

## Identifying Operational Constraints at Bandaranaike International Airport

A.K.Somasundaraswaran<sup>1</sup>, D.B.D.S.Somasri<sup>2</sup>, G.D.Vipulasena<sup>3</sup> and H.K.R.S. Kethuka<sup>4</sup>

<sup>1</sup> Department of Civil and Environmental Engineering, Faculty of Engineering, University of Ruhuna, Galle, <sup>2</sup> Kumagai Gumi Co Ltd, Indigaskatiya, Baddhegama, <sup>3</sup> MAGA Engineering Construction (Pvt) Ltd, Colombo, <sup>4</sup> TERM trust, 3<sup>rd</sup> Floor, Isurupaya, Battaramulla

### Abstract

*Ever increasing passenger and cargo transport through the Bandaranaike International Airport (BIA) makes many constraints in its operation. Very limited studies were carried out to address these constraints and related issues. Therefore this study investigates the current situation with the objective to evaluate the passengers' satisfaction as a tool to measure the constraints at facilities. Results revealed that critical operational constraints were at the departure lobby, especially in check-in counters, emigration, immigration and transfer areas. Moreover the passengers are very much concern about the facilities like variety at restaurant and bar, comfortable seating arrangements all over the airport, comfortable level of air condition, and flight information display system. Finally, the study group in a view that reallocating checking counters in the departure lobby might ease the congestion in the departure terminal.*

### Introduction

Increased globalization, safety standards, comforts, and most obvious over all price reduction over the last two decades initiated a rapid air traffic demand at Global level<sup>[1]</sup>. Bandaranaike International Airport (BIA) is an international airport, ideally located in the center of south Asia, and catering to all international flight to Sri Lanka. In 1983, Airport and Aviation Services (Sri Lanka) Limited has taken over the airport as an agent of the Government of Democratic Socialist Republic of Sri Lanka. Since, then its operational, maintenance, navigational and safety aspects are managed by them. Subsequently, the traffic flow at BIA shows a significant growth, and number of airlines carrying passengers and freights started to increase. But the supporting facilities within the airport were not increased to support the increased demand; as a result there are many constraints for the passengers. Moreover, nowadays the passengers' expectation has changed. Therefore, the objective of this study was divided into two: to examine the trend in passenger movements over the last two decades, and to investigate the feeling of the passengers who actually used the facilities located at arrival, transfer and departure terminals.

### Traffic Flow

Passenger movements during the period between 1983 and 2003 show a healthy development as reported elsewhere<sup>[2]</sup>. The recent trend shows a remarkable growth in the international passenger movements. According to the data for the years 2003 and 2004, in year 2003, there were 3,232,742 passengers movements recorded, and it is 17% increase compared with 2002 figures. Again very steady increase was observed in year 2004, and number reached a total of 4,078,474 passenger movements, and it is over 26% increase compared to 2003 figures.

### Methodology

A questionnaire survey is an easy method to measure subjective information like quality of services than objectively measuring it in a large scale. Therefore in this study, a questionnaire survey was carried out. The respondents were asked to give their level of satisfaction to the type of services at counters or security check points, waiting time, service personnels efficiency, courtesy and helpfulness and so on. Many of the questions were scored and categorized into six groups as excellent to very bad, and an over all judgment on airport performance by the passengers was also included in the questionnaire. A survey was carried out in the terminal buildings on and off between July to December 2004. During December to January, BIA used to be busy, thus this study has a higher tendency of reflecting the peak flow passengers' opinion. Three different questionnaire sheets were used for survey covering departure passengers, arrival passengers and transfer passengers. Engineering undergraduate students were used to conduct the survey, where many of them were female students. Based on a trial-

test, the questionnaire was further improved. The surveyors recorded the answers to the questions, hence, the misunderstanding between the question and answers were minimized. Since arrival passengers were not willing to spend their time for answering questionnaires for the reasons given by Somasiri<sup>[2]</sup>, the number of the questions for arrival passengers was limited to less than fifty.

### Passengers View in Departure Terminal

Table 1 shows the passengers view in the departure terminal building. The responses for each item in percentage are shown in the third column to eighth column. Bolded numbers, show the medium level of the passengers' view.

