

Kapasitas Terminal Penumpang Domestik di Bandar Udara Internasional Adi Soemarmo Boyolali

The Capacity of Domestic Passenger Terminal in Adi Soemarmo Boyolali International Airport

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ABSTRACT

This research aimed to analyze the capacity of domestic passenger terminal in Adi Soemarmo Boyolali International Airport. The data were collected from observation, documents, and literature review and analyzed using the formula in the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 178 of 2015 on Service Standards for Airport Service User. The capacity of the terminal in this airport was used as an initial forecast of the needs for facility development, including area per during peak hour passenger and Initial Indication of Development, Utilization, Expansion, and Operation (abbreviated as IAP4 in Indonesian). Based on the calculation, the IAP4 value of the terminal was 0.32, indicating the capacity was sufficient. In 2019, as there were 1,565,093 passengers departing domestically from this terminal, the peak hour passenger coefficient was 0.050. Based on these findings, the existing capacity of the domestic terminal was sufficient to accommodate up to 2,925,600 passengers. Therefore, the terminal's level of occupancy was 53.49% in 2019. It is necessary to carry out this research regularly, particularly when there is an increase in the number of passengers to evaluate whether the airport is still able to accommodate all passengers' movements.

Keywords : airport, capacity of terminal, passenger, occupancy rate, terminal

ABSTRAK

Penelitian ini bertujuan untuk menganalisis kapasitas terminal penumpang domestik di Bandar Udara Internasional Adi Soemarmo Boyolali. Data dikumpulkan dengan metode observasi, dokumentasi, dan studi pustaka untuk selanjutnya dianalisis menggunakan perhitungan yang diatur dalam Peraturan Menteri Perhubungan Republik Indonesia Nomor PM 178 Tahun 2015 tentang Standar Pelayanan Pengguna Jasa Bandar Udara. Kapasitas terminal bandar udara ini digunakan sebagai prakiraan awal kebutuhan pengembangan fasilitas, yang meliputi luas per penumpang pada jam sibuk serta Indikasi Awal Pembangunan, Pendayagunaan, Pengembangan, dan Pengoperasian (IAP4). Hasil perhitungan menunjukkan nilai IAP4 yaitu 0,32. Artinya, kapasitas yang tersedia masih mencukupi. Jumlah penumpang keberangkatan domestik pada tahun 2019 adalah 1.565.093 orang, sehingga koefisien penumpang waktu sibuknya yaitu 0,050. Berdasarkan informasi tersebut, kapasitas terminal domestik saat ini dikalkulasikan cukup untuk menampung sampai 2.925.600 penumpang. Dengan demikian, tingkat okupansi tahun 2019 adalah 53,49%. Penelitian ini perlu dilakukan secara berkala,

terutama ketika terjadi peningkatan jumlah penumpang agar dapat diketahui apakah bandar udara masih dapat memadai seluruh pergerakan penumpang.

Kata kunci : bandar udara, kapasitas terminal, penumpang, tingkat okupansi, terminal

A. Introduction

According to The Law of the Republic of Indonesia (2009), airports are classified based upon airport service capacity and airport operational activities. The capacity refers to the ability of an airport to accommodate largest aircrafts and a number of passengers or goods. In addition, airport operational activities are regulated under the Decision of the Ministry of Transportation of the Republic of Indonesia (2002). Airport's areas are divided into airside and landside areas. According to the Decision, landside area is an airport's area that is not directly involved in its aviation operational activities. One of the facilities in an airport's landside area is passenger terminal used to accommodate the departure and the arrival of passengers.

Passenger terminal is an important element of an airport's infrastructure. Its capacity depends on various factors, such as service standard that is regulated by airport authority. Increasing the capacity of passenger terminal is one of the measures taken by PT Angkasa Pura I (Persero) to ensure that the available facilities in the Adi Soemarmo Boyolali International Airport meet the aviation safety and security requirements and that the airport services meet the applicable standard. The Ministry of Transportation of the Republic of Indonesia (2015) stated that the airport service standards are the benchmarks used as the guideline for service delivery and the reference for service quality assessment as the obligation and the promise of the service provider to the community to provide quality, fast, easy, affordable, and measurable services. One of the service standards is the capacity of an airport terminal to accommodate passengers during peak hours.

Evaluations on policy planning related to the capacity of passenger terminals are

usually affected by passenger demand forecasts. Suryani *et al.* (2010) stated that several important factors that determine the increase in the capacity of a passenger terminal are ticket price, airport's level of service, gross domestic product, population, and the number and the time of flights per day. The conclusion drawn from her research was demand forecast is important to support long-term plans in order to meet the demand in the future.

Internationally, a global index to evaluate operational components of an airport in Brazil was discussed in a paper by Correia *et al.* (2008). That research identified the most important factor of an airport's level of service based on passengers' perception. The findings can be used by the airport management to determine the level of importance of all the factors related to their services to utilize their limited resources effectively and efficiently.

Fernandes & Pacheco (2002) used Data Envelopment Analysis (DEA) approach to analyze 35 domestic airports in Brazil. The research found out which airports whose capacities were efficiently utilized and which whose capacities were in surplus state. Based on the passenger demand forecast, the research found out when the airports should increase their capacities and when they were still able to maintain their capacities.

