ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

Performance Study On Check-in Counter Terminal toward the Passenger Level Of Service at Sultan Babullah Airport, Ternate

Sumarni Hamid Aly, Sakti Adji Adisasmita
Lecturer in Civil Engineering Department, Faculty of Engineering, Hasanuddin University, Makassar - Indonesia

Abstract: ***The purpose of this study is to analyze the performance of check-in counter at Sultan Babullah airport, Ternate. The primary data obtained through survey, interviews, and discussions with manager of airport, Government official, and passengers. The secondary data conducted from several agencies, namely airline companies, Technical Operational Unit of airport, Directorate General of Air Transport and the Central Bureau of Statistics. Forecasting analysis of passengers and aircrafts using time series method to calculate the trend values (SPSS 16.0 Programe). The existing of check-in area space was not adequate, level of service of check-in area (based on IATA standards) was in the E category, the percentage of performance services at check-in counter already reached 92.42%. The research results used to analyse the design and determine the performance of facility at the airport check-in counter.***

Keywords: **Airport, Check-in Area, Level Of Service.**

I. INTRODUCTION

Airports are the perceptions of a gateway of an area, region, even state and have become a symbol of prestige that will be remembered by aircraft passengers both domestically and internationally [1,15,16]. Sultan Babullah airport is an airport, which is quite high of level of service to the flow of passengers and goods. Sultan Babullah airport management still in the authority of Technical Operational Unit (TOU) of Directorate General of Air Transport, Ministry of Transport, Republic of Indonesia. Limited of *check-in counter* services equipment facilities at airport departure terminal of Sultan Babullah will have an impact on the the number of passengers queues waiting for service proceed.

Problems that occured in the form of chaos in the *check-in counter* services. The normal time to wait at the *check-in counter* services was < 2 minutes, and the average time at the *check-in* proceed was 2 minutes 30 seconds. However, it was also found that passenger could wait more than 20 minutes.

II. RESEARCH OBJECTIVES

The purpose of this study are:

- Analyzing the capacity of existing condition at *check-in counter*, with space standard calculations based on Ministry Decree No. 20, 2005.
- Measuring *Level of Service* at *check-in counter* area at Sultan Babullah airport based on IATA standards.
- Analyzing the performance of *check-in counter* area based on Director General of Civil Aviation Decree, Republic of Indonesia (SKEP/284/X/1999).
- Forecasting on departing passengers at *check-in* area and capacity at Sultan Babullah Airport in the next 5 years.

III. AIRPORT CONCEPT

Based on *Law of Republic of Indonesia (No 1, 2009)*, airport is an area of land and/or water with certain limits, which are used as a place of aircraft landing and take-off, up and down for passengers; loading and unloading of goods, and movements of intra and intermodal transport, which is equipped with a safety facility and aviation security, as well as basic facilities and other supporting facilities [5 – 13].

The terminal building is a central point for public, passengers and all activities of employees and is a fundamental part for the operation of an airport (*http://id.wikipedia.org/wiki/terminal_bandar_udara*) [1,2,14,15,16].

Passenger terminal should be able to accommodate the operations, administration and commercial, and must meet the requirements of security and safety of flight operations, in addition to other requirements related to building issues. (SKEP-347-XII-1999) (SKEP-347-XII-1999) [5 – 13].

IV. CHECK-IN AREA & CHECK-IN COUNTER DESKS

According to Directorate General of Air Transportation (SKEP/77/VI/2005), to calculate the *check-in area*, used the following equation [11].

$$A = 1{,}1\ [0{,}25(a+b)]$$

Description :

A = wide of *check-in area* (m^2)
a = number of departing passenger at peak hours
b = number of transit passenger

Table 1 shows the space of *check-in area.*

Table 1. Space Standard of Check-in Area

Terminal	Check-in Area(m^2)
Small	≤ 16
Moderate	16 – 33
Intermediate	34 – 165
Big	166 - 495

Sourcer:Directorate General of Air Transportation, SKEP/77/VI/2005 [11]

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

The space of *check-in area* at Sultan Babullah airport currently as big as 34.35 m^2, so as mentioned in Table 1, the terminal is already included in the intermediate category. To calculate the number of *check-in counters*, used the following equation.

