International Journal of Innovation, Creativity and Change. www.ijicc.net
Volume 6, Issue 5, 2019

Study of Railroad Crossing at Merdeka Street, Kiaracondong and Andir in Bandung City

Raden Herdian Bayu Ash Siddiq[a], [a]Departement of Civil Engineering, Widyatama University, Indonesia, Email: raden.herdian@widyatama.ac.id

Along with population growth and increasing movements to Indonesia, railroad crossing use is increasingly high. One of the triggers for accidents at railroad crossings is the completeness of signs that meet the required standards. From the results of observations and analysis of complete railroad crossings in 3 locations in Bandung, precisely on Merdeka Street, Kiaracondong and Andir, based on the Director General of Land Transportation Regulation number: SK.407 / AJ.401 / DRJD / 2018 concerning Technical Control Guidelines Traffic on Roads in the Location of Potential Accidents at the Railroad Crossing, it was found that these 3 crossing locations do not meet the required standards. This can lead to potential accidents. The 7 things that must be fulfilled in a level crossing are warning signs, prohibited signs, road markers, rumble stripes, line separators, light signal and crossing doors.

Key words: *Railroad Crossing, Bandung, Technical Control Guidelines.*

Introduction

Railroad crossing are a hazard that have claimed many lives. The number of train crossing points in the PT KAI second operational area in Bandung area reached 752 units. Of these, 576 crossings are prone to accidents. Along with population growth and increasing movements to Indonesia, the use of railroad crossing is increasingly high. One of the triggers for accidents at railroad crossings is the completeness of signs that meet the required standards.

This study intends to analysis railroad crossings in an effort to improve the safety of motorists and railroad users by evaluating the technical conditions of railroad crossings with regards to the completeness of signs and infrastructure.

According to Hasan (2009), safety levels at railroad crossings are determined by the following factors:

1. The condition of the vehicle and the driver
2. Natural conditions
3. The design of the intersection between the railway line and road
4. Damage of the road structure, and
5. Completeness of signs and markers

Literature Review

Railroad crossings are a junction with the flow of motorized vehicles on one side while on the other side is the flow of rail transport. According to the Director General of Land Transportation Regulation number: SK.407 / AJ.401 / DRJD / 2018, concerning Technical Guidelines for Traffic Control on Roads at Potential Accident Locations at Section 6 Railroad Crossings, the implementation of traffic control measures at locations of potential accidents at railroad crossings includes the following stages:

1. Procurement of road equipment according to stipulations with technical drawings
2. Installation of road equipment according to the determination of technical drawings.
3. Repair of road equipment
4. Maintenance of road equipment.

Installation of road equipment in the context of controlling traffic on roads at the location of potential accidents at the level crossing is guided as follows:

1. Warning signs
   a. Additional signs can be installed at level crossings at critical location distances
   b. Warning signs with words stating to be careful approaching the train crossing.
   c. Signs that indicate the presence of obstacles or dangerous objects on the side of the road.
2. Prohibited signs
   a. Signs to prevent stopping and / or continuing the trip after being ascertained safe.
   b. The prohibition signs continue until certainty of safety is secured on a single train line.
   c. The prohibition signs continue until certainty of safety is secured on the double train line.
3. Road marker
   a. Cross markers as boundaries must stop before the vehicle crosses the railway line.
   b. Longitudinal markers as a ban on vehicles crossing the line.
   c. Cross markings and railway posts as a warning sign of crossing with a railway line
4. Rumble stripe

a. White rumble stripes are retro reflective
b. Stripe thickness of at least 30mm and a maximum of 40mm
c. Minimum bandwidth width of 250mm and a maximum of 900mm
d. The distance between a minimum band of 500mm and a maximum of 5000mm.
e. The number and distance of the stripes are in accordance with the results of management studies.

5. Line Separators
a. Permanent or movable with a minimum length of 60m.

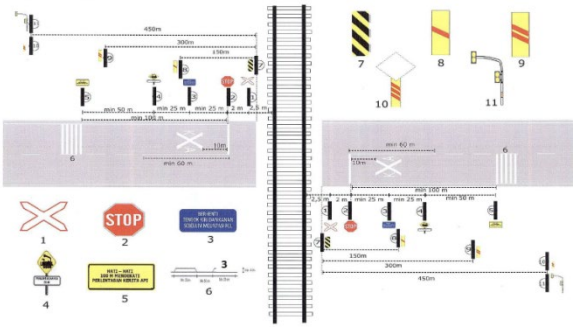
6. Light signal
a. Blinking yellow signaling device or two alternately lit lights and placed before crossing at a distance of 50m.

