Characteristics of Traffic Accidents in Jalan Tol Surabaya-Porong, Jawa Timur

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ABSTRACT

The main problem in transportation besides traffic congestion is the high level of accidents both in big cities and rural areas. Traffic accidents are one of the biggest causes of death in Indonesia. There are several factors that cause an enhancement in the level of accidents, like environmental conditions, driver behavior, traffic characteristics and vehicles. Due to the large number of victims, it has an economic impacts (losses) and social problems. The various efforts that related parties is to improve traffic facilities, but the results have not been as expected. PT Jasa Marga as the Indonesian Government provide the primary and secondary data that were obtained directly from the field, based on traffic accident data on the Surabaya - Porong Toll Road from 2015 - 2018, traffic volume data, and road load data. This research characterized the traffic accidents in Jalan Tol Surabaya-Porong Jawa Timur to evaluate the main factor happened between 2015-2018 to plan the solution reducing the accident number. The identification of the problem is the driver who is not disciplined in traffic and ignores the feasibility of the vehicle. The efforts of reducing the level of accidents carried out the addition of facilities for resting areas, supervision and firm action against undisciplined road users, counseling the public about how good traffic is. Overall minor injuries were the highest number followed by major injuries and fatalities. The factors that influence the occurrence of accidents are humans as the driver being the highest factor, followed by vehicles, environment and roads. The time when most accidents occur is 00.00 -06.00, then 12.00 - 18.00 becomes the second time most occurs. Furthermore, working days are the days that have the most accidents compared to holidays.

Key words : Surabaya - Porong Toll Road, Traffic Accident, Identification, Effort.

1. INTRODUCTION

Road traffic accidents are avoidable events which are increasing in frequency day by day. According to a report of WHO, the road accidents are facing a growing trend and there will be an 80% increase in accidents from 2000 to 2020 [1] [2].

Nowadays, road accidents as critical of any other health disease is proved as a top ten contender of human health problems and a threat to the lives of the general public. Most of the road accidents occur in developing countries, one of developing countries that has the highest accident rates is Indonesia. The police reported that in 2017 there were 101,022 cases of traffic accidents, while in 2018 there were 103,672 cases. road accidents increase relatively from year to year [3]. As reported by [4] in 2016 as many as 463 people died. Then in 2017 it decreased to 29,810 people died and in 2018 to 27,910 people died. The Ministry of Health reported in 2017 state that an average of 3 people died every hour due to road accidents. The data also defined that the large number of accidents is caused by several things, namely: 61% of accidents are caused by human factors which are related to the ability and character of the driver, 9% is due to vehicle factors (related to meeting roadworthiness technical requirements) and 30% caused by infrastructure and environmental factors [5].

Road accident data analysis as a perspective of engineers revolves has the two major factors: (i) traffic characteristics and (ii) geometric design. Because of that reason, the hotspot identification of accident-prone locations remains a focal point of interests for transportation engineers. Different methods were applied to locate the risky road segments to be treated for safety level enhancement. Motorways and highways remained a major target of analysis of safety improvements for safety scientists. Researchers [6] [7] not only explored the road accidents model development for prediction and analysis, but also discussed the low and higher cost treatments to solve the safety problems [8]. This study focuses to determine the factors that cause traffic accidents that occur on the Surabaya - Porong Toll Road and to find out the characteristics of traffic accidents that occur on the Surabaya - Porong Toll Road.

Therefore, road crash is one of the most important issues facing in Indonesia road, especially in Surabaya highway at present due to the large number of fatalities and death toll. Surabaya constitute as the capital province of east java and the

second biggest city in Indonesia which is dominantly attract some vehicles way in and out. Today, many vehicles pass the toll road from one city to another since it offers high way. One of toll roads passing Surabaya is Surabaya - Porong road. Surabaya - Porong Toll Road has been operating since 1986 with a length of 37 kilometers. Previously, the Toll Road from Surabaya-Gempol had a length of 43 km, but in 2006, 6 km of toll roads were closed due to the Lapindo mudflow event. So the government is relocating the Porong-Gempol toll road, which has begun to be carried out in stages along 10 km. Nowadays, the Surabaya-Gempol Toll Road that has been cut off for 12 years due to the presence of Lapindo mud has been repaired and the length of the Surabaya-Porong toll road has been extended from 43 km to 45 km. In order to reduce the accident number, knowing the main factor of the accident can help the government to regulate the road role.

2. METHODOLOGY

Indonesia crash data was reported in the compilation of statistical data based on information obtained from traffic crashes submitted by PT. Jasa Magra for Surabaya-Porong toll road. The data from crash reports are collected periodically from POLDA (Polisi Daerah) through written crash reports submitted to PT Jasa Marga. A wide variety of crash data reporting information and accident statistical analyses regarding vehicle crashes and their contributing factors are available.