$$N = 1{,}1 \left(\frac{a+b}{60}\right) \text{ x t1 } Counter$$

Description :

N = number of desks

a = number of departing passengers at peak hours

b = number of transit passengers (20%)

t1= processing time at *check-in counter*/pax (2 minutes/pax)

V. CHECK-IN COUNTER PERFORMANCE

Based on the Directorate General of Air Transportation Decree (SKEP/284/X/1999), the performance of an airport can be assessed using the airport operational performance standards associated with the *level of service.* To the *check-in counter*, there are several things that can be taking as an indicator of quality of service, i.e. waiting times and processing time, baggage delivery, providing *the check-in counter* desks, through the provision of computers and scales [4,6,19]. Whereas under the provisions of the IATA in *Airport Development Reference Manual* (ADRM) given a coefficient comparison at each Level of Service starting from level A to level F.

Table 2. Category Standard LoS based on IATA Standard

No.	LoS	Coeff. of Comparison
1	A	1
2	B	0,8
3	C	0,6
4	D	0,4
5	E	0,2
6	F	< 0,2

Source: IATA Standards

VI. FORECASTING THEORY

An airport plan (Horenjeff/McKelvey, 1988) shoul be developed based on an estimate *(forecast).* From the requests estimates can be evaluated/determined the effectiveness of airport facilities. In general, estimates are needed for short, medium, and long terms or roughly 5 years, 10 years, and 20 years [15,16].

A prediction or forecast is a good course that is able to estimate the number of data as accurately as possible, or estimate as small as possible. Minimal error can be anticipated by calculating the value of the trend with SPSS program [17]. Trend is a up or down movements in the long term that is obtained from the average change over time and the value is quite flat (smooth). To Calculate the trend values can be done by several methods, including:

a. Least Square Method :

$Y = a + bx$

b. Quadratic Trend Method :

$Y = a + bx + cx^2$

c. Exponential Trend Method:

$Y = a\ (e^{bx})$

VII. RESEARCH METHODOLOGY

Methods of data collection based on field survey (*Cross Sectional Survey),* in which the information was collected only at a particular time, means that data collection can be done not just on one day, but it can be done in a few weeks because of the situation. (Kountur, 2004).

Study of *check-in counters* performance were only focused on the airlines of Sriwijaya Air, Garuda Indonesia Airways, and Wings Air, these airlines could represent the performance of facilities *check-in counters,* because it has the largest number of passengers.

Research Location

This research was carried out at the Sultan Babullah airport terminal for two weeks, starting on February 4, 2013 until February 18, 2013. The site location was on the *check-in counters area* of 2 (two) airlines companies, namely, Garuda Indonesia Airways, Sriwijaya Air.

Fig. 1. Airport Location

Data Collection

In the process of data collection, there were two types of data, i.e. primary and secondary data. Primary data, which gained for existing *check-in area,* waiting time and processing time per passenger, and the availability of *check-in counter* desks. As for secondary data was conducted for number of passengers and aircraft movements (arrived and departured) from 2007-2011 based on the statistical data derived from Technical Operational Unit, Directorate General of Air Transportation, and the Central Bureau of Statistics.

VIII. RESULTS AND DISCUSSIONS

Here are the graphs of the movements of passengers and aircrafts within the last 5 years. Figure 3 shows, the passenger growth increased each year from 2007 until 2012 with an average growth of 23.90 %, while Figure 4 shows, the aircraft movements each year has increased from 2007 to the year 2012 with an average growth of 13.51 %.

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

The existing space of *check-in area* was 34,35 m^2 for 8 (eight) airlines. The number of passengers at peak hours was obtained by direct survey for 7 (seven) consecutive days.

Table 3. Check-in Area Capacity

Nama Maskapai Penerbangan	Kebutuhan Meja Check-in Counter		Luas Check-in Area (m^2)	
	Eksisting	Kebutuhan	Eksisting	Kebutuhan
Sriwijaya Air	2	4	5.40	27.78
Garuda Indonesia	3	3	5.40	19.80
Total			10.80	47.58
Level of Service			0.23 (E)	

Source: Analysis Results

Using the survey data, obtained the needs of *check-in area* for both airlines amounted to 47.58 m^2, while the space of *check-in area* for both airlines was 10.80 m^2, so the *level of service* according to the *IATA* standards was at the level of "E".

