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Article

Analysis of Traffic Accident Characteristics on the Pekanbaru-Bangkinang Highway KM 20-60, Kampar Regency

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A B S T R A C T

Based on the Kampar Police traffic accident report data, on the Pekanbaru - Bangkinang KM 20 - 60 highway section, there have been many cases of traffic accidents that have caused material losses, minor injuries, serious injuries, and death. This study aims to determine and identify the causal factors and characteristics of traffic accidents. The method used in this research is descriptive qualitative method based on primary data from direct observation and secondary data obtained from relevant agencies, namely the Kampar Traffic Police related to traffic accidents. The results of the analysis show that on the Pekanbaru - Bangkinang KM 20 - 60 highway section can be identified The results of the analysis according to the 2018 - 2022 data show that based on the time of occurrence the most frequent accident is at 14.00 - 16.00 WIB with 50 accidents. Based on the vehicle involved, it is known that the most frequent accidents are caused by motorbikes - motorbikes as many as 76 incidents. the number of accident victims is 320 people where 65 people died, 67 people were seriously injured, 188 people were slightly injured. Most accident involvement is teenagers aged 15-20 years. This shows that at that age there is still a lack of awareness of driving knowledge. From the analysis, it is also known that 218 traffic accidents occurred on the Pekanbaru - Bangkinang KM 20 - 60 highway section (2018 - 2022), 207 traffic accidents were caused by human error/factors, 6 accidents were caused by road factors, 4 accidents due to vehicle factors and 1 accident due to environmental factors.

1. Introduction

Kampar Regency, Riau Province, continues to experience development as a result of rapid socio-economic growth. Consequently, the need for adequate transportation infrastructure to support economic operations tends to increase annually (Adeswastoto, 2021).

In Law No. 22 of 2009 concerning traffic and road transportation, it is explained that for safety, security, order and smooth traffic flow as well as ease of use of roads, roads must be equipped with: signs, road markings, road user safety devices, and supporting facilities for traffic activities. A good level of safety on the road will make people as users feel safe to carry out travel activities such as work, trade, school or go on recreation. If the level of safety is guaranteed, it will certainly be able to reduce or eliminate the number of accidents in traffic.

Based on the recapitulation of traffic accident report data from the Kampar Police, on the Pekanbaru - Bangkinang highway KM 20 - 60, there have been many traffic accident cases in the last 5 years (2018 - 2022) which caused 218 accidents. Of these 218 accidents, there are data that 65 people died, 67 people were seriously injured, 188 people were slightly injured and resulted in total material losses of around 1,072,000,000.00 (one billion seventy-two million rupiah). From the data and conditions above, it is necessary to conduct a study in the form of analysis so that it can become or provide input to the relevant authorities as policy makers about how large the number of accidents is in terms of traffic volume, road length, and also areas prone to accidents. To further strengthen this input, it is necessary to carry out analytical actions using data and facts found in the field and conditions in the last few years.

2. Literature Review

2.1 Understanding Traffic Accidents

According to Law No. 22 of 2009, a traffic accident is an unexpected and unintentional event that occurs on a highway involving vehicles with or without other road users, resulting in human casualties, property damage, or both. These accidents usually involve elements of unintentionality and unpredictability, and can be shocking and traumatizing for those who experience them. An accident is considered fatal if it results in loss of life. Traffic engineering to improve traffic safety is indeed expensive, but the price paid for accidents is also very high. Damage or loss of property can be calculated nominally, but the loss of life cannot be valued in rupiah. (Supiyono, 2018)

2.2 Factors Causing Traffic Accidents

A traffic accident is defined as an event caused by one or more factors. (Iqbal 2021).

The main factors that cause accidents are:

1. Road Users
   a. Driver

According to the Ministry of Transportation of the Republic of Indonesia (1993), as part of the implementation of the Traffic and Army Law, a Driver is a person who directly supervises prospective drivers who are learning to drive a car or a person who drives a car.

   b. Pedestrians

People who walk on pedestrian paths, whether on the side of the road, sidewalk, or crossing area, or special paths, are called pedestrians. According to Ambarwati (2018), pedestrians are people who walk on the road without using any assistance (in this case, a vehicle).

   c. Other Road Users

Other road users include street vendors, security officers, traffic sign repair officers, and officers who handle road facilities such as gas, electricity, water, and telephone.

2. Vehicles

Vehicle-related accidents are usually caused by several factors, including: rapidly deteriorating vehicle components, such as brakes, engines, lights, tires, and other components, or even the front and rear bumpers. Vehicle loads exceeding the applicable limits.

3. Road

The likelihood of traffic accidents can be greatly influenced by the characteristics and conditions of very poor roads, such as potholes, inappropriate road alignment and geometry, and inadequate lighting. Damaged roads can cause accidents, both serious and minor, but rarely result in fatalities. (Nawir, 2021).

