

Research Article

Punctuality of Intercity Trains and Passengers' Perspective towards Arrival Time Delay

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Abstract: Systematic railway scheduling is important to encourage the public to choose rail transit system as their preferred transportation mode. However, the punctuality of trains still becomes the main problem in railway operation service in Malaysia. The purpose of this study is to determine the punctuality and arrival time of Keretapi Tanah Melayu Berhad's (KTMB) intercity trains at Kluang Railway Station. The study was conducted at Kluang Railway Station by using observation and survey methods. The observation study was focused on several types of intercity trains where the arrival times of the trains were recorded and compared with the train schedule. Next, the survey was aimed to obtain passengers' perspective towards the punctuality of the trains. As a result from the observation, the average arrival time delay for all observed trains was around 10 min. In addition, most of the passengers responded that the punctuality of the intercity trains was poor and this punctuality issue has to be improved. The results obtained from this study are useful to enhance the train services.

Keywords: Arrival time, KTMB intercity train, train delay, train operation, train passengers, train schedule

INTRODUCTION

The increased concern in traffic safety issues, demand for mobilisation, road congestion and blooming of trading activities have caused punctuality of train services in their arrival and departure times as one of the essential factors in determining their service quality. According to Salkonen (2008), punctuality is usually considered in measuring the quality of service for train network. Different countries and organisations have their own ways to measure the punctuality of trains. For example, research done by Gelders *et al.* (2008) indicated that train punctuality in Belgium is reviewed by the passengers in every third day of the year.

Nonetheless, the most common way that is usually chosen by many train companies is by using a regular quantity-time. According to Ackermann (1998), punctuality is expressed as the percentage of arriving or departing at the stations with delays more than 5 min. However, there are countries such as Japan and European countries that have applied high timetable precision of seconds because of their extraordinary high degree of punctuality with less than one minute average delay per train (Weigand, 1996). Therefore, due to the existence of modern system and computer facilities to assist the train service, Goverde *et al.* (2001) described punctuality in the context of train service as "the percentage of trains that arrived, passed or departed no later than 60 sec compared to all train movement in the

same time period at predefined representative network locations."

According to Salkonen and Paavilainen (2010), considering passengers' perspective as indicator to measure the punctuality of the train service is still a new concept. Although the relevance of taking into account the passengers' perspective had been argued by Nathanail (2008) and NEA Transport Research and Training (2003) had already proved that there is a relationship between punctuality and passengers' level of satisfaction. The more punctual the train service, the higher level of passenger's satisfaction is and vice versa.

Several studies also agreed that punctuality affects passengers' perception (Goverde *et al.*, 2001; Yuan and Hansen, 2002). By measuring passengers' perception, it would offer the railway industry new ways to approach and measure punctuality. This kind of indicator can be used to monitor overall service quality of train service as well as to measure passengers' satisfaction. This is because the train delay could affect the passengers' behaviors or tasks to be done in work for that day and affected their daily costs which are considering as money and time (Kato *et al.*, 2010).

In Malaysia, Keretapi Tanah Melayu Berhad (KTMB) owns the largest railroad network that includes the operation for intercity freight and passenger service. However, unlike other developed countries, the railway tracks for the train service in



Fig. 1: Keretapi Tanah Melayu Berhad (KTMB) railway tracks

Malaysia is still using the old system. The single track system is still being used and sometimes the concept of right-of-way is implemented to prevent delays. Figure 1 shows the railway tracks for KTMB intercity railway trains. They consist of North-South Line (Butterworth-Woodlands) and East-South Line (Tumpat-Woodlands). Trains usually stop at Gemas or Kuala Lumpur for passengers' transit before they move to the last terminal. The average speed of intercity trains is usually 50 km/h. currently, the train services still have low frequency as some train services operate during peak hours or season duration only. The train services also include the shuttle trains that skip some stations in order to run faster.

