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Analysis of Accident-Prone Areas on The Kalimalang Canal Inspection Road, East Jakarta

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Abstract

The number of traffic accidents that increase every year can be caused by factors such as drivers, vehicles, roads and the environment. In Indonesia, traffic accidents are one of the problems in the transportation sector. Prevention taken so far to anticipate accidents is only based on data on the quantity of accidents that have occurred. Whereas the factors or events that can cause accidents are the biggest contributor to accidents. For example, driving a vehicle in an orderly manner, driving at a speed above the average determined traffic regulation and non-standard road conditions. This research was conducted to identify accident-prone locations in an area by identifying and analyzing each segment based on point coordinates in the accident data and applying it to the AEK method. The research location is on the Kalimalang Canal Inspection road, East Jakarta which is divided into 5 segments. And these segments start from the border of Bekasi with East Jakarta to Cawang East Jakarta. The results show that the research location has the potential as an accident-prone area where the location is in segment 5 and on these roads after surveying it is found that there are several points. which do not have road markings, minimal road signs, several damaged road points, and incomplete street lighting. Which can result in traffic accidents

Keywords
Accident Prone Area, AEK, Kalimalang Channel Inspection Road.

1. Introduction

An accident is an event that occurs in a traffic movement due to an error in the traffic shaping system, namely the driver (human), vehicle, road, and the environment. (Carter and Homburger, 1978). Based on data from the World Health Organization (World Health Organization, 2013), the total number of victims who die from road traffic accidents worldwide reaches 1.24 million per year. In 2012, 27,700 people died in the European Union due to road accidents, around 313,000 were seriously injured and many more suffered minor injuries (European Transport Safety). In the Global Status Report on Road Safety, it is stated that every year, worldwide, more than 1.25 million victims die from traffic accidents and 50 million people are seriously injured. Of this number, 90% occur in developing countries where the number of vehicles is only 54% of the total registered vehicles in the world. (World Health Organization, 2015) Every year 1.35 million people are recorded as being killed by traffic accidents worldwide. This means that every 24 seconds one person loses his life on the streets around the world (World Health Organization, 2018).

Traffic accidents tend to increase and are still a major problem in the implementation of road transportation in Indonesia (Gito sugiyanto, 2017) . Accidents on a road can occur not only due to the condition of the road but the condition of the road users which can also affect the occurrence of a traffic accident (Warpani, 2001). in Indonesia, an average of 3 people dies every hour due to road accidents. The data also states that a large number of accidents was caused by several things, namely: 61% of accidents were caused by human factors, namely those related to the ability and character of the driver, 9% were due to vehicle factors (related to meeting roadworthiness engineering requirements) and 30% caused by infrastructure and environmental factors. (Korlantas Polri, 2017).

in East Jakarta, there were 1,022 traffic accidents occurred throughout 2018. Of these, 1,191 people became victims. "Data was taken until December 16, 2018. There were 1,022 accidents with 1,191 victims. (Korlantas Polri, 2017)

The identification of problems in this study is that road infrastructure has not been fulfilled or adequate, lack of road signs and markings, inadequate lighting, and lack of facilities for pedestrians.

The purpose of this study is to determine the accident-prone areas, determine the causes of accidents on the Kalimalang Channel Inspection road section and provide solutions in handling accidents on the Kalimalang Channel Inspection road section.

