The Identification of Characteristic, Cause, and Disaster Management of Traffic Accident at the Sungailiat – Belinyu Road

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Abstract

This study aims to identify the characteristic, cause, and disaster management of traffic accidents at the Sungailiat – Belinyu road. The research method used is descriptive quantitative. Data collection techniques is in the form of documentation and observation. The data collected then analyzed using data analysis techniques with classification methods. Based on the research done, the results obtained are the accidents that occur on Jalan Raya Sungailiat - Belinyu are the most common in Riau Silip District with a percentage of 59.8%. The accidents characteristics on Sungailiat - Belinyu road based on the time of the incident, mostly occurred during the afternoon to evening at 12.00 - 17.59 WIB and in the evening at 18.00 - 23.59 WIB. Based on the type of collision, the most common types of collisions are frontal collisions by 30% and collisions due to loss of control by 26.6%. Based on road users, road users who are most involved in accidents are motorcycles by 40%, cars by 23.3%, dump trucks by 10%, and the other vehicles in a small percentage. As for the factors causing the accident, it was found that the accident was caused by road users (73.33%), road factors (23.33%), and environmental factors (6.66%). The handling of accident management is arranged according to the causative factors that are done before, when it occurs, and after an accident occurs as an effort to reduce the risk of accidents on the Sungailiat – Belinyu road, Bangka Regency.

Keywords: *Accident; Sungailiat - Belinyu*

A. Introduction

Government performance can be seen from the life expectancy indicator. A high life expectancy indicates that the government in a country has been able to provide people's welfare, whereas a low life expectancy is a signal of the low level of services and facilities received by the society. Life expectancy is related to the health status of the population of a country. In a sense, the quality of health determines the age of the population to live up to the maximum age. High quality of health will lead to high life expectancy. On the other hand, the poor quality of population health will lead to high mortality rates.

However, the mortality rate is not only determined by health factors, but there are also many other factors that can cause death. One of the factors that causes the high mortality rate is the disaster. According to Nur Hafizah, Azlinda, and Noremy (2018), a disaster is an event that causes the destruction of property and life. Natural disasters cost lives such as earthquakes, tsunamis, liquefaction, and so on. The death from social disasters is inevitable from a war or ethnic and religious conflict. Non-natural disasters also cause

high mortality rates. One of the non-natural disasters that contributes to the high death rate in Indonesia is traffic accidents.

WHO in the Ministry of Communication and Information Technology of the Republic of Indonesia revealed that 1.25 million people died due to traffic accidents and 50 million people were seriously injured in 2015. Thus, accidents contribute to the low life expectancy. Accidents as a disaster can be avoided, as well as the low life expectancy due to accidents can be overcome. The results of research by Jihwook Bahk & Kyunghee Jung Choi (2020) revealed that Korean life expectancy increased from 1998 to 2017. The main factors driving the increase in life expectancy were avoidable causes such as cerebrovascular disease and traffic accidents. Other research results from Cervantes & Montano (2016) found a decrease in deaths from traffic accidents and other accidents in Mexico.

Accidents often occur in developing countries that use motorbikes as private transportation. Nunud Nurdjanah (2010) found that the increasing growth of motorcycles resulted in an increase in the high number of traffic accidents. According to the Ministry of Communication and Information of the Republic of Indonesia, an average of three people die every hour due to accidents. This disaster that created many victims also happened in Bangka Belitung. Bangka Belitung is an area that is relatively safe from natural and social disasters. However, deaths from non-natural disasters cannot be avoided from traffic accidents. Traffic accidents in Law Number 22 of 2009 concerning Road Traffic and Transportation, in article 1 it is explained that a traffic accident is an event on the road that is unexpected and unintentional involving a vehicle with or without other road users resulting in human casualties and/or property loss.

Table 1. Traffic Accident Cases in 2017 Bangka Belitung Province

No	District	Number	Disaster Risk			
			Died	Serious Injury	Minor Injury	Material Loss
1.	West Bangka	39	34	24	20	232.120.000
2.	Bangka	62	40	52	51	385.400.000
3.	Pangkal pinang	35	21	23	21	150.800.000
4.	Belitung	14	18	4	14	94.800.000
5.	Central Bangka	40	33	32	23	284.750.000
6.	East Belitung	13	12	4	12	131.000.000
7.	South Bangka	21	20	12	21	297.000.000
Total		21	20	12	21	1.466.862.000