4. Environment

Environmental factors contribute to traffic safety, both in the natural environment and in the built environment (man-made). For example, trees obstructing visibility, steep inclines, and declines. Furthermore, weather changes significantly impact road users, particularly drivers, in controlling their vehicles, although this influence is not as significant as that of road user factors. (Supiyono, 2018)

2.3 Types of Traffic Accidents

According to Wijaya (2016), there are five types and forms of accidents:

1. Accidents based on the number of victims
2. Accidents based on the location of the incident
3. Accidents based on the time of the incident
4. Accidents based on the location of the accident
5. Accidents based on the number of vehicles involved

3. Research Methodology

A qualitative descriptive method was used to conduct this research. The initial step before

conducting the research was to locate and prepare research materials to explore new theories and research approaches for data collection and analysis related to the topic to be discussed. After preparation, data needs were identified. The identification revealed the need for primary and secondary data. Primary data was collected through a survey of the locations being reviewed. Secondary data was obtained from the Kampar Regency Police Traffic Unit, specifically accident reports from 2018-2022 for the Pekanbaru-Bangkinang highway section, KM 20-60.

During data collection, observation techniques were used to obtain accurate information based on the results of direct observations at the research site, including daily traffic data and road geometry. The data were then calculated and analyzed. The results and discussion were simplified in tables and figures. The final results will be summarized and recommendations provided to the authorities (Dishub/Satlantas) to minimize traffic accidents on the Pekanbaru-Bangkinang road section, KM 20-60.

4. Results and Discussion

4.1 Traffic Accident Data

The following is a table for traffic accident data:

No	Desa/Daerah	KM	Tahun					Jumlah
			2018	2019	2020	2021	2022	
1	Rimbo Panjang – Sungai Pinang	20 – 25	3	8	5	8	6	30
2	Sungai Pinang – Danau Bingkuang	25 – 33	8	10	17	10	10	55
3	Danau Bingkuang – Kampar	33 – 38	6	5	1	5	7	24
4	Kampar – Koto Tibun	38 – 43	7	7	5	3	7	29
5	Koto Tibun – Air Tiris	43 – 48	2	6	3	5	14	30
6	Air Tiris – Batu Belah	48 – 55	1	6	4	7	8	26
7	Batu Belah – Bangkinang	55 – 60	10	5	-	5	4	24
		Jumlah	37	47	35	43	56	218

Figure 1 Number of Accident Frequency Based on Location

From the table above, it can be seen that the highest accident frequency of 218 incidents over 5 years (2018 – 2022) based on region is as follows:

1. Sungai Pinang – Danau Bingkuang KM 25 – 30 with 55 accidents.
2. Rimbo Panjang – Sungai Pinang KM 20 – 25 with 30 accidents.
3. Koto Tibun – Air Tiris KM 43 – 48 with 30 accidents.
4. Kampar – Koto Tibun KM 38 – 43 with 29 accidents.
5. Air Titis – Batu Split KM 48 – 55 with 26 accidents.
6. Lake Bingkuang – Kampar KM 33 – 38 with 24 accidents.
7. Batu Belah – Bangkinang at KM 55 – 60 with 24 accidents.

4.2 Factors Causing Traffic Accidents

The following data on the factors causing traffic accidents on the Pekanbaru-Bangkokinang highway, km 20-60, was obtained from the Kampar Police Traffic Unit. Of the 207 accidents, 6 were caused by human error, 6 by road factors, 4 by vehicle factors, and 1 by environmental factors.

No	Penyebab Utama		Total
1	**Faktor Manusia**		
	A.	**Kondisi Fisik Pengemudi/Kesehatan**	
		- Mengantuk atau Lelah	4
		- Lengah	1
		- Kurang Antisipasi dan kurang Penglihatan	2
	B.	**Pejalan Kaki dan Pengemudi Sepeda**	
		- Kurang hati – hati sewaktu menyeberang jalan	5
		- Tidak berhati hati sewaktu keluar dari gang/masuk ke jalan	1
	C.	**Pengemudi Mobil Penumpang**	
		- Menyalip kendaraan dengan memaksa	12
		- Mendahului di tikungan	3
		- Kecepatan tinggi	20
		- Tidak berhati hati sewaktu keluar dari gang/masuk ke jalan	3
		- Berhenti di bahu jalan	2
		- Hilang kendali	3
		- Melawan arus	1
	D.	**Pengemudi Sepeda Motor**	
		- Melawan arus	9
		- Mendahului ditikungan	3
		- Tidak menjaga jarak iring	7
		- Kecepatan tinggi	52
		- Menyalip kendaraan dengan memaksa	23
		- Tidak berhati hati sewaktu keluar dari gang/masuk ke jalan	42
		- Hilang kendali	1
	E.	**Pengemudi Truk/Bus**	
		- Menyalip kendaraan dengan memaksa	3
		- Tidak berhati – hati saat keluar masuk jalan	2
		- Tidak hati – hati saat berbalik di *U-turn*	5
		- Parkir di bahu jalan	3
2	**Faktor Kendaraan**		
	A.	Rem tidak berfungsi	1
	B.	Lampu tidak ada	3
3	**Faktor Jalan**		
	A.	Jalan Licin dan Bergelombang	1
	B.	Jalan rusak dan Berlobang	5
4	**Faktor Lingkungan**		
	A.	Pasar/Pusat Keramaian	1
	B.	Pemukiman/ Industri	-

