

SERVICE PERFORMANCE EVALUATION IN LARGE RAILWAY STATION IN INDONESIA

A. Caroline Sutandi

Department of Civil Engineering
Parahyangan Catholic University
Jln. Ciumbuleuit 94
Bandung 40141, Indonesia
caroline@unpar.ac.id

Floid Olzon Paladan

Department of Civil Engineering
Parahyangan Catholic University
Jln. Ciumbuleuit 94
Bandung 40141, Indonesia

Abstract

People need transportation for social and economic daily activities. Since road network usually experience traffic congestion, railroad is one of good alternatives. People will choose train as a public transportation if there is a good service performance. In accordance with domestic and international social and economic activities in Indonesia, national and international service standard is important. The aim of this study is to evaluate the service performance of large railway station in a large city in developing country. Bandung large railway station is carried out as a case study. Indonesian transportation minister regulation No. 48 year 2015 regarding people transport by train and Department for Transport Scotland, 2015 regarding design standards for accessible railway stations used as the standards. Results indicated that waiting room, boarding room, and prayer room fulfill the standards while restroom, lighting, and air-conditioner are unfulfilled. Furthermore, improvement, routine inspection, and maintenance have to be implemented consistently.

Keywords: service performance, large railway station, large city, developing country

Abstrak

Manusia memerlukan transportasi dalam kegiatan sosial dan ekonomi sehari-hari. Jaringan jalan umumnya selalu mengalami kemacetan lalu lintas, karenanya jalan rel adalah alternatif yang baik. Orang akan memilih kereta api sebagai moda transportasi publik jika terdapat pelayanan yang baik. Berkenaan dengan kegiatan sosial dan ekonomi yang bertaraf nasional dan internasional di Indonesia, maka pemenuhan terhadap standar pelayanan nasional dan internasional menjadi penting. Tujuan studi adalah mengevaluasi kinerja pelayanan stasiun besar kereta api di kota besar di negara berkembang. Stasiun besar kereta api Bandung digunakan sebagai studi kasus. Peraturan Menteri Perhubungan Republik Indonesia No. 48 Tahun 2015 tentang Standar Pelayanan Minimum Angkutan Orang dengan Kereta Api dan Standar Department for Transport Scotland, 2015 tentang Standar Desain untuk Stasiun Kereta Api yang mudah diakses digunakan sebagai pedoman. Ruang tunggu, ruang *boarding*, dan mushola memenuhi kedua standar. Toilet, penerangan, dan sistem pendingin ruangan tidak memenuhi kedua standar. Selanjutnya perbaikan, inspeksi rutin, dan pemeliharaan harus konsisten dilakukan.

Kata-kata kunci: kinerja pelayanan, stasiun besar kereta api, kota besar, negara berkembang

INTRODUCTION

Transportation is needed for social and economic daily activities of society. Since road network usually experience traffic congestion, railroad is one of good alternatives. In order to make people change from using bus to train as public transportation, a good service performance has to be fulfilled.

The aim of this study is to evaluate the service performance of large railway station in a large city in a developing country. The case study is at Bandung large railway station. Service performance standards used in this study are The Indonesian Transportation Minister Regulation No. 48, Year 2015, regarding people transport by train, and the Department for Transport, Scotland (2015), regarding design standards for accessible railway stations. All detail results of this study is beneficial for further improvement, routine inspection, and maintenance that have to be implemented consistently and continuously.

Table 1 Observation Data Accordance to Minimum Service Standard Indicators at Bandung Large Railway Station (Paladan, 2015)

