

DESIGN AND DEVELOPMENT OF NUSAWIRU AIRPORT PASSENGER TERMINAL USING A GREEN BUILDING CONCEPT

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Abstract: Pangandaran Regency is one of the strategic tourism areas that have a variety of tourism that is quite well developed. However, the attractiveness of tourists visiting Pangandaran Regency using air transportation as the main mode is still very low. This is what causes Nusawiru Airport, which is located in Kecamatan Cijulang has become forgotten and not well maintained, both in terms of the land side of the air side due to the lack of suppliers from the aviation sector. The choice to use the green building concept at the 300m² passenger terminal (existing condition) is the right choice because applying the eco-green building concept at the Nusawiru airport, it is not only related to energy-saving management but will also facilitate the maintenance aspect and add aesthetic value. The purpose of this design is how Nusawiru can become a functional airport that is also environmentally friendly and this design is based on forecasting for the next 20 years. Thus, with the increase in the volume of passengers in 2040 as many as 63,962 passengers, it is found that the saturation in service and the passenger terminal needs to expand according to the standard, namely 600m². Environmental but also from an economic point of view. The research method used is to analyze, observe and survey the needs of the Nusawiru passenger terminal.

Keywords: *Airport, Green Building, Passenger Terminal*

Introduction

As we know that Pangandaran is one of the strategic areas for national tourism. However, the attractiveness of tourists visiting Pangandaran Regency using air transportation as the main mode is still very low, because many national tourists still rely on land transportation to travel to Pangandaran. This is what causes Nusawiru Airport to be forgotten and not well maintained, both in terms of the land side or the air side due to the lack of suppliers from the aviation sector.

At this time the condition of the 300m² passenger terminal area does not reflect the aesthetic side, which is why the application of the Green building is very appropriate in the design of the Nusawiru Airport passenger terminal. This design is based on forecasting for the next 20 years. Thus, with the increasing volume of passengers in 2040 as many as 63,962 passengers, it is found that the saturation in service and the passenger terminal needs to expand according to the standard, namely 600m². Environmental but also from an economic point of view.

Therefore, the easiest thing to support the planning and development of Nusawiru Airport is to create innovations in bringing in domestic tourists, such as involving the Pangandaran community in creating new tourism fields and introducing Nusawiru Airport to the Indonesian people. The creation of a collaborative activity partner between Nusawiru and the Pangandaran community will have a positive impact on Nusawiru as a guide for the Pangandaran community toward an eco-green airport. So Nusawiru does not only stand alone, but the existence of the Pangandara community also supports the realization of Nusawiru Airport as an eco-green airport.

According to Annex 14 of ICAO (International Civil Aviation Organization): An airport is a certain area on land or water (including buildings, installations, and equipment) which is intended either in whole or in part for the arrival, departure, and movement of aircraft.(Design & Edition, 2018) The airport has a role as; Node in the transportation network following its hierarchy, Gateway to economic activity, Place of transportation mode switching activities, Encouraging and supporting industrial and/or trade activities, Opening of regional isolation, development of border areas, and disaster management, Infrastructure strengthening the Archipelago Insight and state sovereignty. (SETYORINI, 2016)

According to the Minister of PUPR Regulation No. 2 of 2015 concerning Green Buildings. Green Buildings are buildings that meet building requirements and have significant measurable performance in saving energy, water, and other resources through the application of green building principles under functions and classifications in each stage of its implementation.(PermenPUPR No.2, 2015) The basic concepts or values of green buildings are: Building on a concept that minimizes unnecessary damage to land values, habitats, and green spaces, Savings, and quality by preserving existing natural water cycles while minimizing unnecessary and inefficient use of drinking water, Environment, and energy by minimizing adverse effects on air, water and natural resources, Indoor climate quality by providing health, comfort, and indoor productivity to occupants and visitors. Buildings, Resources, and materials are the use of non-renewable building materials and other resources. (Alam & Haque, 2016)

Passenger terminals are all types of buildings that connect the air transportation system and can accommodate the transfer of land access to aircraft and vice versa. Passenger terminals must be able to handle operational, administrative, and commercial activities and must meet flight operational safety requirements. (PERMEN HUB, 2005)

Table 1

No.	Number of passengers/year	Terminal area standard		Note
		m ² /number of passengers during busy times	Total/m ²	
1.	0 - ≤ 25.000	-	120	This standard of the terminal area does not take into account commercial activities.
2.	25.001 - ≤ 50.000	-	240	
3.	50.001 - ≤ 100.000	-	600	
4.	100.001 - ≤ 150.000	10	-	
5.	150.001 - ≤ 500.000	12	-	
6.	500.001 - ≤ 1.000.000	14	-	
7.	>1.000.001	Calculated in more detail	-	

Source : (SNI 03-7046-2004)

To implement the safety requirements for flight operations, the terminal building is divided into three groups of rooms, including the following: Common room; public room serves to accommodate public activities, both passengers, visitors, and airport employees (officers). Semi-sterile room; The room used for passenger services such as the passenger and baggage registration process or check-in. Sterile room; Strict and careful checks are carried out by security officers before entering the room and there is no concession space.