On the other hand, by using the annual aircraft movement data, obtained the needs of *check-in area* amounted to 158 m^2, while the space of *check-in area* was at 34.35 m^2, so the *level of service* was at the level of "E", where the *level of service* and comfort was not enough, the movement/flow was unstable, and the delay was unacceptable. In terms of performance services, the percentage of the existing *check-in counter* based on Director General of Civil Aviation Decree (SKEP/284/X/1999) has reached 92.42%, as the indicators of service quality assessment. As some shortcomings, such as *check-in* services, and the provision of *check-in counters* desks services were less and *check-in area* capacity was considered less than adequate.

For the needs of space area and *check-in counter* desks in the next 5 years, the trend value calculated with SPSS program. Based on Table 4, it was found that the selected models used in the 5 (five) years ahead was exponential model.

Table 4. Linear Trend Model

Model	Symbol	Parameter Model	Statistic Model	
			R2	Error of Estimate
Passenger Movement				
Linear	a	200923	0.975	14184.770
	x	33468.5714		
Quadratic	a	197160.4286	0.976	15941.141
	x	33468.5714		
	x^2	806.2653		
Exponential	a	186983.3704		
Aircraft Movement				
Linear	Arus Pergerakan Pesawat Berangkat			
	a	4311.667	0.892	332.279
	x	360.464		
Quadratic	a	4167.786	0.907	355.683
	x	360.464		
	x^2	30.832		
Exponential	a	4235.367	0.915	0.067
Eksponensial	x	0.083		

Source: Calculation Results

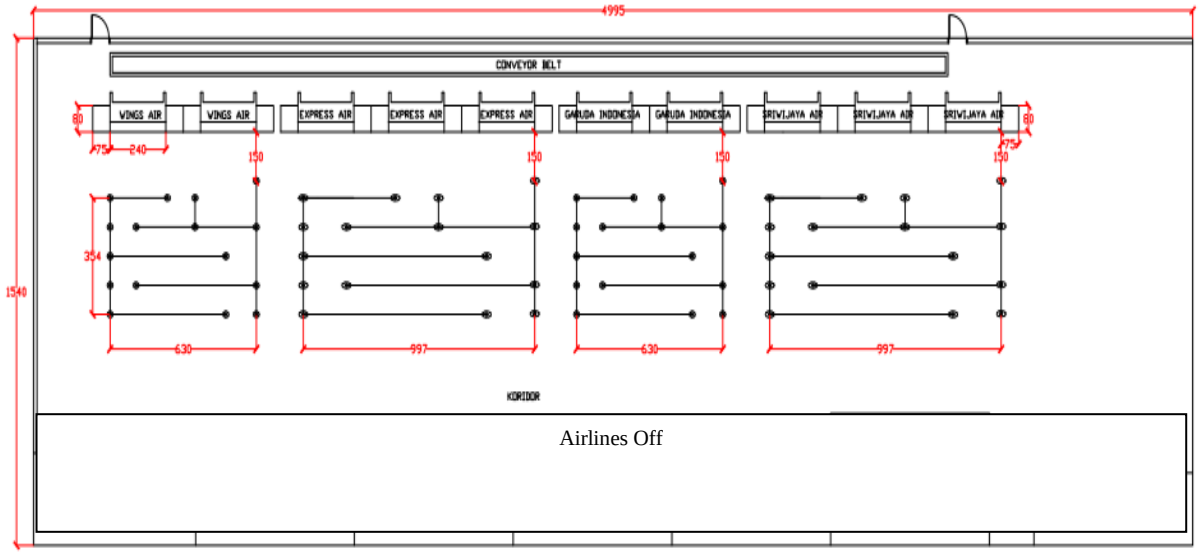

Fig 5. Layout of Future *Check-in Area* at Sultan Babullah Airport

IX. CONCLUSIONS AND RECOMMENDATIONS

The space area of *check-in counter* for the near future (next 5 years ahead) is not adequate. The existing level of service is in the E category, it is required new design for *check-in counter area.* The percentage of performance at existing *check-in counter* based on airport performance standard already reached 92.42%.Referring to the passenger forecasting results, it's expected that Sultan Babullah airport should be developed, to serve the growing number of passengers in the near future.