No.	Convenience Indicator		Number of Observation per day	Observation day					
	Name	Unit		1	2	3	4	5	
1	Waiting Room	m ² per person	1	3.0	4.0	6.3	3.2	1.5	
			2	3.5	4.0	4.5	1.9	2.8	
			3	6.0	2.5	3.0	2.0	4.1	
			4	2.0	3.3	3.6	3.4	2.5	
			5	4.0	2.7	2.9	4.0	2.0	
Condition			Clean						
2	Boarding Room	m ² per person with seating	1	8.0	8.0	8.5	12.0	14.0	
			2	4.0	8.5	5.0	8.0	10.0	
			3	6.0	4.0	5.0	8.5	8.5	
			4	7.5	6.0	6.5	5.0	7.0	
			5	6.0	7.0	8.0	7.5	9.0	
Condition			Clean						
3	Restroom	Availability	Gentlemen: 4 urinals, 2 WC, 2 washbasins, 1 disable restroom Ladies: 2 WC, 2 washbasins, 1 disable restroom						
4	Prayer Room	Number of spaces	Gentlemen: 11 spaces for normal person and 2 spaces for disable person Ladies: 9 spaces for normal person and 2 spaces for disable person						
Condition			Clean						
5	Lighting	Lighting for the room that make passenger comfortable	Lux meter is used to measure lights intensity of all lights (4 lights) in the room with standard measurement						
			Light	6 measurements per light (lux)					
			1	80.5	80.7	64.8	81.3	79.4	59.6
			2	85.9	80.4	65.4	83.5	80.2	63.7
			3	52.8	64	80.5	56.7	67.2	59.6
4	58.7	65.3	85.9	62.4	58.5	64.9			
6	Air Conditioner	AC (Air Conditioner)	1	29°C	28°C	26°C	27°C	29°C	
			2	29°C	28°C	26°C	27°C	29°C	
			3	29°C	28°C	26°C	27°C	29°C	
			4	29°C	28°C	26°C	27°C	29°C	
			5	29°C	28°C	26°C	27°C	29°C	
Fan			Available						

TRAIN AS PUBLIC TRANSPORTATION

Railway system is an integrated system. It consists of infrastructure, station, standard, and procedure to implement train public transportation system (Pemerintah Republik Indonesia, 2007). As a mass public transportation mode that travel people and goods, train, is an effective, efficient, and potential alternatif to ease existing severe traffic congestion problem. Train is chosen because of a number of reasons. One of them is that building road infrastructure is not a priority and cannot solve the problem because annual vehicle growth rate is higher than annual road network development. Furthermore, the mode is effective and efficient in terms of number of people and goods can be transported, fuel consumption saving, pollution emission saving, land use saving, and safety (White, 2009)

Beside the train, railway station as an integrated part of the system has also to fulfill a number of standards, including safety, security, capability, accessibility, equality, and convenience. The standard can be at national and or international levels (Pemerintah Republik Indonesia, 2015, Transport Scotland, 2015).

Indonesian Service Standard of Rail Station

In Indonesia, there is a minimum service standard regarding minimum service standard at the railway station and minimum service standard during travel (Pemerintah Republik Indonesia, 2007, 2009, 2015). Minimum service standard at the large railway station regarding convenience standard consists of the following items and presented in Table 2:

- a. Waiting room is measured by area and condition standard i.e. minimum 0.6 m² per person with 100% clean area and no bad smell. The room can be available outside railway station building. Especially for intercity passenger train;
- b. Boarding room is measured by area and condition standard i.e. minimum 0.6 m² per person with seating and 100% clean area and no bad smell;
- c. Restroom is measured by number and condition of the restroom for ladies and gentlemen. Minimum 4 urinals, 3 WC, 2 washbasins for gentlemen, and minimum 6 WC and 2 washbasins for ladies, and also 1 restroom for disable person. Furthermore, the standard condition is 100% clean area and no bad smell. Availability in accordance with environment conditions;
- d. Prayer room is measured by number of space per person and condition of the prayer room for ladies and gentlemen. Minimum 11 spaces for normal person and 2 spaces for disable person for gentlemen and minimum 9 spaces for normal person and 2 spaces for disable person for ladies. Furthermore, the standard condition is 100% clean area & no bad smell;
- e. Lighting is measured by intensity of light in lux. Light intensity is between 200 lux up to 250 lux. Lighting of the room has to make passenger comfortable;
- f. Air conditioner is measured by temperature. The maximum temperature is 27°C. Air conditioner can be AC (Air Conditioner) or fan.