The service of intercity trains for passengers has become important in Malaysia due to the increasing mobility of people. Currently, KTMB still has the problems with frequent delay in intercity trains that causes substantial nuisance to the passengers and reduces the perceived utility of the system. In addition, the intercity trains for passengers still have to share the same railway tracks with the freight trains. As far as the authors are concerned, this is the first paper in Malaysia that explores the punctuality of intercity trains and measures passengers' perception and satisfaction towards the service quality of the intercity trains. Therefore, in this study, we carried out observation and survey on passengers' perception towards the punctuality of the intercity trains focusing on arrival

Table 1: Arrival times schedule for intercity trains at Kluang Railway Station (KTMB)

North-south line		East-south line	
South to north*		South to east**	
Ekspres Rakyat	10.30	Ekspres Sinaran Timur	7.180
Ekspres Sinaran Selatan	15.38	Shuttle (to Kuala Lipis)	9.590
		Ekspres Senandung Timuran	21.08
		Shuttle (to Gemas)	22.09
North to south***		East to south****	
Ekspres Rakyat	13.57	Ekspres Sinaran Timur	19.27
Ekspres Sinaran Selatan	18.40	Shuttle (from Kuala Lipis)	15.15
		Ekspres Senandung Timuran	08.18

*: Origin station is woodlands and end station is butterworth; **: Origin station is woodlands and end station is tumpat; ***: Origin station is butterworth and end station is woodlands; ****: Origin station is tumpat and end station is woodlands

time. The results from the observation and survey, and their impacts and significance are discussed in this Study.

METHODOLOGY

Observation: Observation was carried out at Kluang Railway Station for 7 days focusing on the arrival time of several types of carriages. The purpose of the observation was to determine the punctuality of each train. This station was chosen because the findings from this study would be useful to support the development plan for Kluang Town. Table 1 shows the time schedule for the intercity trains at Kluang Railway Station. All the trains were subjected to arrive at the Kluang Railway Station according to the arrival times scheduled.

In this study, the observation was done towards North-South Line and East-South Line intercity trains. For North-South Line, two types of intercity trains, which were *Ekspres Rakyat* and *Ekspres Sinaran Selatan* were observed. *Ekspres Rakyat* was bound from Butterworth to Woodlands, while *Ekspres Sinaran Selatan* was bound from KL Sentral to Woodlands. As for East-South Line, there were *Ekspres Sinaran Timur*, *Ekspres Senandung Timuran* and several shuttle trains. *Ekspres Sinaran Timur* and *Ekspres Senandung Timuran* were bound from Woodlands to Tumpat, while the shuttle trains will stop at selected stations and the passengers need to change with other express train that is bound to their destination.

Survey: A survey was conducted involving 100 respondents waiting at the Kluang Railway Station. The survey was carried out simultaneously while observing the punctuality of the train arrivals. The purpose of the survey was to determine the passengers' perception towards the punctuality of the trains. Several questions including respondents' demographic information and their perceptions towards the punctuality of the trains

were asked by the question: "Do you think the train will arrive on time as per scheduled?" Besides, the respondents were also requested to rank the punctuality level of the trains. On other note, it was difficult to get more respondents due to the fact that there were not many train users at Kluang Railway Station.

Data description: Table 2 shows the descriptive statistics of the respondents. Among the respondents, 56% were male and 44% were female. Fifty four percent of the respondents reported themselves as single while 46% were married. In terms of age, the respondents at the range of 20 to 40 years old were the largest group, followed by the respondents of older than forty years old and lower than twenty years old. This means that most of the respondents were adults. Children were not included in this survey. In terms of occupation, 32% of the respondents were school students, 13% were unemployed adults, 26% were self-employed, 11% worked as government servants, and 9% worked in private sectors. Another 9% of the respondents were not included in any of the occupation categories.

From the survey, some of the students claimed that they used the intercity trains to attend extra classes, seminars or talks at school especially after the school hours. Several government servants claimed that they used the intercity trains to travel because they felt that they have to encourage the youth to use public transports to travel and to minimize pollution. Other than those respondents who were unemployed used this transport to move around as they found the public transport was the safest way to reach their destination and the fee was reasonable. Most of the unemployed respondents were the senior citizens and they got discount rate for purchasing ticket. Next, most of the private sector workers and self-employed respondents used the intercity trains to attend business meeting as the trains could offer a comfortable travel for them before and after the meeting.