Source: Directorate of Traffic Bangka Belitung

From the data in table 1 above, the area experiencing non-natural disasters in the form of traffic accidents is the highest in the Bangka Regency area. The high number of traffic accidents in Bangka Regency occurred not only in 2017, but also in the previous three years, which are 75 cases in 2014, 67 cases in 2015, and 58 cases in 2016. Traffic accidents in Bangka Regency each year have increased, it was recorded that in 2019 there were 66 accidents and 31 of them died (http://bappeda.bangka.go.id/ accessed 23 June 2021 at 08.23 WIB). From Diskominfo Bangka, data on Accident-Prone Areas in Bangka Regency is obtained as follows:

1. Sungailiat-Belinyu Road

2. Merawang Road

3. Pudding-Bakam Road

4. Kemuja, Petaling and Kudai Villages

5. Jendral Sudirman Road

Sungailiat – Belinyu road ranks first as the road that has claimed many lives in Bangka Regency. This road is a national road that connects Sungailiat with Belinyu. Sungaliat is the capital of Bangka Regency and is also the area that people pass to the capital of Bangka Belitung Province, namely Pangkalpinang. As a city center, many residents of Bangka Regency move to Sungailiat and Pangkalpinang by using the Sungailiat – Belinyu Highway access.

The mobility of the population of Belinyu District to Sungailiat District passes through the Riau Silip District. Spatially, it can be seen that Riau Silip District is the connection between Belinyu and Sungailiat. On the way from Belinyu to Sungailiat, accidents often occur in the Riau Silip area. One accident on this road is in Silip Village as the results of Jourghi's research (2019) show the Sungailiat - Belinyu road in Silip Village, Riau Silip District, categorized as a prone location with a relatively low accident rate.

This study was conducted to provide data and information on non-natural disasters, namely traffic accidents on Sungailiat – Belinyu road. The data and information are in the form of the distribution of accident-prone locations. In addition, it is to determine the characteristics of accidents, to know the factors causing accidents, and to know the management of accident prevention that occurred in this area.

B. Method

This study uses a quantitative descriptive research design. The number of research subjects was done in a purposive manner, namely intentionally to determine the total number of research subjects which met the criteria. In this way, the subjects of this study are 30 accidents taken from the number of past accidents for three years, from 2018 - 2020.

The object of this research is Raya Sungailiat – Belinyu road. The research data was obtained by data collection techniques in the form of documentation obtained from the Bangka Resort Police Traffic Unit. In addition, it also uses observation techniques to observe the condition of the road which is the object of research. In data management, the analytical technique used is the classification method to determine the location of vulnerability with low, medium, and high classifications. To provide geospatial data and information related to this research, the Geographic Information System in the form of ArcGIS 10.8 software with supervised classification analysis is used.

C. Result and Discussion

Distribution of Incident Locations

Sungailiat – Belinyu road is located in Bangka Regency. This road is a national road on Bangka Island which is the access to the northern part of Bangka. The 47.05 km long road is located in three sub-districts, namely Sungailiat District, Riau Silip District, and Belinyu District.
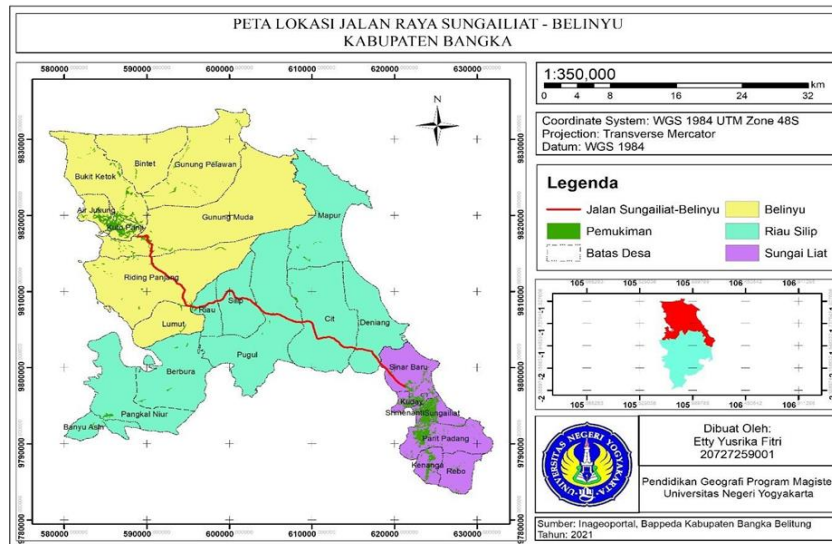
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Figure 1. Location Map of Jalan Raya Sungailiat – Belinyu

From the map in Figure 1, it is known that the number of villages passed by this road are eight villages which are as follows.

