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Performance Improvement of Baggage Handling System in the Soekarno Hatta International Airport

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Abstract: Growing number of passenger in the world resulted congestion problem in the airport. Many airports try to improve the performance of the service by company program related to passenger satisfaction. To develop the company program, management of airport should know performance of existing system. In this research, we measure and compare the performance the existing system and new system of airport departure terminal of Soekarno-Hatta International Airport (SHIA). Discrete-event simulation method was developed to measure the system. ProModel simulator software, from ProModel Corporation, was utilized to simulate the existing system and new system of Departure Terminal in the Airport. To measure the performance, authors focus on some indicators i.e. passengers processing time, passengers waiting time, and utilization of each station. The authors make some scenarios based on the increasing of passengers 4.9% in 2015, 18.9% in 2020, 17.7% in 2025 and 1.5% in 2030. There is a significant difference in 2020 to 2025 in amount of 25% in order to the passengers' average time. Therefore, the new system will have better performance.

Keywords: Modeling, discrete-event simulation, performance measurement.

Globalization has big impact in the airports all over the world. Many international airports increased in large growth of passengers in recent years. There is 2.835 billion passengers of the airplane in the world in 2011 and IATA (International Air Transport Association) standard predicts that it will increased at 4.4 % in 2012, and 4.5% in 2013 [1]. Worldwide international and domestic air transport passenger traffic grew 5.9% to a new high of 5.2 trillion kilometers in the year of 2011[2]. Nowadays, the globalization increases the importance of airports to worldwide connectivity. Passengers growth in the Airport still strong despite economic slow in many region in the world because global business and tourism depend on the air transport industry [2].

Air transport is the fastest, safest, and comfortable public transportation. Low cost airlines become popular in recent years which make prices affordable and inexpensive. Passengers are growing more and more effecting the airport with hectic rush and long queue in the peak hours. Passengers satisfaction depends on processing time in the system because the less time they spend in the system of the airport, the higher

they are satisfied, however, airport must adhere to the standard of the security and safety regulation included proper identification, limited luggage weight, and safety procedures at the security checkpoint [3].

The airport management is a complex system related to the passengers, airplanes and baggage. The passengers are the most important entities in the Airport. The sustainability of airport depends on passengers because passengers are the users of airport service. Passengers' satisfaction has to be the main goal of the airport service. The airport must have adequate facilities and public area to serve the passengers properly. Passengers' satisfaction depends on the performance of airport in serving the passengers.

Performance of facility in the airport can be measured by simulation technique. Many researchers develop simulation technique to measure the capacity of the airport, utilization of each area, passengers waiting time, and passengers processing time in the airport system. Discrete event simulation has been used to measure performance of the system in the departure terminal of SHIA. ProModel simulator version 7.5 of ProModel Corporation is used in order to simulate the system. The study consists of four steps: measurement the performance of existing system, measurement the performance of new system, and compare the performance of two systems. Several scenarios develop to see the reliability of new system with the growth of passengers until 2030 to the capacity of airport.

The results obtained through ProModel Simulator were summarized in two categories; Entity Activity and Utilization of Location. From the results, we conclude that the new system has a better performance than the existing system. The new system can reduce processing time and waiting time.

The scenarios result of new system show that the number passenger of SHIA in the year 2015 to 2020 has a little effect to processing time and waiting time. In the year 2025 to 2030 there is effect of number passenger to waiting time in the airport. This effect will be related to processing time in the system.

After measurement of the performance of the existing system, further work will focus on measure qualitative indicator of baggage handling system at Soekarno-Hatta International Airport. Qualitative indicator related to perception of passenger to the service of the airport. We have to study the qualitative indicators to make a better analysis and understanding of passenger satisfaction.

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