Figure 2 Causes of Traffic Accidents

4.3 Accidents Based on Time of Incident

Distribution of traffic accidents on the Pekanbaru-Bangkinang highway over five years based on the time of occurrence, namely variations in the hours of the day (24 hours). The time variation is shown in the diagram. Based on the time of occurrence, seen from the variations in the hours of the day (24 hours), it can be seen that the highest rate of traffic accidents occurred at:

1. 2:00 PM – 4:00 PM WIB with 50 accidents,
2. 6:00 PM – 10:00 PM WIB with 41 accidents
3. 10:00 AM – 2:00 PM WIB with 40 accidents.
4. 6:00 AM – 10:00 AM WIB with 31 accidents
5. 10:00 PM – 2:00 AM WIB with 27 accidents
6. 2:00 AM – 6:00 AM WIB with 26 accidents.

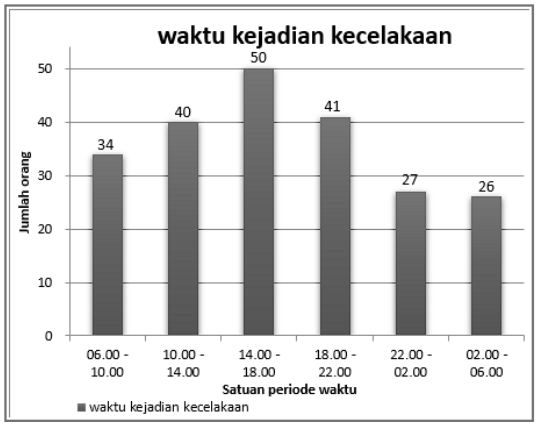

Figure 3 Accidents by Time of Incident
Source: Kampar Police Traffic Unit data summary

4.4 Accidents by Vehicle Type

No	Jenis kendaraan yang terlibat	Tahun					Jumlah
		2018	2019	2020	2021	2022	
1	Mobil penumpang – sepeda motor	6	11	9	8	17	51
2	Truk/bus – Sepeda motor	7	10	9	8	5	39
3	mobil penumpang – m.penumpang	-	4	-	2	2	8
4	Truk/bus – Mobil penumpang	1	-	2	1	3	7
5	Truk/bus – truk/bus	-	-	-	2	1	3
6	Sepeda motor – Sepeda motor	16	14	11	14	21	76
7	Sepeda motor – Pejalan kaki	2	2	-	1	3	8
8	Sepeda motor – Sepeda	-	-	-	1	-	1
9	Mobil penumpang - Pejalan kaki	2	1	-	1	-	4
10	Pick up – sepeda motor	3	4	3	2	2	14
11	Truk/bus – pick up	-	1	-	2	2	5
12	Pick up – Pejalan kaki	-	-	1	-	-	1
13	Mobil Penumpang kesalahan sendiri	-	-	-	1	-	1
Jumlah		37	47	35	43	57	218

Figure 4 Accidents by Vehicle Type

4.5 Accidents Based on Victims

From the table it can be shown that the largest number is categorized from vehicles involved in the Pekanbaru – Bangkinang KM 20 – 60 Kampar Regency road section for five years. It can be seen that the most frequent accidents are caused by motorbikes – motorbikes, motorbikes – passenger cars and motorbikes – trucks/buses, which are the vehicles that most often experience collisions.

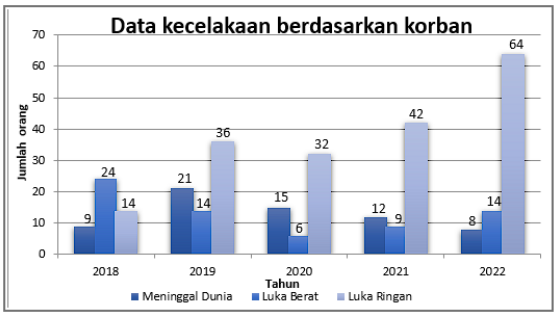

Figure 5 Number of Accident Victims

The classification according to age of the 477 people who were victims of accidents on the road section studied can be seen in the following graph.