ACKNOWLEDGEMENT

As authors, we would like to thanks to our student, Achmad Siswandy Asdam, who help us in preparing the research data.

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

REFERENCES

[1] Adisasmita, S.A. (2007) Aviation and Airport. PT. Graha Ilmu, Yogyakarta.

[2] The Development of Airport Curbside Performance at Sultan Hasanuddin International Airport, Makassar. Journal of Dinamika Teknik Sipil, UMS Solo (2011).

[3] Level of Service Analysis and Airport Terminal Development, Vol. 12, No.02, (Online),(http://www.ijens.org/.../126302-8383-International Journal of IJET-IJENS,2012.

[4] Ahyudanari, E., & Vandebona, U. (2005) Simplified Models for Estimation of Airport Check-in Facilities, Vol. 6, pp. 724–735 (Online), (http://www.easts.info/on-line/journal_06/724.pdf).

[5] Anonim (1992) Ministry of Transportation Decree, Republic of Indonesia (KM 4, 1992): Airport Classification Criteria.

[6] Directorate of Air Transport Decree (SKEP/284/X/1999): Airport Operational Performance Standard related to the Level Of Service at Airport as Policy Standard on Airport Tariff Services.

[7] Directorate General of Air Transport (SKEP/347/XII/1999): Build and Design Standard and/or Technical Facility and Airport Equipment. .

[8] Government Regulation, Republic of Indonesia (No 70, 2001): Airport Regulation.

[9] Ministry of Transportation Decree, Republic of Indonesia (KM 44, 2002): National Airport Management.

[10] Ministry of Transportation Decree, Republic of Indonesia (KM 47, 2002): Airport Operational Sertification.

[11] Directorate General of Air Transport Regulation (SKEP/77/VI/2005): Technical Requirement on Airport Facility Operational.

[12] Ministry of Transportation Regulation, Republic of Indonesia (KM 20, 2005): Implementation of Indonesia National Standard about Airport Passenger Terminal.

[13] Ministry of Transportation Regulation, Republic of Indonesia (KM 11, 2010): National Airport Management..

[14] Bethesda (2011) .Analysis of Waiting Room Capacity at Sultan Hasanuddin International Airport, Makassar. Bachelor Thesis, Civil Engineering Department, Faculty of Engineering, Hasanuddin University, Makassar.

[15] Horonjeff, R., and McKelvey, F. X. (1988) Airport Planning and Design, Chapter 1. Erlangga, Jakarta.

[16] Airport Planning and Design. Jchapter 2. Erlangga, Jakarta (1993).

[17] Sudjana. (1989) Statistics Method. 5th Edition. Tarsito, Bandung.

[18] Thandy, N., and Stone, N. (2009) Passenger Forecasting Analysis at Sultan Hasanuddin International Airport. Bachelor Thesis, Civil Engineering Department, Faculty of Engineering, Hasanuddin University, Makassar.

[19] Wahyoe. (2011) Kinerja Pelayanan Level of Service Performance at Check-in Counter, Juanda Airport, Surabaya(http://www.isjd.pdii.lipi.go.id/admin/jurnal/37311294307_0215-9066.pdf/.

AUTHOR BIOGRAPHY

Sumarni Hamid Aly, obtained Bachelor; MSc; and Dr in Civil Engineering from Hasanuddin University, Makassar - Indonesia. Working as a Lecturer in Civil Engineering Department, Faculty of Engineering, University of Hasanuddin, Indonesia and has been involved in the transportation sector consultancy, having experienced as transport specialist in several transportation research projects. Currently, is a Chartered Member of the Indonesian Transport Society (MTI).

Sakti Adji Adisasmita, obtained Bachelor in Civil Engineering; MSc in Regional Planning and Development from the University of Hasanuddin, Indonesia; MEngSc in Transportation Engineering from the University of New South Wales, Australia; and PhD in Aviation Transport from the University of Newcastle, Australia. Working as a Lecturer in Faculty of Engineering, University of Hasanuddin, Indonesia and has been involved in all aspects of the transportation sector consultancy, having experienced as transport specialist in several transportation research projects. Currently, is a Chartered Member of the Indonesian Transport Society (MTI), Indonesian Airport Expert Association (IABI) and Air Transport Research Society (ATRS).