7. Crossing door

Installation of road equipment at level crossings includes the following:

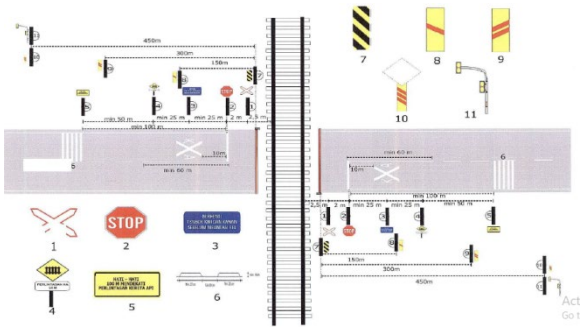
a. Railroad crossings without doors on 2-lane 2-way roads with a single railway line.

Figure 1. Installation of Railroad crossings equipment without doors on 2-lane 2-way roads with a single railway line.



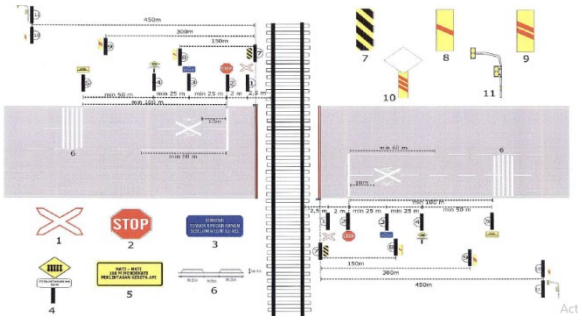
b. Railroad crossings without doors on 2-lane 2-way roads with a single railway line.

Figure 2. Installation of Railroad crossings equipment with doors on 2-lane 2-way roads with a single railway line.



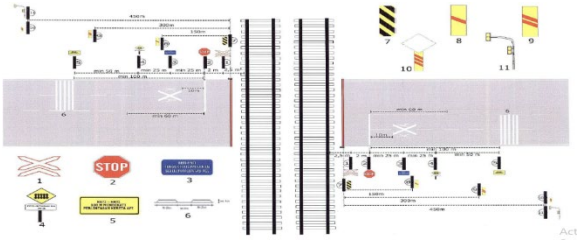
c. Railroad crossings without doors on 4-lane 2-way roads with a single railway line.

Figure 3. Installation of Railroad crossings equipment with doors on 4-lane 2-way roads with a single railway line.



d. Railroad crossings with doors on 4-lane 2-way roads with a double railway line.

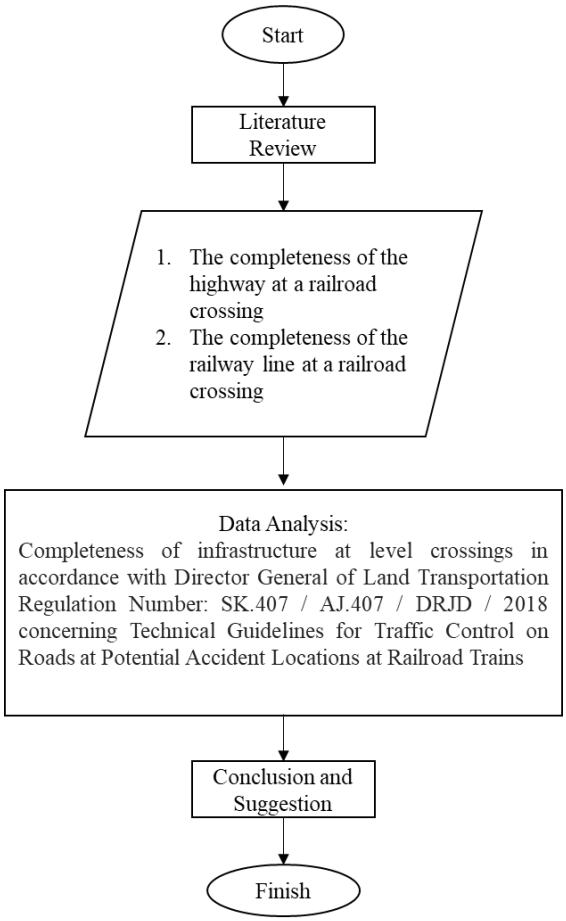
Figure 4. Installation of Railroad crossings equipment with doors on 4-lane 2-way roads with a double railway line.