There were a number of previous research on terminal capacity in Indonesia, but their locations and analysis approaches were different from those in this research. Palupi *et al.* (2004) carried out their research in Adisutjipto Yogyakarta Airport, Yarlina (2012) in SMB II Palembang Airport, Frans *et al.* (2014) in El Tari Kupang Airport, and Pratama *et al.* (2017) in Ngurah Rai Bali Airport. These previous research employed space needs calculation (National Standardization Agency, 2004) as a part of

their analyses. On the other hand, Akbar (2018) who carried out an analysis on the terminal capacity of Ahmad Yani Semarang Airport employed the same approach used in this research, namely a calculation in accordance with the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 178 of 2015 Service Standards for Airport Service User. Although the location of his research was different, the findings can be used as a comparison to observe how the analysis instrument provided clear information on the utilization of airport passenger terminals.

Assessment of service standard, including calculating terminal capacity, should be carried out periodically to determine the quality of the services for airport service users. The new terminal for passenger departure and arrival in Adi Soemarmo Boyolali International Airport has been in operating since August 2019. Ristiani & Wicaksono (2020) conducted a research related to airport service, but the focus of the research was the airport's international departure and arrival terminal, particularly on

its immigration capacity and the service level of the immigration officers. The airport's domestic terminal was yet to be assessed. Therefore, this research aimed to analyze the capacity and the level of occupancy of the domestic passenger terminal in Adi Soemarmo Boyolali International Airport.

B. Research Method

This research used a quantitative research design with descriptive explanation. The data were obtained from literatures and documents provided by Adi Soemarmo Boyolali International Airport management, i.e. data on the area of the existing terminal, total passengers in 2019, and total peak hour passengers in 2019. The calculation for the evaluation of the capacity of the domestic passenger terminal was carried out following the standard set under the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 178 of 2015 on Service Standards for Airport Service User. The calculations were carried out following formula (1), formula (2), formula (3), and formula (4).

$$\text{Ideal terminal capacity} = \frac{(\text{Existing terminal area} \times \text{operational space (\%)}) / \text{Standard terminal area}}{\text{Peak hour passenger coefficient}} \quad (1)$$

$$\text{Level of occupancy} = \frac{\text{Total passengers per year}}{\text{Ideal terminal capacity}} \times 100\% \quad (2)$$

$$\text{Level of service} = \frac{(\text{Existing terminal area} \times \text{operational space (\%)})}{\text{Peak hour passenger per year}} \quad (3)$$

The scales of terminal capacity are:

- A = ≥ 30
- B = 20–30
- C = 14–19
- D = 7–13
- E = 2–6
- F = < 2

$$\text{IAP4} = \frac{\text{Peak hour passenger} \times \text{Standard terminal area}}{\text{Existing terminal area}} \quad (4)$$

The calculated IAP4 value means:

- $\text{IAP4} \leq 0.6$ = the available capacity is sufficient
- $0.75 \geq \text{IAP4} \geq 0.6$ = the capacity is of concern for development
- $\text{IAP4} \geq 0.75$ = the available capacity can be developed

C. Results and Discussion

Airport terminal capacity in accommodating passengers during peak hours is one of the standards for passenger services provided by airport passenger terminal, and it is regulated under the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 178 of 2015 on Service Standards for Airport Service User. The capacity of airport terminal is used as an initial forecast of the needs for facilities development, including area per passenger during peak hours and Initial Indication of Development, Utilization, Expansion, and Operation (abbreviated as IAP4 in Indonesian).

Based on the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 178 of 2015 on Service

Standards for Airport Service User, the terminal area per peak hour passenger should be 14 m²/pax for domestic terminal and 17 m²/pax for international terminal, excluding the area needed for circulation, utility, and concession spaces. However, as the domestic and international departure terminals of Adi Soemarmo Boyolali International Airport are situated at the same location, the figure 14 m²/pax was used to calculate the terminal area per peak hour passenger in this research.

The IAP4 value of Adi Soemarmo Boyolali International Airport was calculated by multiplying total passengers during peak hours by standard terminal area, and dividing it by existing terminal area. The IAP4 value was used to measure the airport's level of operational use.

$$\text{IAP4} = \frac{\text{Peak hour passenger} \times \text{Standard terminal area}}{\text{Existing terminal area}}$$

$$\text{IAP4} = \frac{678 \times 14}{29256}$$

$$\text{IAP4} = 0.32$$

Based on the calculation above, the IAP4 value was 0.32 (lower than 0.6), indicating that the available capacity was still sufficient because Adi Soemarmo Boyolali International Airport developed and expanded its passenger terminal in 2019. In addition, the development was carried out to prepare the airport to accommodate the sharp increase in the number of passengers in the coming years as the airport rail link as a supporting facility had begun its operation.