Table 2 Comparison between Minimum Service Standard Indicators and Existing Data at Bandung Large Railway Station

No.	Name	Description	Convenience Indicator of Large Rail Station		Existing Conditions at Bandung Large Rail Station
			Unit / Condition in Indonesia	Unit / Condition in Great Britain	
1	Waiting Room	A room for passenger before check in, can be open space	Min 0.6 m ² per person	All seating should be clean, comfortable, easy to get in and out of and a range of seating should be freely available	3.3 m ² per person; s=1.2 Clean
			100% clean area and no bad smell	There should be a clear space alongside the seating of 900 mm × 1350 mm for each wheelchair where there are fixed seats	
			Can be available outside railway station building. Especially for intercity	Weather protected and shall be accessible by a wheelchair user	
2	Boarding Room	A room for passenger after personal verification	Min 0.6 m ² per person with seating	All seating should be clean, comfortable, easy to get in and out of and a range of seating should be freely available	7.5 m ² per person; s=2.8 Clean
			100% clean area and no bad smell	There should be a clear space alongside the seating of 900 mm × 1350 mm for each wheelchair where there are fixed seats	
3	Restroom	Availability	Gentlemen: 4 urinals, 3 WC, 2 washbasins	Disabled people should be able to find and use suitable toilet accommodation no less easily than non-disabled people	Gentlemen: 4 urinals, 2 WC, 2 washbasins, 1 disable restroom Ladies: 2 WC, 2 washbasins, 1 disable restroom 2 restrooms for disable person Clean
			Ladies: 6 WC, 2 washbasins		
			1 restroom for disable person	There must be a clear wheelchair turning space of 1500mm x 1500mm	
			100% clean area and no bad smell	Baby nappy changing facilities shall be provided which are accessible to both men and women	
			Availability in accordance with environment conditions	Wheelchair users must be able to manoeuvre feet and footrests under the wash basin when the wheelchair is turned	
4	Prayer Room	A room for praying	Gentlemen: 11 spaces for normal and 2 spaces for disable person		Gentlemen: 11 spaces for normal person and 2 spaces for disable person Ladies: 9 spaces for normal person and 2 spaces for disable person Clean
			Ladies: 9 spaces for normal and 2 spaces for disable person		
			100% clean area and no bad smell		
5	Lighting	Lighting of the room has to make passenger comfortable	Light intensity 200-250 lux	Light intensity min 150 lux	70,1 lux; s=10.7
6	Air Conditioner	Can be AC (Air Conditioner) or fan	Max 27 °C		27,8 °C; s=1.2
Legend: $s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}}$ (Ott, R. L, 1992) s = standard deviation					

Great Britain Service Standard of Access Rail Station

The purpose of the Design Standards for Accessible Railway Stations is to ensure that any infrastructure work at stations makes railway travel easier for disabled passengers. It applies to services provided by operators in Great Britain in relation to trains and stations. The Code identifies European and national standards relevant for all passenger train and station operators in Great Britain. Licensed operators, including Network Rail must follow the Code, a condition of their license, whenever they install, renew or replace infrastructure or facilities. This includes the requirement to establish and comply with a Disabled People's Protection Policy (DPPP), paying due regard to this Code. Train and station operators, and anybody else who carries out work on Great Britain's railway network, should ensure that they are familiar with this version and should check the website on a regular basis for updates (Transport Scotland, 2015).

This standard is technical and detail. It begin with standard of pre-travel information, substitute transport, pre-planned and emergency, car parking (general, location, dimensions and number of spaces, markings, monitoring and enforcement), set-down and pick-up points, locating and approaching the station, unobstructed progress building works, doors, lighting, floors, walls and transparent devices, furniture and free-standing devices, signs, emergency alarms, help points, ticket sales points, lifts, ramps, steps and stairs, escalators and moving walkways, seating, waiting rooms and shelters, toilets (design standard toilets, doors, WC, grab rails, washbasins, accessories and surface finishes, lighting, baby-changing facilities), platform lifts for boarding trains, crossing the track, connecting transport, up to staff training. Detail technical and measurement of convenience minimum service standard are presented in Table 2 (Transport Scotland, 2015).

