

Need an Understanding of the Installation of Motorized Vehicle Safety Triangles to Stop Emergencies

Kelik Endro Suryono, Vicki Dwi Purnomo

Faculty of Law, Widya University of Mataram, Yogyakarta, Indonesia

Email address:

vickydepe@gmail.com (Kelik Endro Suryono), Keliksuryono63@gmail.com (Vicki Dwi Purnomo)

To cite this article:

Kelik Endro Suryono, Vicki Dwi Purnomo. Need an Understanding of the Installation of Motorized Vehicle Safety Triangles to Stop Emergencies. *Research & Development*. Vol. 4, No. 3, 2023, pp. 84-89. doi: 10.11648/j.rd.20230403.12

Received: February 21, 2023; **Accepted:** March 13, 2023; **Published:** July 27, 2023

Abstract: Researcher need to know that traffic accidents are the ninth highest cause of death and are responsible for 2.2% of all deaths globally, road safety audits are one way to anticipate traffic accidents. Accidents that generally occur due to various factors together, namely: human factors, environmental factors and climatic factors. The purpose of this study is to conduct a Road Safety Audit in an effort to reduce accidents related to the use of safety triangles on the heaviest axle vehicles over 8 tons/large size vehicles. Research using descriptive method with a qualitative approach and interview methods. Traffic accidents often occur in cases where the driver of the vehicle collides with a truck or vehicle that is parked or stopped on the shoulder of the road. In conclusion, the factor that increases the occurrence of traffic accidents in the Province of Yogyakarta Special Region is the factor of the installation of a safety triangle which is still not good enough so that other road users do not see the vehicle stopping or parking. Handling to reduce the level of traffic accidents in the Special Region of Yogyakarta is recommended that the Government add regulations on the use of safety triangles on the highway so that safety triangles are visible to other motorists when used to reduce the risk of accidents.

Keywords: Road Safety Audit, Accident, Safety Triangle

1. Introduction

Researcher need to know that traffic safety is an important part of managing traffic to achieve the goal of a safe, comfortable and economical traffic technique. A traffic accident is an event that rarely occurs, is random, affects many factors and always takes precedence over a situation where one or several people fail to adapt to the environment [1].

Traffic accidents are incidents that can be minimized, traffic accidents in Indonesia are considered the third biggest killer, under coronary heart disease and tuberculosis/tuberculosis. In the period 2018 to 2019 it was recorded from the Central Bureau of Statistics:

- 1) In 2018, the number of accidents was 109,215, and 29,472 people died.
- 2) In 2019, the number of accidents was 116,411, and 25,671 people died.

Injury due to traffic accidents is a common thing that is such a big problem for public health, especially traffic accidents themselves are often the leading cause of death

globally. According to reports, as many as 1.2 million people died due to traffic accidents and it is always increasing every year [2].

Of the 10 causes of death globally, traffic accidents are ranked number 9 as a cause of death and are responsible for 3% of deaths globally. Traffic accidents are also the cause of death among adolescents and adults aged 15-29 years. Most traffic accidents occur in lower-middle-income countries, with less than half of the world's vehicles [3]. As a result of traffic accidents which continue to increase every year, countries that have a middle to lower economy always eat more than USD \$ 60 per year and that is more than the total amount received in development assistance or taxes.

Traffic accidents basically occur due to several factors such as human factors such as *human error*, environmental factors such as potholes and climatic factors such as heavy rain. Humans are also the main cause of accidents, although environmental factors are also another major factor in traffic accidents themselves. To prevent traffic accidents, roads must have completeness so that they can help or improve the safety of road users. such as road markings, road signs and street lights [4].

Traffic accidents on the highway are events that are not wanted by every road user. Many researchers have looked for various main factors causing traffic accidents on the highway and for these results he himself explained that the main factor for traffic accidents is purely human negligence. Even though humans are the main factor in the occurrence of traffic accidents, environmental factors and also climate factors cannot be simply forgotten because these factors also contribute to the occurrence of traffic accidents, a Safety Way audit is needed to find out the cause of the accident. Conducting a Safety Road audit is one of the components in identifying high-risk situations on the highway so that the potential for traffic accidents can be handled properly and in eliminating potential accidents on the highway [5].