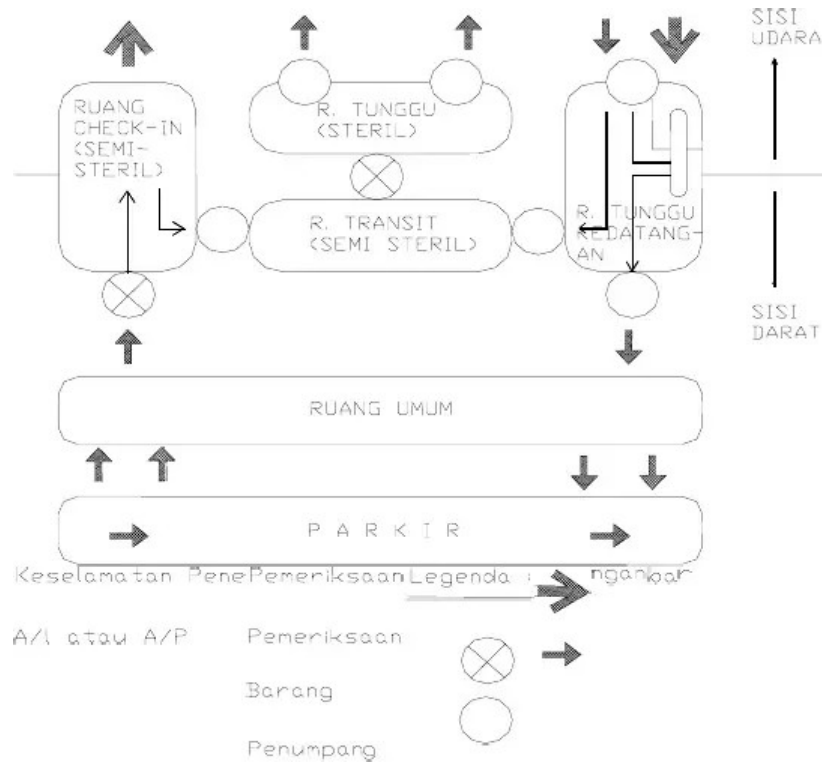


Figure 1

Source : (SNI 03-7046-2004)

Forecasting is an activity to predict what events will occur in the future. Forecasting can be said as the beginning of a decision-making process. Each forecasting method used will produce a different forecast value. Therefore, the analyst or forecaster must choose which method is able to identify and respond to patterns from past data and produce forecast results with the desired level of accuracy. Forecasting Period Compiled When viewed in terms of the forecast period, there are 3 forecasting periods, namely as follows: Short-Term Forecasting (1 year or less), Medium-term forecasting (5 years in the future), long-term forecasting (more than 5 years) forward). (Iswahyudi, 2016)

Methodology

The research method used in this research is the descriptive qualitative method. Data collection and analysis were carried out deductively using the theory that had been studied beforehand. Data were collected through direct observation and interviews. Direct observation is used to record the architectural physical form and complement it with interviews.

Discussion and Result

Flights at Nusawiru Airport located in Cijulang District use a Cessna Grand Caravan aircraft with a seat of 12 passengers, with aircraft movements 2 times in 1 day and passenger movements of 3-9 ferries/day. Nusawiru has a passenger terminal with a terminal area of 300m².

Table 2

Assumption		
Daily		Annual
Daily Movement	1	365
Passenger	9	3285

From the results of the data research, it was found that in 2036 the passenger data/year had reached 50,822 passengers and in 2040 the passenger data had reached 63,962 passengers. This means that it has entered the 3rd category in the standard of passenger area where 50,001 - 100,000 requires a ferry terminal area of 600m². Therefore, in the next 20 years following the estimated number of passengers per year obtained, the passenger terminal of Nusawiru Airport requires the development and expansion of a passenger terminal with a terminal area of 600m².

Table 3

Year	Passenger
2021	1547
2022	4832
2023	8117
2024	11402
2025	14687
2026	17972
2027	21257
2028	24542
2029	27827
2030	31112
2031	34397
2032	37682
2033	40967
2034	44252

2035	47537
2036	50822
2037	54107
2038	57392
2039	60677
2040	63962

The designed passenger terminal area of 671m². This means that it is following the standard passenger terminal area for passenger criteria of 50,001 - 100,000, in 2040. The image on the Nusawiru Airport passenger terminal applies 3 aspects of the green building concept, namely; air circulation, natural lighting, and rainwater utilization. The passenger circulation used in the design of the passenger terminal is by the regulations in SNI 03-7046-2004.



Figure 2



Figure 3

In both looks, it looks like it has high and wide glass, which functions as a way for sunlight to enter the terminal building. This is one form of the

application of the green building concept, which by having a high and wide glass can maximize natural light or the sun entering the room. The design on roof of the Nusawiru Airport passenger terminal is designed by taking into account aspects of the use or reuse of rainwater.

Thus, the design on the roof of the passenger terminal is made slightly downward towards the front/front of the building or towards the concession space which will later be useful in facilitating the flow of rainwater that falls to flow toward the provided water pipe shaft/hole. On the right and left of the terminal building, there are air holes/rosters that function to maintain the air circulation in the terminal building. In addition to maintaining air circulation, the roster also functions as a space for light to enter.

Conclusion

Based on the results of research that has been carried out, with the increase in passenger volume in 2040 as many as 63,962 passengers, the standard passenger terminal capacity does not meet the requirements.

The design of the existing passenger terminal based on research in the field is less aesthetic and does not reflect the concept of a Green building. The application of Green building in the design of the Nusawiru Airport passenger terminal will facilitate future maintenance and maintenance aspects at the airport. The application of the Green building concept also adds aesthetic, economical, and comfort aspects to passengers which can later be used as a plus for passengers to Nusawiru Airport.

Nusawiru Airport is an airport that will have the potential as an opening door with a wider scope, not only in the tourist sector but also as a business opening door that is used to advance the economy and advance the area. That is the challenge now how to transform these potentials into superior results of high quality and value.

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