DATA AND ANALYSIS

Bandung large railway station in Indonesia is the location of case study. Position of the large railway station is in the center of the Bandung City with +709 meter above sea level. It has 8 return intercity trains from Bandung to Jakarta, Cirebon, Semarang, Solo, Yogyakarta, Surabaya, and Malang, and 2 return commuter trains from Bandung to a number of towns around Bandung. The operating hour is from 4 am to 11.30 pm daily (PT KAI, 2015). The real condition of waiting room, boarding room, and praying room at Bandung Railway Station is presented in Figure 1 (Paladan, 2015).

Data collection according to convenience service performance indicators at large railway station is presented in Table 1. Average measurement of each indicator, deviation standard of each indicator, and comparison between existing data at Bandung large railway station and national and international convenience minimum service standard is presented in Table 2. Data is collected 5 times a day during peak hours, and collected 5 in day observation. Lux meter (LX-1108 type) is used to observed light intensity in the room.

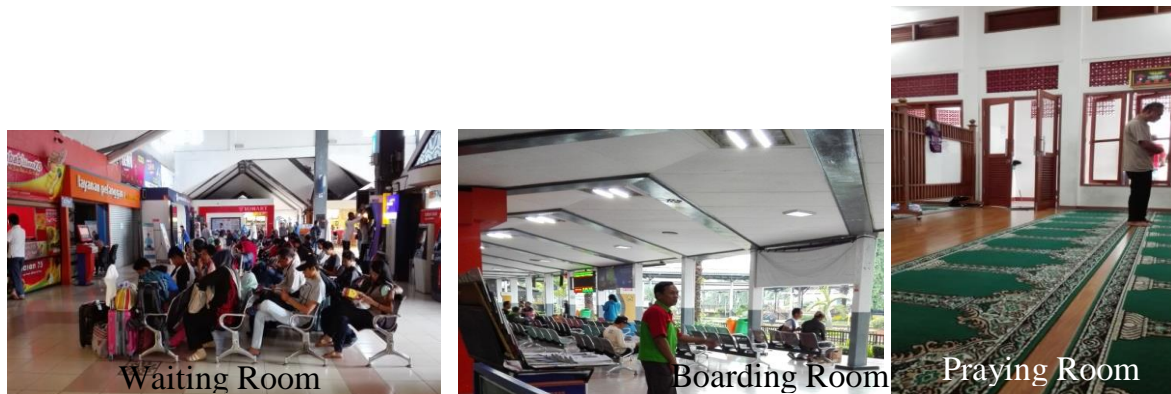


Figure 1 Condition of Waiting Room, Boarding Room, and Praying Room at Bandung Large Railway Station (Paladan, 2015)

DISCUSSION AND RECOMMENDATION

Table 2 shows a comparison between existing data of Bandung large railway station and the national and international convenience minimum service standard indicators. The summary is as follow:

- 1) In waiting room, the average clear space per person is 3.3 m^2 , with a standard deviation (s) of 1.2. This measurement is larger 0.6 m^2 per person as minimum national standard and larger than a clear space alongside the seating of $900 \text{ mm} \times 1350 \text{ mm}$ for each wheelchair where there are fixed seats as international standard. During 5 days observation the room is always clean. There are 2 trash bins and 1 cleaning service person who always standby in the room. This kind of room fulfilled the standards;
- 2) In boarding room, average clear space per person is 7.5 m^2 with s of 2.8 m^2 . This measurement is larger 0.6 m^2 per person as minimum national standard and larger than a clear space alongside the seating of $900 \text{ mm} \times 1350 \text{ mm}$ for each wheelchair where there are fixed seats as international standard. During 5 days observation the room is always clean. There are a trash bin and 1 cleaning service person who always standby in the room. Therefore, this kind of room met the standards;
- 3) In restroom, there are 4 urinals, 2 WC, 2 washbasins, and 1 disable restroom in clean gentleman restroom. This condition less than the minimum standard, i.e. minimum 4 urinals, 3 WC, 2 washbasins, and 1 restroom for disable person. Furthermore, there are 2 WC, 2 washbasins, and 2 disable restrooms in clean lady restroom. This condition also fulfills the minimum standard. However, there is no nursery room or baby nappy changing facility. As a whole, restroom standards did not fulfill the standard;
- 4) In clean prayer room for gentlemen, there are 11 spaces for normal person and 2 spaces for disable person. In clean prayer room for ladies, there are 9 spaces for normal person and 2 spaces for disable person. Tthe prayer rooms fulfill the national standard. There is no requirement of prayer room in international standard;