Table 2: Descriptive statistics of the respondents

Gender (N = 100)	Male 56%	Female 44%				
Marital status (N = 100)	Single 54%	Married 46%				
Age (N = 100)	<20 16%	20-40 53%	>40 31%			
Occupation (N = 100)	Student 32%	Unemployed 13%	Self-employed 26%	Government servant 11%	Private sector worker 9%	Others 9%

Table 3: Observation on intercity trains' arrival time

	Mon	Tue	Wed	Thurs	Fri	Sat	Sun	Mean	S.D.
North-south line									
South to north									
Ekspres Rakyat	0	0	0	0	25	0	30	9	13
Ekspres Sinar Selatan	10	10	0	5	15	20	15	11	7
North to south									
Ekspres Rakyat	10	20	0	15	15	12	7	11	6
Ekspres Sinar Selatan	10	5	0	10	5	15	5	7	5
East-south line									
South to east									
Ekspres Sinaran Timur	0	5	20	10	15	10	15	11	7
Shuttle to Kuala Lipis	10	-3	10	15	10	7	10	8	6
Ekspres Senandung Timuran	20	15	15	10	10	14	10	10	4
Shuttle to Gemas	10	10	10	5	5	7	3	10	3
East to south									
Ekspres Sinaran Timur	15	25	20	15	20	15	20	19	4
Shuttle to Kuala Lipis	0	0	0	10	10	10	15	6	6
Ekspres Senandung Timuran	10	10	10	10	10	5	13	13	2

RESULTS AND DISCUSSION

In this study, the observation on the arrival time for the intercity trains was done in seven consecutive days. Table 3 shows the mean, standard deviation and data from the observation based on the arrival times shown in Table 1. From the table, the range of arrival time delay for the intercity trains at Kluang Railway Station is between 6 to 19 min. From the observation during the study, the longest delay occurred on Sunday involving *Ekspres Rakyat* intercity train that arrived 30 min late from the schedule. This train was bound from Woodlands to Butterworth and the delay could have been caused by the late departure at Woodlands station. However, late departure time and dwell time are not included in this study. However, on Tuesday, the shuttle train for Kuala Lipis arrived three minutes earlier from the scheduled time.

Next, in terms of passengers' perspective towards the punctuality of the trains, 82% of the respondents perceived that the train service would not arrive on time while only 18% of the respondents perceived that the trains would arrive on time. Most of the respondents claimed that the late arrival could be due to the train's old engine causing the train not able to speed or causing the train to take longer time for maintenance.

Figure 2 shows the ranks given by the passengers for the punctuality of the intercity trains based on their experience in using the intercity trains. 47% of the

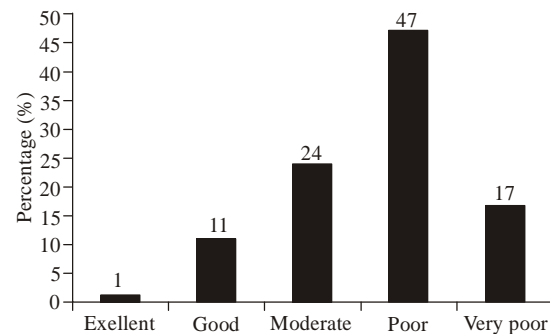


Fig. 2: The rank of punctuality ranked by the passengers of the intercity trains

respondents ranked the service as poor, showing that most of them were not satisfied with the service. 24% of the respondents ranked the service as moderate as they were neither satisfied nor dissatisfied with the service. Seventeen percent of the respondents ranked the service as very poor. This is might due to the very long hours waiting experience that they had faced in the past. On the other hand, 11% of the respondents ranked the service as good as they might have travelled using the train for short distance travel or due to the trains coincidentally arrived on time. Finally, only 1% of the respondents ranked the service as excellent. Therefore, in terms of the punctuality of the intercity trains as ranked by the respondents involved in this study, it can be concluded that the service was poor.