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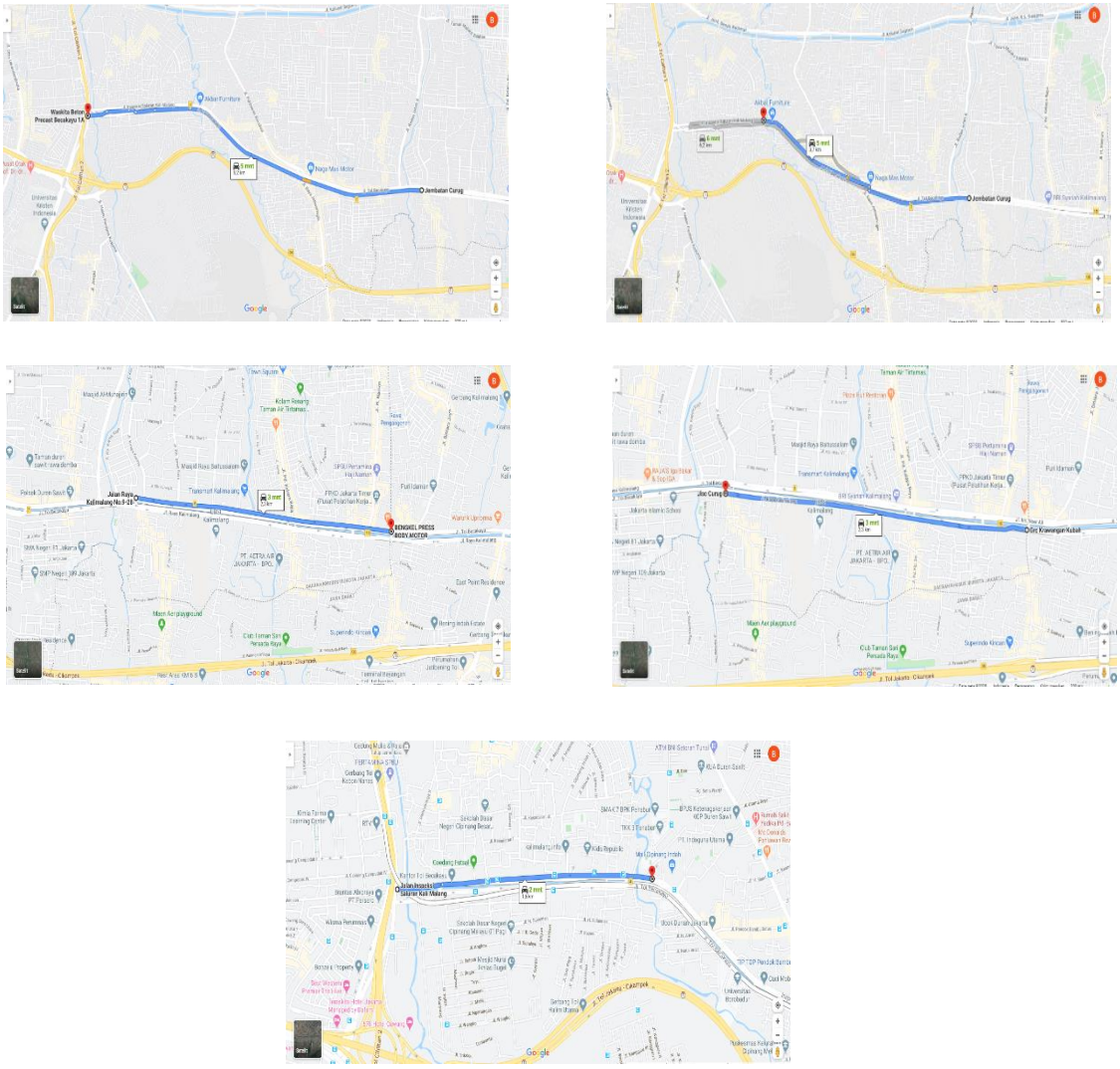

Figure 1. Segment 1 to Segment 5 Research Locations
Source: Personal Data, 2020

2. Methodology

The analytical method used is a quantitative method that functions to calculate the number of conflicts that occur at the research location. Where this method consists of several stages, namely:

a. preparations that discuss preliminary surveys,
b. the data collection stage that discusses how to collect data
c. analysis stage that discusses the calculation of traffic volume, vehicle speed and the existing road completeness.

The data required in this study include accident data in the last 4 years, and data from the survey results (traffic volume, vehicle speed, and road completeness) at the site.

3. Results and Analysis

3.1. Accident Incident Data

The accident data contains the types of accidents that occurred on the Kalimalang Canal Inspection road in 2016 - 2019 which consists of 7 table conflicts 1.