Road Safety Audit (AKJ) is a method for anticipating the occurrence of traffic accidents and a formal process by which planning, design, construction and use and maintenance of roads are examined by an independent and qualified person or team, to identify potentially hazardous forms or Operational Arrangements that may harm user safety. So this study aims to identify hazards that may arise to safety and provide recommendations for actions or efforts to prevent/eliminate these potentials before they occur [6].

In this case the author conducts a Road Safety Audit regarding the use of a safety triangle for large vehicles or trucks with the heaviest axle load above 8 tons, so that it has materials and sources of problems in improving road safety and is the most effective step in terms of road transportation safety the author reviews the factors Factors that cause accidents due to negligence. The last safety cross is one of the most urgent parts of managing traffic to achieve the goal of a safe, comfortable and economical traffic passing technique. Traffic accidents are one of the biggest causes of death in Indonesia. A large number of victims will cause significant economic (material loss) and social impacts. Traffic congestion that occurs on roads in urban areas, it turns out, is also a problem of toll road traffic congestion which has recently been seen to be quite prominent and tends to show an increase. Road Safety Audit is one way to prevent traffic accidents in general caused by several factors, namely humans, road conditions, vehicle conditions, and the environment. Humans are the dominant factor causing traffic accidents, even though road conditions can also be one of the causes of traffic accidents. So to prevent this, roads need to be equipped with various road equipment to help regulate traffic flow, namely: road markings, traffic islands, dividing lines (median), traffic lights, safety fences, and other manipulation of traffic. In addition, road alignment both horizontally and vertically also greatly affects the smooth flow of traffic, or even endangers traffic safety.

2. Problem Formulation

As a result of frequent accidents caused by drivers hitting trucks parked on the shoulder of the road in traffic spaces, the number of accidents and fatalities is still high. Traffic accidents that often occur that have accident categories such

as motorcycle riders and car/truck driver accidents. Traffic accidents also have various factors, one of which is the installation and use of safety triangles when parking or stopping are not carried out properly so that other road users do not see the condition of parked vehicles. In principle, accident factors are classified as environmental factors, human factors, road factors and vehicle factors that can cause death and material loss, based on the description of the background, it is very urgent to do research so that research is needed to investigate the contributors to traffic accidents. traffic both in accident-prone zones and in determining priority handling and prevention that is so in-depth that the author conducted research in the Province of the Special Region of Yogyakarta.

3. Method/Approach

Learning is something that means a tree in the development of knowledge and technology, because the study aims to reveal the truth systematically, methodologically and consistently. A learning can run smoothly and well and produce what is expected if it is determined in advance the steps taken in carrying out the learning which is often referred to as the learning method. This study is an attempt to be able to study and reveal the evaluation of the causes of accidents in the DIY area. Researchers used qualitative research methods with a descriptive design. Qualitative studies according to research methods which believe that reality is seen as something holistic, complex, dynamic, full of meaning and inductive mindset [7].

Thus qualitative research seeks to uncover problems that are not yet clear to researchers and the research results of researchers may be different from the working hypothesis. This method is used in the hope of carrying out the research process and uncovering problems by adapting to actual circumstances and conditions and disclosing facts in accordance with ongoing social circumstances or situations so that all activities that occur can be observed and explained.

According to Bungin, descriptive research aims to describe, summarize various conditions, various situations, or various social phenomena that are the object of research and try to draw these realities to the surface as characteristics, characteristics, characteristics, models, signs or descriptions. certain conditions, situations, or phenomena [8]. In other words, this study aims to describe the nature of something or social phenomena that are currently occurring in recent studies.

The study described here is intended to find facts with interpretations that describe the nature of the phenomenon originating from groups or individuals originating from findings in the field. Using qualitative research methods because they are generally holistic, complex, dynamic, full of meaning, besides that researchers also intend to understand social situations in depth, find patterns, hypotheses and theories. This qualitative approach is a research procedure that produces descriptive data in the form of written or

spoken words from observable people or actors. This approach is directed at the background and individual *holistically* (whole) [9].

Subject and Object Studies

The object of study is related to the evaluation of the causes of traffic accidents. This research concerns the internal processes and constraints of the implementation of the Road Transport Traffic Act Policy Number 22 of 2009 and Minister of Transportation Regulation Number 74 of 2021 concerning Motor Vehicle Safety Equipment [10].

