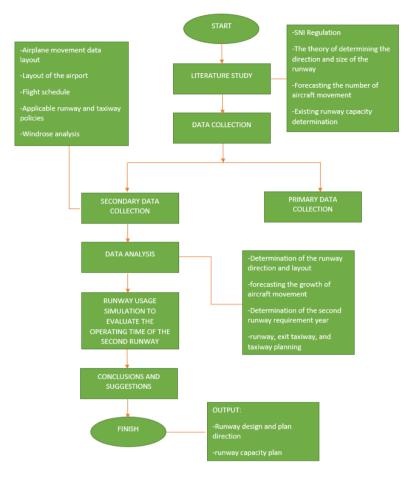**Figure 1.** Mozes Kilangin International Airport

Figure 2. Flow Diagram Research

Taxiway planning, determining exit taxiways, slopes and visibility, taxiway widths, taxiway curves, and fillet planning are based on aircraft plan data and guided by the requirements issued by ICAO. For the planning of the terminal area and the necessary facilities, it is based on the results of the analysis of the development of air traffic flows and the number of aircraft and passenger movements during future peak hours.

3. RESULTS AND DISCUSSION
3.1. Annual Departure Mozes Kilangin Airport

Figure 3 shows the number of annual departures at Mozes Kilangin Airport in 2015 to 2019 from Republic of Indonesia Air Transport Statistics Agency. From this data we will get the i parameter in units of %. This parameter is used to predict the annual departure planning (in passenger units) in the following year (Adisasmita and Hadipramana, 2011).
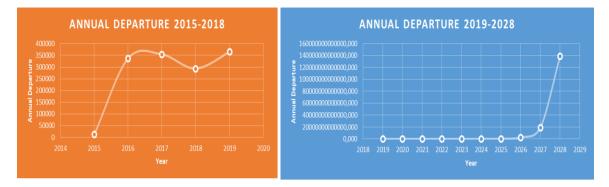
Figure 3. Annual Departure 2015-2018

3.2. **Runway Classification**

Figure 4 shows the Mozes Kilangin Runway. For subgrade conditions, flexible pavements are planned with varying subgrade strengths, namely subgrade that has CBR 5 (Sari *et al.,* 2019). Pavement planning uses the FAA (Federal Aviation Administration) method. With this condition, ICAO and FAA issued a regulation on aircraft loading for uniform calculation (Knoch, 2014). **Table 1** show the result of Pavement Design using the FAA method.

Figure 4. Mozes Kilangin Runway

Table 1. Results of Pavement Design using the FAA method (subgrade CBR 5%)

Layer	Material Used	Dense Plan	
		Inchi	Cm
Surface (surface course)	item P-401 HMA (Hot Mix Asphalt)	3	8
Foundation (base course)	Item P-209 – (Crushed Aggregate Base Course)	3	8
Sub Foundation (subbase course)	Item P-154 – (Subbase Course)	14	36

Figure 5 shows the Windrose Result. The runway from an airport must be designed in such a way as to be in the direction of the prevailing wind. This is so that when the aircraft maneuvers the landing, the cross wind component is not excessive. Wind data at Mozes Kilangin Airport is obtained from the local BMKG (Meteorology, Climatology and Geophysics Agency) station. Based on wind data calculations, a wind diagram must be made for windrose analysis (Ocherudy, 2016). The percentage of wind corresponding to a given direction and speed range is marked in the appropriate sector on the wind chart using the polar coordinate scale for wind direction and magnitude.
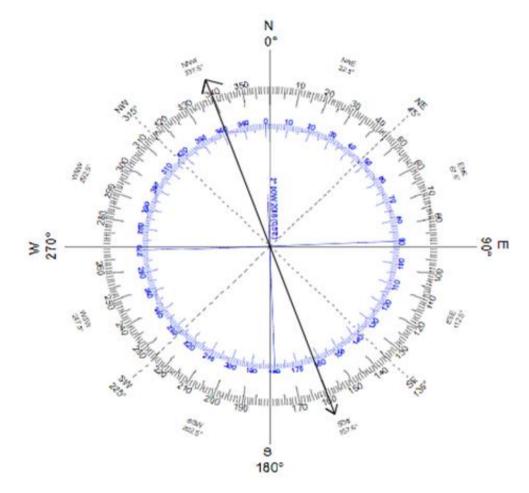

Figure 5. Windrose Result

4. CONCLUSION

Based on the results of calculations that refer to the standards of the International Civil Aviation Organization (ICAO) with CN-235 plan aircraft, it takes a runway length of 3,949 meters and a runway width of 60 meters. The distance between the runway axis and the runway axis is 185 meters. The total width of the taxiway is 38 meters, and the required apron area is 750.5 × 164 = 123,082 m.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

6. REFERENCES

Adisasmita, S. A., and Hadipramana, J. (2011). Improving the airport operation and environmental quality at small airports in indonesia. *International Journal of Sustainable Construction Engineering and Technology*, *2*(2).

Sari, C., Winfried, A., and Surachman, L. (2019). Analisis perkerasan landas pacu bandar udara Husein Sastranegara, Bandung. *Jurnal Infrastruktur*, *5*(1), 51-57.

Brill, D. R., and Parsons, I. D. (2001). Three-dimensional finite element analysis in airport pavement design. *International Journal of Geomechanics*, *1*(3), 273-290.

Maniriho, E. A. (2019). The characteristics and variables accounted by operators in the planning and operation of airports. *ICAO Scientific Review: Analytics and Management Research (ceased publication)*, *1(2019)*, 115-126.

Knoch, U. (2014). Using subject specialists to validate an ESP rating scale: the case of the International Civil Aviation Organization (ICAO) rating scale. *English for Specific Purposes*, *33(2014)*, 77-86.

Walo, M. F., and Sudarmo, B. S. (2018). Desain bandar udara Mozes Kilangin dengan transformasi atumics rumah honai. *Jurnal Mahasiswa Jurusan Arsitektur*, *6*(3) 1-5

Yao, Y. P., Ruan, Y. Z., Chen, J., Geng, Y., Zhang, X., Liu, B. Y., … and Yu, G. Z. (2018). Research on a real-time monitoring platform for compaction of high embankment in airport engineering. *Journal of Construction Engineering and Management*, *144*(1), 04017096.