1. Sinar Baru Village, Sungailiat District

2. Deniang Village, Riau Silip District

3. Cit Village, Riau Silip District

4. Pugul Village, Riau Silip District

5. Silip Village, Riau Silip District

6. Riau Village, Riau Silip District

7. Riding Panjang Village, Belinyu District

8. Gunung Muda Village, Belinyu District

Among the three sub-districts passed by Sungailiat – Belinyu road, each sub-district which is on the Sungailiat – Belinyu road is the location of several accidents with varying frequency of occurrence.

Table 2. Location of Accidents

District	Village	Total	Percentage (%)
Belinyu	Riding Panjang	5	16,6
	Gunung Muda	4	13,3
Total		**9**	**29,9**
Riau Silip	Riau	4	13,3
	Silip	2	6,6
	Pugul	7	23,3
	Cit	3	10
	Deniang	2	6,6
Total		**18**	**59,8**
Sungailiat	Sinar Baru	3	10
Jumlah		**3**	**10**
Total		**30**	**100**

Based on table 2, the area where the most incidents occurred was in Riau Silip District with 18 cases or 59.8%, the rest occurred in Sungailiat and Belinyu Districts. The area with the fewest accidents is Sungailiat District.
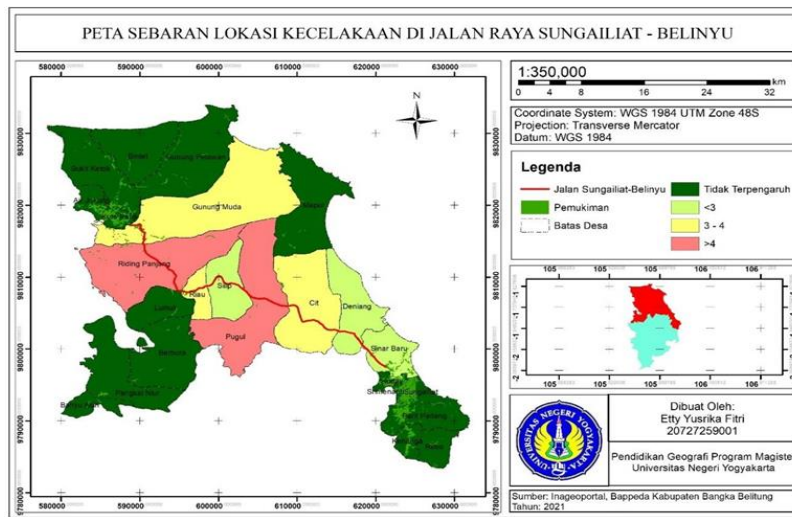

Figure 2. Map of the Distribution of Accident Locations on Jalan Raya Sungailiat – Belinyu

The impact of this accident consists of material loss and injury. Material losses reached Rp. 130,350,000.00 and for injury include Minor Injury (LR), Serious Injury (LB), and Death (MD).

Table 3. Number of Accident Victims in 2018 – 2021

Victim	Year			Total Victim	Material Loss
	2018	2019	2020		
Minor Injury	5	4	2	11	30.850.000
Major Injury	4	3	3	10	32.000.000
Died	13	11	7	31	67.500.000
Total	**22**	**18**	**12**	**52**	**130.350.000**

From the data in table 3, it is known that the most victims were those who died as many as 59.61%. In the case of death, some of the victims died on the spot and some died from serious injuries which later died in the hospital or died while on the way to the hospital. The impact of the least fatalities is the victim who suffered minor injuries with a total of 11 victims. This figure is a relative figure because from the observations there are many cases of accidents with minor injuries that are not reported to the police by the local community.

Traffic Accident Characteristics

A phenomenon has characteristics that can be studied. The characteristics of a phenomenon are not the same as other phenomena because they are in different spaces which geographically on its each space is not the same so that it produces phenomena that are not the same as other areas. Likewise, the accident phenomenon on Sungailiat – Belinyu road. In the case of an accident on Sungailiat – Belinyu road, we will discuss several characteristics, including characteristics based on the location of the incident, based on time, based on the impact experienced by the victim, based on the type of accident, and based on road users.