Table 1. Passengers view in the departure terminal building

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Area	Facilities/Services/Courtesy	Excellent	Very Good	Good	Satisfactory	Bad	Very Bad
Main Security	Feeling about Delay/Waiting time	0	5	40	<b>45</b>	10	0
	Courtesy/Helpfulness of the staff	5	20	<b>52</b>	20	0	3
Check-in Counters	Feeling about Delay/Waiting time	3	5	42	<b>43</b>	7	0
	Courtesy/Helpfulness of the staff	5	37	<b>43</b>	15	0	0
Emigration Counters	Feeling about Delay/Waiting time	0	0	25	<b>55</b>	20	0
	Courtesy/Helpfulness of the staff	10	23	<b>42</b>	25	0	0
Food & Beverages	Quality	0	0	50	<b>33</b>	17	0
	Variety	0	4	25	<b>63</b>	8	0
Duty Free Shops	Price	0	0	45	<b>39</b>	16	0
	Availability of goods/Variety	0	0	41	<b>45</b>	14	0
Other Facilities	Signs and Guidance/Directions	0	10	<b>45</b>	30	15	0
	Availability of Trolleys	5	13	<b>51</b>	18	13	0
	Flights Information Display	10	8	<b>47</b>	32	3	0
	Audio Information	0	13	<b>54</b>	28	5	0
	Space in Departure Lobby Area	3	10	27	<b>40</b>	20	0
	Appearance of Departure Lobby and Lounge	3	10	<b>63</b>	24	0	0
	Availability of Drinking Water	0	4	31	<b>48</b>	17	0
	Toilet Facilities	3	3	<b>49</b>	27	9	9
	Telephone Facilities	0	3	<b>59</b>	31	7	0
	Availability of Retail Shops	0	0	12	23	<b>42</b>	23
	Internet (from who actually using)	4	0	<b>50</b>	46	0	0
	Medicine / Pharmacy	0	0	<b>55</b>	36	9	0
Respondent	Experience of the Respondent	<b>8</b>	<b>5</b>	<b>55</b>	<b>30</b>	<b>2</b>	<b>0</b>
Airport	Overall rating	<b>0</b>	<b>20</b>	<b>65</b>	<b>15</b>	<b>0</b>	<b>0</b>

As shown in Table 1, the quality and variety of foods in restaurant, availability of drinking water facilities, having more seating and open spaces in the departure lobby, inadequate or absence of retail shops are commented to a lower level of satisfactory. As an over all view, about 20% of the passengers said the facilities in the departure terminal building was very good, while 65% said good and remaining 15% said satisfactory. None of them said excellent or bad or very bad. Thus these survey results have also confirmed the importance of improving departure terminal. The purpose of the passengers' visits at departure terminal was also interviewed and found that about 15% for employment, 15% for visit relatives, 20% for personal matters, 23% for tourist on vacation and 27% for other purposes. Their age distribution falls between 19 and 55 years, and their over all experience in airport was rated as good. Measured and reported delay and queuing at BIA<sup>[2]</sup> urged to introduce an appropriate mechanism to minimize the delay at the main security, checking and emigration counters.

### Passenger View in Arrival Terminal

Unlike the departing or transfer passengers, arrival passengers are very much eager to leave the place at earliest for several known reasons<sup>[2]</sup>. Hence, return of the baggage to passengers in an efficient manner after their flight is very important<sup>[3]</sup>. The passengers' views in arrival terminal facilities are given in Table 2. A level of satisfactory was suggested for the services at immigration counters as well as in the baggage claim area. To improve the passengers' satisfaction in the baggage collecting area, the dwelling time could be reduced by providing good display system as well as by increasing space for baggage clearing area.

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Table 2. Passengers view in arrival terminal building

Area	Facilities/Services/Courtesy	Excellent	Very Good	Good	Satisfactory	Bad	Very Bad
Arrival Lobby	Shuttle Bus	0	0	57	37	3	3
	Immigration Counters	0	0	40	53	7	0
Baggage Reclaim	Space/Facilities	0	0	33	50	17	0
	Trolley Availability/Condition	0	0	30	47	23	0
Customs	Control Area/Counters	0	0	60	40	0	0
Other Facilities	Duty Free Shops	0	0	68	27	5	0
	Guidance/Signs/Directions	0	0	23	63	14	0
	Availability of Drinking Water	0	0	52	39	9	0
	Toilet Facilities	3	0	78	19	0	0
	Telephone Facilities	0	0	80	17	3	0
	Courtesy/Helpfulness of the Security staff	0	4	91	5	0	0
Respondent	Experience of the Respondent	0	0	60	40	0	0
Airport	Overall Rating	0	13	80	7	0	0

As shown in Table 2, the over all passengers view in the arrival terminal building was not evaluated as bad or very bad, on the other hand it was not elevated to a level of excellent. About 13% of the passengers said that the facilities in the arrival terminal building was very good, while 80% said good and remaining 7% said satisfactory.