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Table 1. Accident Incident Data

No	Accident Type	Year				Total
		2016	2017	2018	2019	
1	Single	1	1		1	3
2	Front - Front	2	2	4	1	9
3	Front - Back	1	11	12	7	31
4	Front - Side	1	1	2	1	5
5	Side - Side			1		1
6	Streak					
7	Human Hit		7	2		9
	Total	5	22	21	10	58

Source: Personal Data, 2020

Based on table 1, it is found that front-to-back conflicts were the most frequent with 31 conflicts.

3.2. Segment Accident Data

This data contains the coordinate segment of Kalimalang Channel Inspection Road, stretching from the coordinate point 6.249803,106.943.620 - 6.239975,106.878983 which is 7 km long. The data is divided into 5 segments to be included in the AEK calculation method

Table 2. Segment Accident Data

Year	Victims			Number Of Victims	Material Loss (Rp)
	Md	Lr	Lb		
2016	1	8	3	12	11000000
2017	1	13	13	27	20300000
2018	2	18	3	23	131200000
2019	2	8	1	11	13300000
Total	6	47	20	73	175800000

Source: IRSMS Data, 2020

No	Segment		Long Road	Victims				Value	Loss
	Start	Finish	(KM)	MD	LB	LR	Objects	AEK	(Rp)
1	-6.249.641	-6.247.585	2,3 KM	0	2	17	17	74	94100000
2	-6.250.094	-6.248.226	2,3 KM	2	4	14	13	91	42500000
3	-6248022	-6239348	3,7 KM	0	1	0	1	4	500000
4	-6.248.022	-6.240.403	5,2 KM	3	3	13	18	102	25500000
5	-6.248.022	-6.239.907	5,4 KM	1	0	3	4	25	17000000

Source : Personal Data, 2019

After grouping per segment and done with the aek method in get the chart that can be seen on chart 1.

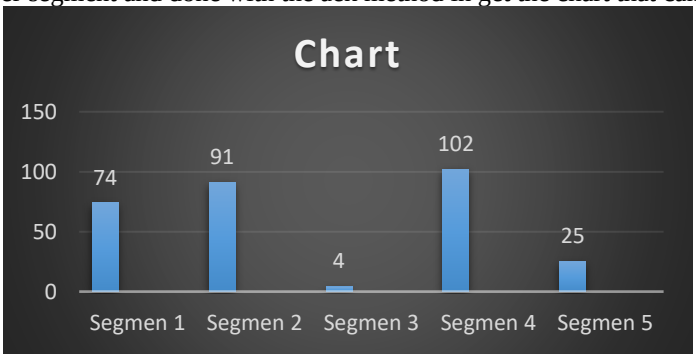

Figure 2. Chart After grouping
Source : Personal Data, 2020

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Based on table 2 and table 3, the calculation results of accident-prone areas and it is found that segment 4 is an accident-prone area with an AEK value of 102.

4. Conclusion

Traffic accident fatality rates can be reduced by addressing road infrastructure safety deficiencies. This study aims to identify accident-prone areas and assess the handling efforts to minimize the chance of accidents occurring. The parameters used to determine the study location are based on the AEK value and the fatality rate. The results of the study can be summarized as follows:

1. The location of the study, namely the Kalimalang Channel Inspection Road section of East Jakarta (from Bekasi City to Cawang) after a survey and calculation using the AEK method, resulted that this location has the potential to cause accidents. Thus, this method can be used to improve the safety and security of road users.
2. After performing calculations on each segment and it is found that segment 4 is an accident-prone area with a value of AEK 102 with a total of 19 accidents and a total material loss of 25500000 and with an average speed on site is 32.16 Kph
3. To reduce conflict, some things that can be done are:
   a. Painting new markings so that each vehicle from the opposite direction remains on its track and lane.
   b. Addition/update of traffic signs because many signs are outdated/unfit.
   c. The addition of street lighting because there are still locations that are not fully lit by lighting
   d. Repair of hollow and damaged roads in order to minimize accidents.

Based on the above conclusions, expect the handling of accident -prone areas to be taken seriously because with the number of casualties and material losses above is not a small number and should be of particular concern

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