1. By Time and Location

The Directorate of Traffic Police of the Republic of Indonesia (Dirlantas POLRI) classifies time into two, namely the type of day and time. In this study, the time classification based on the hours of the accident was classified into four time groups as follows:

a. Early morning at 00.00 – 05.59

b. The morning at 06.00 – 11.59

c. Afternoon 12.00 – 17.59

d. Evening at 18.00 – 23.59

Table 4. Time of Accidents on Sungailiat – Belinyu Highway in 2018

No	Incident Time	Time	Location (sub-district)			Total	(%)
			Belinyu	Riau Silip	Sungailiat		
1	Early Morning	00.00 – 05.59	1	2	-	3	10
2	Morning	06.00 – 11.59	3	6	-	9	30
3	Afternoon	12.00 – 17.59	3	8	-	11	36,6
4	Evening	18.00 – 23.59	1	4	2	7	23,3
	Total		**8**	**20**	**4**	**30**	**100**

From the time of the incident above, accidents that occurred on Sungailiat – Belinyu road in a complex way occurred mostly during the afternoon and evening. However, spatially between the three sub-districts that this road passes through, there are two areas that have the same characteristics of the incident time. In Belinyu Subdistrict and Riau Silip Subdistrict, accidents often occur in the morning at 00.00 – 05.59 until afternoon at 06.00 – 11.59.
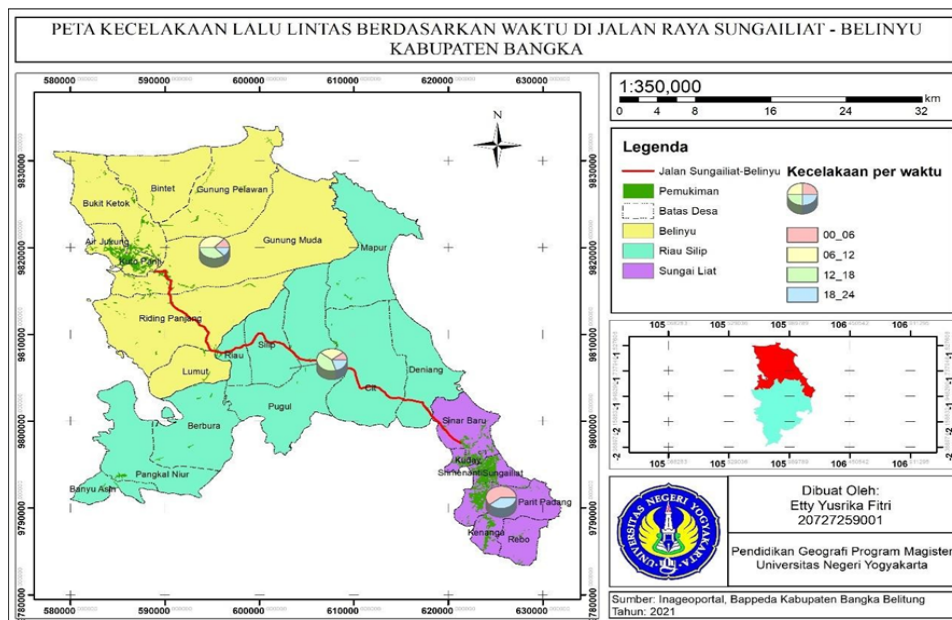

Figure 3. Traffic Accident Map by Time on Jl. Sungailiat Kingdom – Belinyu

The map in the image above presents an accident modeling on Jalan Raya Sungailiat – Belinyu, Bangka Regency based on the distribution of settlements, time, and location of the incident by village. From this map, it can be seen that accidents in Riau Silip District can occur in four time groups, as well as in Belinyu District. However, for Sungailiat Subdistrict, it occurs in two times, which are early morning and evening.

From the appearance of residential areas and observations in the field, the area crossed by Sungailiat – Belinyu Highway in Riau Silip and Belinyu Districts is a sparsely populated area, while in the Sungailiat

District area, namely the Sinar Baru village, the gateway to Sungailiat City is starting to become densely populated, so drivers are careful. Be careful when crossing roads in this area. Unlike Riau Silip and Belinyu, this area is a sparsely populated area. The settlements between villages are separated by forest with good road conditions so that motorists cross this road at high speed which causes accidents.