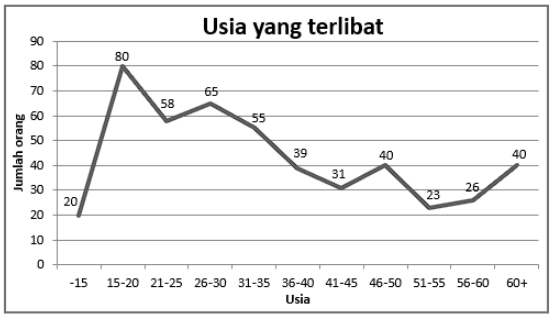

Figure 6 Classification Based on Age Involved in Accidents

4.6 Description of Traffic Accident Prone Locations

Based on research findings and discussions, an analysis was obtained of locations prone to traffic accidents on the Pekanbaru-Bangkinang highway which are prone to accidents at Km 20 to Km 60.

1. Bending Road

Researchers conducted field observations on bends on Class I arterial roads and found that the bends had limited visibility for drivers and some road widths were less than the minimum requirement of 7 meters. The following is a description of these locations.

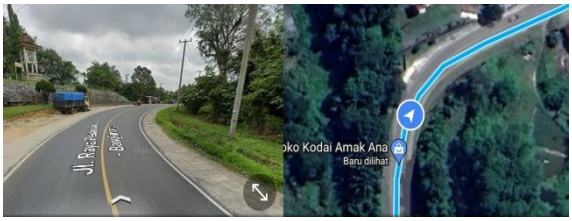

Figure 7 Accident-Prone Area KM 52

Location Description:

At kilometer 52 of Simpang Kubu Village, the road conditions include a bend that limits driver visibility due to trees. Furthermore, there is a lack of traffic signs in the area, and road markings are present.

2. Crossroads

Intersections often cause accidents because they are the meeting point for vehicles from different directions. Furthermore, some of these locations are equipped with traffic lights, while others are not. The majority of accidents at intersections along the Pekanbaru-Bangkinang highway, between KM 20 and 60, are caused by drivers being careless and not taking precautions when crossing, exiting, and entering the road. Therefore, pedestrians should exercise caution and reduce speed when entering intersections. Here are some locations:

Figure 8 Accident-Prone Area KM 35

Location Description:

At KM 35 of the Danto Intersection in Koto Prambahan Village, the road conditions are a four-way intersection with no traffic signs, no visible road markings, and the straight main road, which causes many drivers to drive at high speeds in this area.

3. Roads with Dense Residential Areas and Busy Centers

The Pekanbaru-Bangkinang highway, between km 20 and 60, is home to numerous residential areas, schools, and markets. During peak hours from morning to evening, local community activities create crowds, affecting traffic. Market activity in several locations, such as Air Tiris, Kampar, and Bingkuang Lake, often causes congestion. This busy environment and crowding contribute to the frequent occurrence of traffic accidents on this stretch of road.

Figure 9 Accident-Prone Area KM 50

Location Description:

Based on direct field observations, KM 50 is a busy area due to the presence of the Air Tiris market. Vehicles are frequently parked on the shoulder of the road, constricting traffic flow.

4. Potholed Road

Based on direct field observations, the road from Rimbo Panjang to Sungai Pinang is relatively straight. This causes drivers to consistently drive at high speeds. However, several points on this stretch of road are riddled with potholes. If drivers are not prepared for potholes, they are at risk of losing their balance. Therefore, drivers must exercise caution when driving.

Figure 10 Potholed Road in Rimbo Panjang Village

5. Conclusion

The analysis results according to 2018-2022 data show that based on the time of incident, the most frequent accidents occur between 2:00 PM and 4:00 PM WIB with 50 accidents. Based on the vehicles involved, it is known that the most frequent accidents were caused by motorcycles - motorcycles as many as 76 incidents. The number of accident victims was 320 people, of which 65 people died, 67 people were seriously injured, and 188 people were slightly injured. Most of the accidents involved teenagers aged 15-20 years. This shows that at that age there is still a lack of awareness of driving knowledge.

From the analysis results of 218 traffic accidents on the Pekanbaru – Bangkinang highway KM 20 – 60 years (2018 – 2022), 207 traffic accidents were caused by human error/factors, 6 accidents were caused by road factors, 4 accidents were due to vehicle factors and 1 accident was due to environmental factors.

It is important to improve driving skills and knowledge of road traffic discipline, as well as awareness of personal safety by wearing helmets on motorcycles and seat belts for car drivers. In addition, traffic education is provided, such as obeying traffic signs and not driving above the recommended speed limit.

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