- 5) The average light intensity measurement in a room is 70.1 lux with s of 10.7 lux. This condition is less than the minimum light intensity in national standard, i.e between 200 lux up to 250 lux and also less than the minimum light intensity in international standard, i.e. at least 150 lux. The lighting standard is not fulfilled and mau cause passengers feel uncomfortable;
- 6) The average room temperature is 27.8°C with s of 1.2°C. This temperature is slightly higher than the maximum temperature in the standard, i.e. 27°C, meaning that the national air conditioner standard is not fulfilled.

The previous detail conditions indicated that convenience service performance in the large railway station only fulfill minimum convenience service standard for waiting room, boarding room, and praying room. But it did not fulfill the minimum convenience service standard for restroom, lighting intensity, and air conditioner. Based on the real conditions, further immediate action is needed so that all convenience minimum service standards can be fulfilled.

A number of recommended can be described in this section. First, improvement to increase items of unfulfilled standard. In this case, develop facilities accordance to restroom standard, including nursery room that can be accessed by gentlemen and ladies. Then, change kind of existing lights to lights that have minimum 200 lux in light intensity. Furthermore, also maintain the room temperature to maximum 27°C all day. Second, re-evaluation of all conditions after improvement to ensure that the results fulfill the standard. Third, if the results still fails to fulfill the standard, then other improvements have to be done. Forth, routine inspection of all conditions according to indicators in the minimum service standard of railway stations, including convenience minimum service standard, has to be implemented. And finally, in order to have better service performance, regular maintenance of all condition has to be implemented consistently and continuously.

CONCLUSIONS

This study evaluates the service performance of large railway station in a large city in developing country. The Bandung railway station was selected as a case study. The condition of this station was evaluated using national and international standards. Based on this study, it was faound that the railway station did not completely fulfill the standards. Further studies regarding fulfillment of all minimum service standard indicators at large, medium, and small railway stations can be implemented in the same method and analysis. The most important thing is that the results should be used to improve the existing performance. Then, re-evaluation of all conditions after improvement, routine inspection, and regular maintenance of all conditions consistently and continuously are necessary in order to have better service performance.

REFERENCES

- Kereta Api Indonesia, PT. 2015. *Perkeretaapian di Indonesia*, (Online), (<http://www.kereta-api.co.id/>, accessed March 2016).
- Paladan, F.O. 2015. *Evaluasi Kinerja Pelayanan di Stasiun Kereta Api Bandung Berdasarkan Standar Pelayanan Minimum Angkutan Orang dengan Kereta Api*. Skripsi tidak diterbitkan. Bandung: Jurusan Teknik Sipil, Fakultas Teknik, Universitas Katolik Parahyangan.
- Pemerintah Republik Indonesia. 2007. *Undang-Undang Republik Indonesia Indonesia Nomor 23 Tahun 2007 Tentang Perkeretaapian*. Jakarta.
- Pemerintah Republik Indonesia. 2009. *Peraturan Pemerintah Republik Indonesia Nomor 72 Tahun 2009 Tentang Lalu Lintas dan Angkutan Kereta Api*. Jakarta.
- Pemerintah Republik Indonesia. 2015. *Peraturan Menteri Perhubungan Republik Indonesia No. 48 Tahun 2015 Tentang Standar Pelayanan Minimum Angkutan Orang dengan Kereta Api*. Jakarta.
- Transport Scotland. 2015. *Design Standards for Accessible Railway Stations*. Version 04. Glasgow.
- White, P. 2009. *Public Transport, It's Planning, Management, and Operation*. 5th Edition, Urban Railways and Rapid Transit Systems. Routledge. NY.