**Passenger View in Transfer Terminal**

Table 3 shows the passengers' view from the transfer passengers. The response for each item in percentage is shown in the third to eight columns. In their view, availability of medicine or pharmacy was weighted badly. On the other hand facilities at prayer room were weighted as very good. Other facilities were rated between good and satisfactory as shown in Table 3.

Table 3. Passengers view in transfer building

Area	Facilities/Services/Courtesy	Excellent	Very Good	Good	Satisfactory	Bad	Very Bad
Transfer	Boarding Counters	0	0	25	50	25	0
	Availability of seats at transfer area	19	0	26	26	29	0
Rest Rooms	Cleanliness	8	0	73	19	0	0
	Facilities	0	0	50	50	0	0
Restaurants & Bars	Quality	0	3	48	20	29	0
	Variety	0	0	32	29	36	3
Duty Free Shops	Price compared to other counties	0	0	52	44	4	0
	Availability of goods/Variety	0	0	30	52	18	0
	Courtesy/Helpfulness of the staff	4	0	89	7	0	0
Security	Efficiency of the staff	3	0	65	32	0	0
	Courtesy/Helpfulness of the staff	3	26	61	10	0	0
Other Facilities	Guidance/Signs/Directions	0	3	26	52	19	0
	Flights Information Display	3	0	19	48	26	4
	Audio Information/Information Staff	19	20	55	3	3	0
	Availability of Drinking Water	0	0	25	39	29	7
	Toilet Facilities	3	3	32	55	7	0
	Telephone/Internet Facilities	7	7	54	32	0	0
	Prayer Rooms	8	58	34	0	0	0
Medicine / Pharmacy	0	0	0	75	0	25	
Respondent	Experience of the Respondent	0	26	48	26	0	0
Airport	Overall rating	3	3	68	26	0	0

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As an over all view only 3% of the passengers said the facilities in the transfer terminal building is very good or excellent, while 65% said good and remaining 15% said satisfactory. None of them said bad or very bad.

### Conclusion

Passenger movements during the period between 1983 and 2003 show a healthy development over the good and bad years, and rapidly increasing. Therefore this study was conducted to examine the constraints at BIA in 2004. Data provided by Airport and Aviation Services (Sri Lanka) Limited as well as the data collected from conducting three different sets of questionnaires were used to accomplish the task in the intended study objective. Results revealed that very poor level of services was at departure concourse, departure lounge, transfer lounge, arrival foreign green channel and arrival concourse. In 2004, the passengers view on terminal buildings reflects that the planners and designers have to incorporate their view towards maximizing the customers' benefits. With the recent development in 2005, some one could easily observe an overall deduction in the operational constraints addressed in this research. However, few methodologies were suggested elsewhere<sup>[2]</sup> to improve current situation at BIA, one of such suggestion is to reallocating checking counters in the departure lobby. In future, similar studies should be repeated with suitable modification to further improve the facilities at BIA. But, all survey and observations must be conducted with approval from many sources. Therefore, future study group should keep in mind that getting permission takes considerable processing time, thus enough lead time must be planned in advance for any study of this nature. This survey group with an opinion that generally departing passengers and transfer passengers was willing to co-operate the questionnaire, but not the arrival passengers. Therefore questionnaire survey for arrival passenger could be conducted while visitors staying hotels and so on.

### References

- Richard de Neufville and Amedeo Odoni (2003) Airport Systems: Planning, Design, and Management, McGraw-Hill, Toronto.
- Somasri D.B.D.S, Kethuka H.K.R.S and Vipulasena G.D (2005) Identifying Operational Constraints at BIA, Undergraduate Research Report, Department of Civil and Environmental Engineering, University of Ruhuna, Galle, Sri Lanka, January, 2005.
- Alexandre G. de Barros and S.C. Wirashinghe, (2004) Sizing the Baggage Claim Area for the New Large Aircraft, Journal of Transportation Engineering, Volume. 130, No. 3, May 1, 2004, ASCE

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