Zulaichah (2015) also calculated the IAP4 value using the same formula, but for H.A.S. Hanandjoeddin Airport, Bangka Belitung. Her analysis was carried out in accordance with the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 69 of 2013 on Management of National Airport, and the airport's IAP4 value was 4.39 (higher than 0.75), meaning that the airport terminal capacity should be increased to improve the services provided for

the passengers. Indeed, this airport's total peak hour passengers when the research was carried out were fewer than the total peak hour passengers in Adi Soemarmo Boyolali International Airport. However, the existing terminal area of this airport was only 1,148 m² and there was no departure hall. Therefore, this airport's passenger terminal should be expanded to avoid long passenger queue, particularly at the entry point of the departure process leading to check-in area.

An evaluation of the airport terminal service improvement carried out by Hamzah *et al.* (2020) in Merauke Regency, Papua, found a decrease in the IAP4 value of the airport terminal, but it was still higher than 0.75, meaning that the new passenger terminal still needed to be developed to meet the service standard. Planning for the terminal development was crucial as the new terminal needed to be expanded. Accurate calculations to predict total passengers (particularly during

peak hours) and improving several service attributes are expected to serve as bases for calculating ideal terminal capacity in accommodating passenger movements.

Total peak hour passengers should be taken into account. Based on a research by Suandi *et al.* (2017), the IAP4 value of Minangkabau Padang Pariaman International Airport indicated that the airport's terminal capacity should be developed. The existing terminal area of the airport was smaller by 8,688 m² than that in Adi Soemarmo Boyolali International Airport, indicating that the airport terminal needed to be expanded to meet the service standard. The reason was, the total peak hour passengers in Minangkabau International Airport were three times higher than in Adi Soemarmo Boyolali International Airport. Although the data were acquired in different years, the logical conclusion drawn

from this comparison was calculating and estimating peak hour passengers are crucial in evaluating the capacity of and planning passenger terminals.

The Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 178 of 2015 on Service Standards for Airport Service User also stated that in providing services to airport service users, airport service providers are required to provide facilities for operational services minimum 70% and facilities for commercial services maximum 30% of the total passenger terminal area minus 20% for circulation space and building utilities. Ideal terminal capacity was calculated by multiplying existing terminal area by operational space (%), and dividing it by standard terminal area, and dividing it again by peak hour passenger coefficient.

$$\text{Ideal terminal capacity} = \frac{(\text{Existing terminal area} \times \text{operational space (\%)} / \text{Standard terminal area})}{\text{Peak hour passenger coefficient}}$$

$$\text{Ideal terminal capacity} = \frac{(29256 \times 70\% / 14)}{0.050\%}$$

$$\text{Ideal terminal capacity} = 2925600$$

In 2019, total passengers in Adi Soemarmo Boyolali International Airport were 1,565,093 people. Therefore, its peak hour passenger coefficient was 0.050. Based on the calculation, at the moment, the terminal capacity was sufficient to accommodate up to 2,925,600 passengers.

Level of occupancy was used to measure how many percent of the terminal capacity was already utilized. To calculate it, total passengers per year was divided by ideal terminal capacity and the result was then converted into percent.

$$\text{Level of occupancy} = \frac{\text{Total passengers per year}}{\text{Ideal terminal capacity}} \times 100\%$$

$$\text{Level of occupancy} = \frac{1565093}{2925600} \times 100\%$$

$$\text{Level of occupancy} = 53.49\%$$

The results of the calculation showed that the level of occupancy of the passenger terminal in Adi Soemarmo Boyolali International Airport was 53.49%, or lower than half the terminal capacity. Therefore, it can be concluded that the passenger

processing activities in the terminal had not reached its saturation point and it was expected that such situation made the passengers comfortable. However, airport terminal development was expected to be able to increase the level of occupancy in the

future, and eventually able to bring the airport more profit.

The level of service was obtained by multiplying existing terminal area by operational space percentage, and then dividing it by peak hour passengers per year.

$$\text{Level of Service} = \frac{\text{Existing terminal area} \times \text{operational space (\%)}}{\text{Peak hour passenger per year}}$$

$$\text{Level of Service} = \frac{29256 \times 70\%}{678}$$

$$\text{Level of Service} = 30.20$$

Based on the calculation, the level of service of Adi Soemarmo Boyolali International Airport in 2019 was 30.20 or of A class (Excellent) based on the classification of the level. The Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 178 of 2015 on Service Standards for Airport Service User stated that the minimum value for the level of service of an assessed facility should be C (Good). This means, Adi Soemarmo Boyolali International Airport in 2019 was already in compliance with the regulation.

These findings were different from those in a research by Akbar (2018) in Ahmad Yani Semarang International Airport. It was certainly due to the difference in the existing terminal area and the peak hour passengers of both airports. His research suggested that the airport was in need of terminal development to accommodate its passenger movements.

D. Conclusion

The results of this research suggested that the current capacity of the domestic passenger terminal in Adi Soemarmo Boyolali International Airport was sufficient to accommodate up to 2,925,600 passengers and its level of occupancy was 53.49% while its level of service was 30.20 or of A class (Excellent). These findings can serve as evaluation materials for the airport management to make their policies related to their passenger services in the future.

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Similar with the IAP4 calculation, peak hour passenger is an important factor in determining the level of service, and therefore it needs to be observed regularly. The level of service concept can also be used for space planning.

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