3. RESULT AND DISCUSSION

3.1 Daily traffic volume

The charts below present a data on the daily traffic volume of the Surabaya - Porong toll road. The data is useful to find out the daily traffic volume of the Surabaya - Porong toll road from 2015 - 2018 and to find out how much the daily traffic volume growth from year to year.
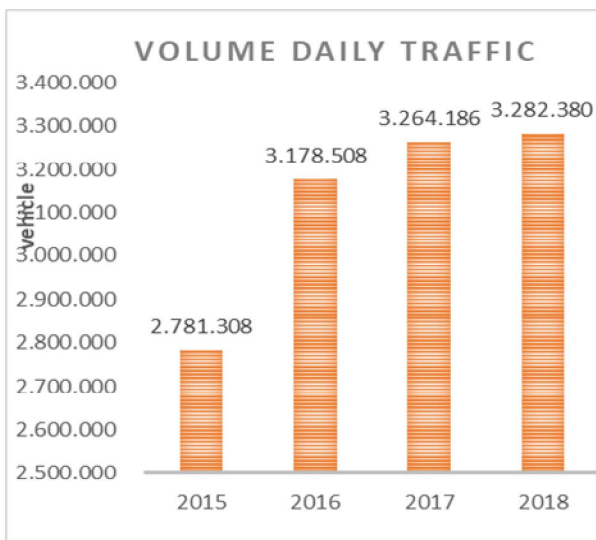
Figure 1: Volume daily traffic

In figure 1, the data presents data on average daily traffic volume from 2015 - 2018. It can be seen that the daily traffic volume of the Surabaya - Porong toll road from 2015 - 2018 continues to increase from year to year. Increasing the number of vehicles entering and exiting due to Surabaya - Porong toll road facilitates access for vehicles that want to go outside the city and makes it easier for trucks to go to Tanjung Perak.
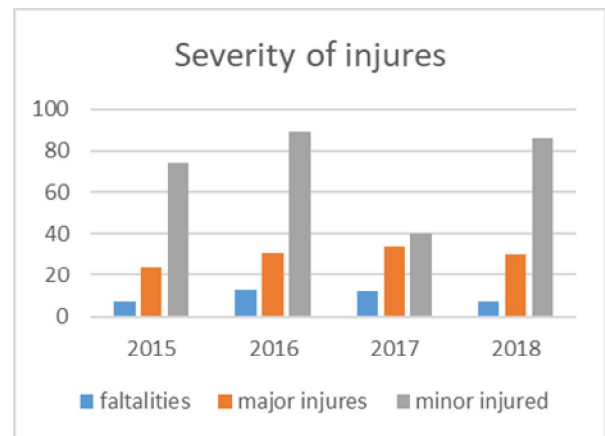
3.2 Number of Accidents
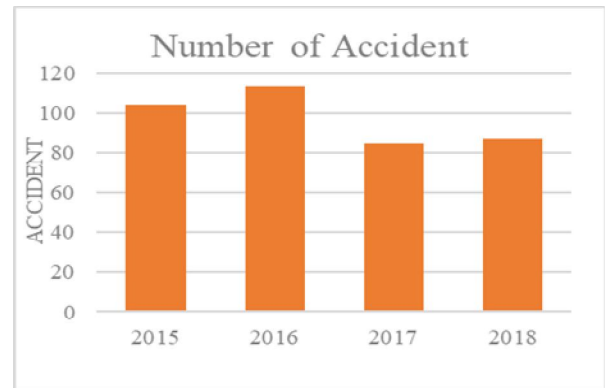
Figure 2: Number of Accident

Based on figure 2 presents data on the number of accident incidents from the year 2015 - 2018. It can be seen that the number of accidents in 2015 to 2016 has increased, while from 2016 - 2017 has decreased dramatically, while in 2017 - 2018 has increased.

3.3 Severity of injures

Figure 3: Severity of injures

Figure 3 presents the number of severities of injures that occurred during 2015 - 2018. It can be seen that the number of accidents in the last four years has increased and decreased. In terms of the number of seriously injured victims showed an increase from 2015 - 2017 and in 2017 to 2018 decreased. As for the minor injuries and death victims experienced an increase and even heredity.

3.4 Factors Causing Traffic Accidents
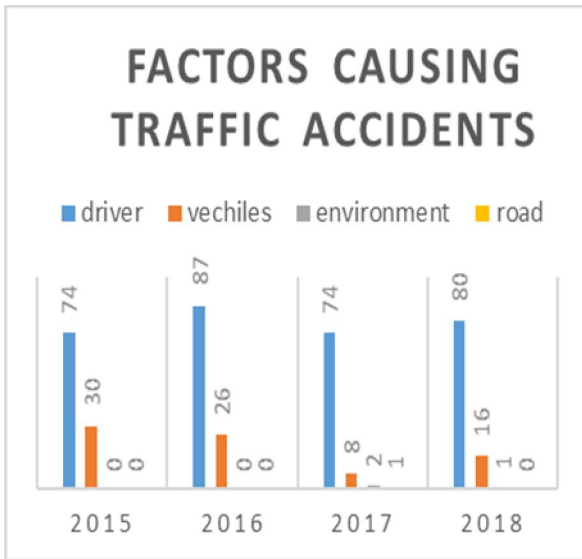
Figure 4: Factors causing traffic accidents

The causes of traffic accidents have various factors namely, vehicles, humans as drivers, roads, and the environment. The data on the causes of accidents below are reported by PT Jasa Marga (Persero) for the Surabaya - Porong toll road. The data below is useful to find out the number of accidents on the Surabaya - Porong toll road based on the causal factors from 2015 - 2018 and also to know the growth each year as shown in figure 4.