CONCLUSION

This study supports the finding by Goverde *et al.* (2001) and Yuan and Hansen (2002) that passengers' perception towards arrival time influences how they rank the punctuality of the train especially when they have had experience in the delays. According to Preston *et al.* (2009), there are three reasons of train delay; caused by operators (e.g., train faults and shortage of crew), network infrastructure (e.g., track and signaling faults); and external factors (e.g., suicides, vandalism, or extreme weather). From the observation, the intercity trains were far behind the latest available technology in train operation system as they still used single track system. These were agreed by the respondents in this study. In Malaysia, the intercity train delays are caused by operators and network infrastructure problems such as lack of officers, single track operation and old coach.

In addition, KTMB is expected to become more proactive in serving for the needs of the users including by improving the punctuality and using new technology of train operation system. These are for the public transportation provider to be competitive with other train services such as KTMB commuters, Light Rail Transit (LRT), and Electrified Train System (ETS) that have been developed in Malaysia. This is because, even though the services of the intercity trains have been ranked as poor, the users still use the mode.

There are a few weaknesses in this study especially the lack of investigation on dwell time and departure time for the trains. However, this study is an exploratory study to understand the real situation at the intercity train station in Malaysia that has not yet been examined. Future study with bigger scale of data collection and locations should be conducted in order to understand other causes that might influence the punctuality of the trains. However, the findings in this study can still be used to offer new strategies to improve the intercity train system in Malaysia.

REFERENCES

Ackermann, T., 1998. The Evaluation of Timeliness as a Quality Parameter for Passenger Services on the Basis of Direct Utility Measurement. Swiss Transport Inst University, Stuttgart, Germany, pp: 300, ISBN: 3922203213.

- Gelders, D., M. Galetzka, J.P. Verckens and E. Syedel, 2008. Showing results? An analysis of the perceptions of internal and external stakeholders of the public performance communication by the Belgian and Dutch Railways. *Govt. Inform. Quart.*, 25(2): 221-238.
- Goverde, R.M.P., I.A. Hansen, G. Hooghiemstra and H.P. Lopuhaa, 2001. Delay distributions in railway stations. The 9th World Conference on Transport Research, Seoul, Korea, Paper No 3605.
- Kato, H., Y. Kaneko and Y. Soyama, 2010. Influence of chronic delays in Tokyo urban rail service on passenger behaviours and perceptions. *European Transport Conference*, Glasgow, Scotland, UK.
- Nathanail, E., 2008. Measuring the quality of service for passengers on the Hellenic railways. *Transport. Res. Part A Policy Pract.*, 42(1): 48-66.
- NEA Transport Research and Training, 2003. *Bob Railway Case Benchmarking Passenger Transport in Railways*. Rijswijk, Netherlands.
- Preston, J., G. Wall, R. Batley, J.N. Ibáñez and J. Shires, 2009. Impact of delays on passenger train services evidence from Great Britain. *Transport. Res. Record No.*, 2117: 14-23.
- Salkonen, R., 2008. The Accuracy of Measurement of Rail (Measuring Punctuality in Railway Traffic. Publications of the Finnish Rail Administration a 15/2008, Traffic System Department, Helsinki, Finland, ISBN: 978-952-445-251-9.
- Salkonen, R. and J. Paavilainen, 2010. Measuring railway traffic punctuality from passenger's perspective. The 12th World Conference on Transport Research, Lisbon, Portugal
- Weigand, W., 1996. Success of the Japanese railways in the market for long-distance passenger traffic. *Railway Techn. Rev.*, 45(11): 709-719.
- Yuan, J. and I.A. Hansen, 2002. International Conference on Traffic and Transportation Studies (ICTTS). Proceedings of the Third International Conference on Transportation and Traffic Studies, held in Guilin, Guangxi, China, pp: 522-529.