Method

In this study the data used is primary data with direct observation at the study site. Documentation was collected from each location to compare the existing conditions. From the results of these comparisons, conclusions are drawn regarding the condition of level crossings in these 3 locations.

Figure 5. Research flow chart



- Observation survey of railroad crossing at Merdeka Street location

Figure 6. First condition view of Merdeka Street railroad crossing

Figure 7. Second condition view of Merdeka Street railroad crossing

- Observation survey of railroad crossing at Kiaracondong location.

Figure 8. First condition view of Kiaracondong railroad crossing

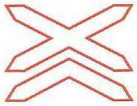
Figure 9. Second condition view of Kiaracondong railroad crossing.

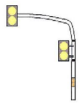
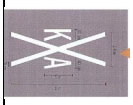
- Observation survey of railroad crossing at Andir location.

Figure 10. First condition view of Andir railroad crossing

Figure 11. Second condition view of Andir railroad crossing

Result and Analysis

No	Standards	Railroad Crossings		
		Merdeka Street	Kiara-condong	Andir
1	Warning Sign			
		X	X	X
		√	√	√
		√	√	√
		X	X	X
		√	√	X
		√	X	X
		X	X	X
		X	X	X

No	Standards	Railroad Crossings		
		Merdeka Street	Kiara-condong	Andir
		X	X	X
		X	X	X
		X	X	X
		X	X	X
b	Road Marked			
		√	X	X
c	Road Separator	X	√	√
d	Crossing Door	√	√	√

Conclusion

From the results of the observations and analyzes, several results were obtained as follows:

1. The railroad crossing on the location of Merdeka Street is consistent with the type of level crossing pointing to a 4-lane 1-way road with a double railway.
2. The railroad crossing at the Kiaracondong site is consistent with the type of level crossing pointing on a 4-lane 2-way road with a double railway.
3. The railroad crossing in the Andir location is consistent with the type of level crossing pointing on a 2-lane 4-lane road with a double railway.
4. From the results of observations and analyzes it was found that none of the three railroad crossings met the standards of Land Transportation Director General Regulation number: SK.407 / AJ.401 / DRJD / 2018, concerning Technical Guidelines for Traffic Control on Roads at Potential Accident Locations at Railroad Crossing.
5. Of the three railroad crossings the Merdeka Street railroad crossing location achieves the most completeness based on the standard.

Suggestion

From these conclusions, the authors provide the following suggestions:

1. There needs to be attention and improvement from the government regarding the completeness of signaling facilities at railroad crossings, because with the increasing number of vehicles, the risk / potential for accidents at these crossing sites will increase.
2. It is hoped that by fulfilling the standards of complete crossing, both those with doors and without doors, the number of risks / potential for accidents will be reduced.
3. Subsequent research needs to use the parameters of traffic capacity and degree of saturation as a consideration of increasing railroad crossings.
4. A scientific study of the waiting times (delay) considered acceptable by drivers at an effective railroad crossing is needed.
5. Subsequent research needs to analyze vertical alignments as a consideration for increasing railroad crossings in accordance with applicable regulations.
6. Subsequent research needs to include the parameters of visibility at the crossing.

REFERENCES

Hasan, Bani. 2009. Feasibility Evaluation of Railroad Crossings (Case Study: Patukan, Gamping, Sleman, Yogyakarta). Faculty of Civil and Environmental Engineering. Gajah Mada University. Yogyakarta.

Balitbang Research Team of Central Java Province. 2007. Research on safety and security at the Central Java Railroad Track. Semarang.

Wildan. 2013. Road Safety Study on Railroad Crossing. Postgraduate Masters in Civil Engineering UNISSULA Semarang. Semarang.

Yulisetianto, Dwi Hary.2008. Risk Analysis at a Square Crossing between Roads and Railways. Faculty of Civil and Environmental Engineering at Gajah Mada University. Yogyakarta.