3.5 Time of Accident
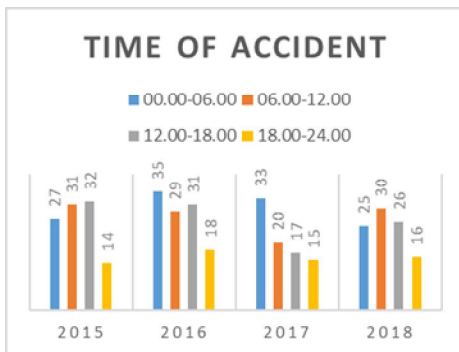
Figure 5: Time of Accident

Based on figure 5 shows that the time interval of accidents around 00.00 - 06.00 in 2015 - 2016 has increased, and in 2016 - 2018 has decreased from year to year. Whereas at the time of the accident around 06.00 - 12.00 and around 12.00 - 18.00 experienced a decline in 2015 - 2017 and in 2017 to 2018 experienced an increase. Whereas at the time interval of the accident around 18.00 - 24.00 for the last 4 years (2015 - 2018) has increased and decreased from year to year.

3.6 Accident Day
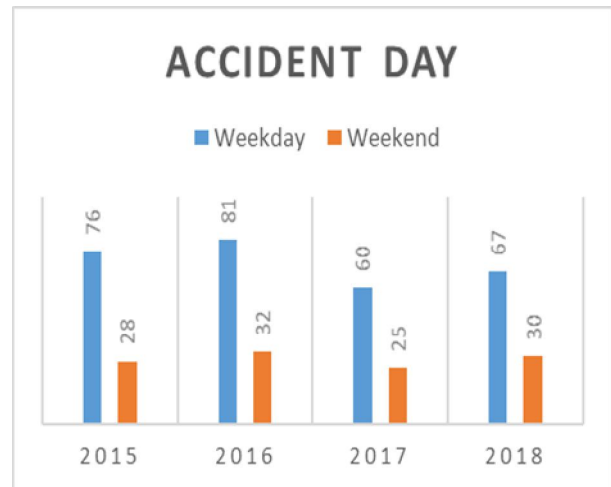
Figure 6: Accident day

From figure 6 shows that in 2015 - 2018 accidents on working days and holidays experienced an increase and decrease from year to year. The highest accident occurred on working days occurred in 2016 and the lowest occurred in 2017. While the highest accident occurs on holidays, namely in 2016 and the lowest occurred in 2017.

3.7 Weather Conditions
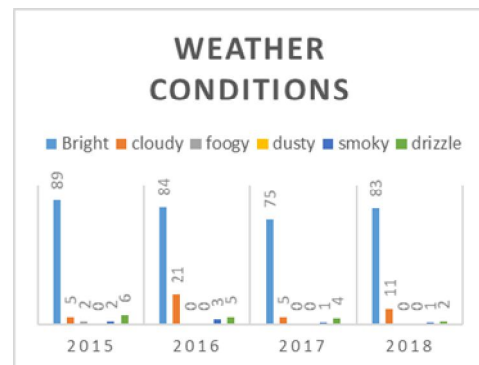
Figure 7: Weather conditions

In figure 7 the highest number of accidents occurs during sunny weather. It can also be seen that in 2015 - 2017 the condition of sunny weather has decreased every year, and in 2017 - 2018 experienced an increase. Whereas in the drizzling and heavy rain conditions it decreases every year.

4. CONCLUSION

The characteristic of road accidents in Surabaya Porong toll road form of statistical data was carried out in this research. The number of vehicles in and out the Surabaya toll road every day has increased from year to year. Therefore, the number of traffic accidents in Surabaya Porong showed a significant increase between 2015- 2018. Overall minor injuries were the highest number followed by major injuries and fatalities. The factors that influence the occurrence of accidents are humans as the driver being the highest factor,

followed by vehicles, environment and roads. The time when most accidents occur is 00.00 -06.00, then 12.00 - 18.00 becomes the second time most occurs. Furthermore, working days are the days that have the most accidents compared to holidays. Hence, Governments need to take action to address road safety in a holistic manner, which requires involvement from multiple sectors, addressing the safety of roads, vehicles, and road users themselves.

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