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

APPENDIX

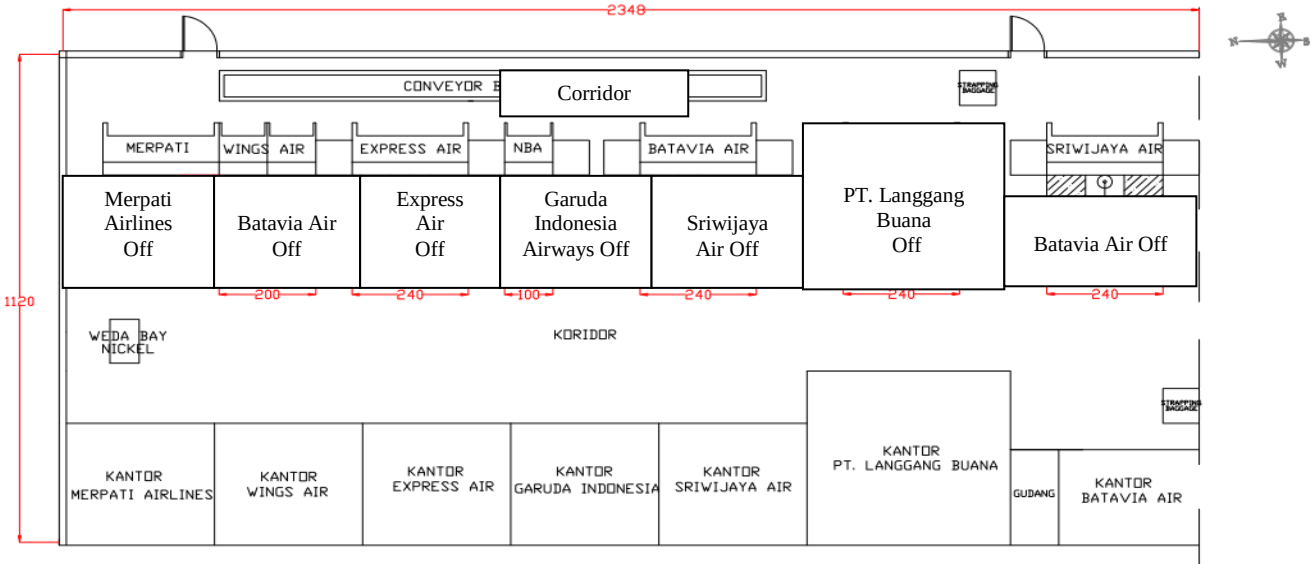

Fig. 2. Layout of Existing *Check-in Area* at Sultan Babullah Airport

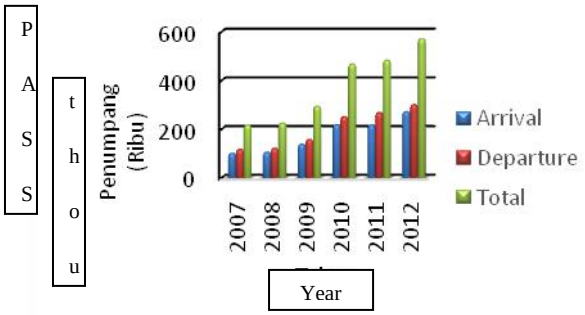

Fig. 3. Passenger Movement at Sultan Babullah Airport
Source: Directorate General of Air Transport and Central Bureau of Statistics)

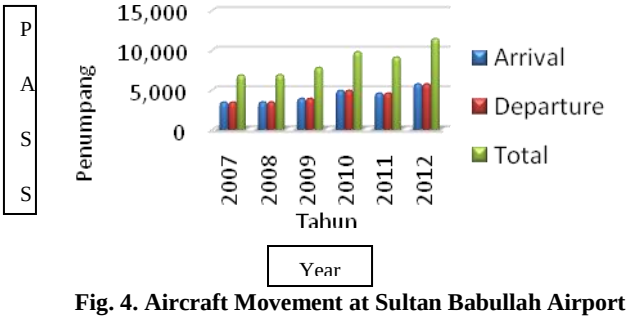

Fig. 4. Aircraft Movement at Sultan Babullah Airport
Source: Directorate General of Air Transport and Central Bureau of Statistics