2. By Collision Type

Based on the type of collision, traffic accidents are divided into:

a. Right Angle or crash at the angle

b. Rear End or hit the back

c. Side Swipe or hit the side (grazing)

d. Head on or hit the front

e. Pedestrians or hitting pedestrians

f. Hit and Run

g. Out of Control or crash due to loss of control

Table 5. Types of Traffic Accident Collisions at Sungailiat – Belinyu Highway

No	Collision Type	Total	Precentage (%)
1	Front collision	9	30
2	Angle collision	5	16,6
3	Rear crash	3	10
4	Pedestrian collision	3	10
5	Crash lost control	8	26,6
6	Hit and Run	2	6,6
	Total	**30**	**100**

From table 5 above, it is known that the most common types of collisions are front-end collisions, loss-of-control collisions, and corner collisions. A front collision on this road is a collision that strikes the front of another vehicle from the opposite direction when overtaking or cutting another vehicle and entering another lane through a road marking resulting in a collision. The second type of collision is a collision due to loss of control. The nature of this second collision is single or known as a single accident. From the documentation of events recorded at the Bangka Police, the type of out-of-control collision that occurred was a single accident. Riders experience loss of control due to drowsiness, lack of concentration, fatigue, and high speed. From the table data above, it is also known that the type that occurs the least is the hit and run type. In this study, all hit-and-run incidents were not identified by personal identity or the vehicle that hit, and all hit-and-run victims were victims who died on the spot. From this fact, it can be concluded that a hit-and-run is a type of collision that occurs without the identity of the impactor being known, the victim dies, and there are no witnesses to the incident.

3. Involved Road Users

Sungailiat – Belinyu road is the national road and the only road to the northern part of Bangka where the northern part of Bangka is a tourism area that is often visited by the people. On the other hand, the Sungailiat to Pangkalpinang area is the center of the economy which is the place for rural communities in the north for economic and public activities. For this reason, almost all types of vehicles use this road, including heavy vehicles such as excavators and so on. In this discussion, road users are people who use roads for traffic.

Table 6. Road Users Involved in Traffic Accidents

No	Road Users Involved	Amount
1	Motorcycle	12
2	Car	7
3	Pedestrians	3
4	Bicycle	2
5	Truck	2
6	Pick Up	1
7	Dump Truck	3
	Total	30

Based on table 6, the most involved vehicles are motorcycles and cars. Accidents based on this type of vehicle occurred because the motorcyclist drove at high speed on Sungailiat – Belinyu road or cross from the opposite direction there were also cars traveling at high speed. From the results of observations, physically this road is a good asphalt road, straight, and some have bends.
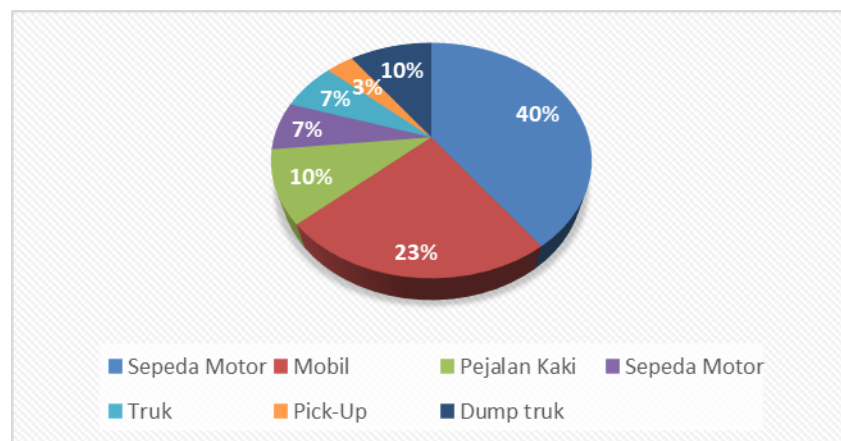
Figure 4. Percentage of Traffic Accident Victims by Road Users

From Figure 4, it is known that road users who become victims in accidents are dominated by motorbikes by 40%, cars by 23.3%, and dump trucks by 10%. The rest of the victims were pedestrians, cyclists, trucks, and pick-ups. The variety of road users who become victims shows that drivers have not driven their vehicles according to traffic ethics and there are still limited traffic signs related to speed reduction orders.

4. Factors Causing Traffic Accidents

According to the Directorate General of Land Transportation of the Ministry of Transportation in 1990 and in Law No. 22 of 2009 traffic accidents occur due to road users, vehicle condition, road issue, and/or environmental issue. From this basis, it can be seen the factors that cause accidents on Sungailiat – Belinyu road.

Table 7. Factors Causing Accidents on Sungailiat Kingdom – Belinyu Street

No	Factor	Description	Amount	Percentage (%)
1	Road users	Careless, high speed, unskilled, not keeping distance, pedestrian issue, violating signs and markings	2 2	**73,33**
2	Vehicle	Tires burst, brake system malfunction, steering system malfunction, loose axle/coupling, light system malfunction	0	**0,00**
3	Road	Crossroad, no signs, no speed limit boards	7	**23,33**
4	Environment	Weather (dark, fog, rain)	3	**6,66**
Total			30	**100**

From table 7 above, it is known that the main factors causing traffic accidents on Sungailiat – Belinyu Street are caused by road users, road factors, and environmental factors. With the number 73.33% of accidents occurred due to the most common road users, namely due to carelessness or loss of control, high speed, and passing road markings which caused an accident with the impact of seriously injured victims and died at the accident site or while on its way to hospital.

The second factor is the road factor with a percentage of 23.33%. In the second factor, the accident occurred at a crossroads. Among the seven accidents caused by road factors, this occurred at Simpang Mapur, Pugul Village, Riau Silip District, Bangka Regency. Furthermore, the third causal factor, namely environmental factors, found that accidents by this factor occurred at 00.00 – 05.59 in the morning and 18.00 – 23.59 in the evening. Currently, the situation on Sungailiat – Belinyu road is dark due to the lack of lighting. For accidents caused by vehicle factors, there are no accidents on Sumgailiat – Belinyu road. This indicates that the vehicles used by users of the Sungailiat – Belinyu road are vehicles in a good condition.

5. Traffic Accident Control Management

In formulating appropriate accident disaster management, it relates to the causes of accidents. As previously described, the factors that cause accidents on Sungailiat – Belinyu road are caused by road users, road factors, and environmental factors. For this reason, accident control management is arranged according to the causative factors carried out before the accident, during the accident, and after the accident.

Table 8. Traffic Accident Disaster Management

No	Factor	Traffic Accident Disaster Management		
		Before Happening	When Happening	After Happening
1	Road Users	1. Socialization and internalization of traffic procedures/ethics to the community in collaboration with governments, kindergarten, elementary and junior high school 2. Assign police officers to	1. Help the victim and contact the police when there is a traffic accident 2. The police take the first action at the accident scene.	1. Giving awards for traffic safety and security action. 2. Consistent law enforcement. 3. Documentate the perpetrators of violations

		accident-prone locations or establish police posts.	3. The police secure the evidence. 4. The police process the crime scene. 5. Police conduct case investigations. 6. Regulate the traffc flow	so that they become an appeal to other road users. 4. Make a simulation of violations that have occurred to be disseminated through social media with the aim of providing traffic ethics education to the public (road users).
2	Road	1.Create traffic spaces that encourage road users to behave in an orderly manner. 2. Provide controlled intersection. 3. Install warning signs on the side of the road within a certain distance before the intersection. 4. Install minimum speed signs and install speed bumps. 5. Lower the speed limit 6. Blunt the corners of the intersection so that vehicles from each direction can be seen before reaching the intersection point.	1. Help the victim and contact the police when witnessing a traffic accident 2. Police arrived at the scene immediately. 3. Regulate the traffic flow	1. Assessing traffic safety and security issues. 2. Evaluate management before an accident occurs.
3	Environment	1. Install and upgrade street lighting. 2. Increase the visibility of road users 3. Supervise through CCTV. 4. Installing traffic signs in residential areas.	1. Help the victim and contact the police when witnessing a traffic accident 2. Arrive at the scene immediately. 3. Regulate the traffic flow	1. Evaluate events. 2. Conduct action to control traffic accidents. 3. Improve the quality of lighting at the scene.

Conclusion

From the results of this study it can be concluded that:

1. Accidents that occur on the Sungailiat – Belinyu road mostly occur in Riau Silip District with a percentage of 59.8%.

2. Characteristics of Accidents on the Sungailiat – Belinyu road as follows:

   a. Based on the time of the incident, 36.6% of accidents occurred during the day at 12.00 - 17.59, 30% occurred in the morning at 06.00 - 11.59, 23.3% occurred in the evening at 18.00 - 23.59 WIB, and 10. % occurred in the early hours of 00.00 – 05.59 WIB.
   b. Based on the characteristics of the type of collision, the most common type of collision is the front type of collision by 30% and the loss of control collision by 26.6%.
   c. The dominant characteristics of road users involved in accidents are motorbikes by 40%, cars by 23.3%, and dump trucks by 10%.
   d. Factors that cause accidents are caused by road users (73.33%), road factors (23.33%), and environmental factors (6.66%).
   e. Accident management handling is arranged according to the factors causing the accident. Accident handling is done before an accident occurs, during an accident, and after an accident occurs.

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