The subject matter of this study includes accidents in the DIY area caused by accidents when vehicles are parked on the shoulder of the road/emergency and collisions occur. This is because the position of the vehicle parked on the road is not visible to other motorists.

Data Source Study

The source of the research data is the subject from which the data is obtained. This research requires data to summarize research results, which consist of:

Main data

Primary data is data obtained directly from the field or from the community. This data is obtained from observations and interviews with parties who are considered competent.

Secondary data

Secondary data is data obtained from library materials. This data comes from articles, literature studies, documents, statistical data, archives and media periods.

The main data sources in this study are the words and activities of people observed as vehicle perpetrators and survivors in cases of crashing into parked or emergency vehicles, as well as documents related to motor vehicle accidents due to concrete management (control) for vehicle use, motorized. Data obtained from and through:

Informant

Qualitative research focuses more on social phenomena, therefore the roles and relationships between researchers and informants are more communicative, so that researchers can explore in detail all the information from informants. Researchers began to explore problems with key informants and explore interesting things until data saturation occurred so that the validity of the data was guaranteed.

According to Nasution, selecting informants was not easy. No, there are guidelines for that [11]. There are times in a conversation where you will find people who have a lot of experience and knowledge and are ready to provide valuable information. Sometimes in-depth interviews uncover good people who are used as informants. There may also be people who volunteer to assist researchers who may also understand naturalistic study methods.

Researchers directly observe the object of research to obtain secondary data and primary data directly from the information source or location of origin of the information center. Conduct interviews with direct question and answer interviewed freely and structured to informants. The expected information is correct and according to the facts, so it is necessary to establish a good relationship with the informant to obtain the information objective.

Documentation that is relevant to the problem or focus of the study includes:

- 1) Constitution, Government Regulations,
- 2) Other documents related to inspection of motorized vehicles.

Data collection technique

This study used a qualitative approach and descriptive method, so that the data collection techniques used were: Interviews are conversations carried out with a specific purpose. Carried out by two parties, namely *the interviewer who asked* the question, and the interviewee (*interviewee*) who gave the answer to the question [9]. The interviews were intended to obtain information from informants' stories, experiences and knowledge of informants related to the problem. This study used *in-depth interviews*, aiming to get an overview of the research objectives by asking questions face-to-face between researchers and informants. Interview materials ranged from problems and research objectives.

Observation or what is also called observation, includes activities of focusing attention on an object by using all the senses. So Observation can be done through sight, touch and taste [12]. Observation was carried out through systematic observation and recording of the symptoms studied. Observation This direct action is carried out at the scene of the accident and the cause of the traffic accident. Researchers participate in several activities carried out during the specified data collection.

Documentation is a way that researchers do by investigating written things such as books, magazines, documents, regulations, photos, minutes of meetings, diaries, and so on. The researcher uses secondary data by collecting and filtering existing data on accident data owned by the DIY Government and other documents related to conditions at the research location.

Literature Study, namely by conducting a study of library books to obtain and study information as well as other material documents related to the study of issues of concern about traffic accidents resulting from hitting a vehicle parked on the shoulder of the road.

Study Instrument

Research instruments The most important thing in qualitative research is the researcher himself, with whom the researcher understands properly the methods, research procedures, and approaches to the object to be studied [13]. Researchers conduct field studies to research objects for data collection in the form of recordings, interviews, observations, and so on.

Data analysis

The data that has been collected, analyzed and processed using qualitative analysis is to describe the evaluation of motorized vehicle inspections that must be tested on the roads of the Sleman Regency Communication and Information Service. In general, qualitative analysis of data can be carried out in stages: selecting, simplifying, classifying, focusing, organizing (associating symptoms systematically and logically), making abstractions on concluding the meaning of the results of the analysis [14].

The well-known qualitative analysis model is the Miles and Hubberman model which includes [15]:

1) reduction data

Reduction is sorting urgent, relevant, and meaningful data from data that is not useful.

2) Serving descriptive

Descriptive presentations are in the form of narratives, visual images, tables, with a systematic and logical presentation.

3) Conclusion of the results presented.

Model analysis can be described as follows:

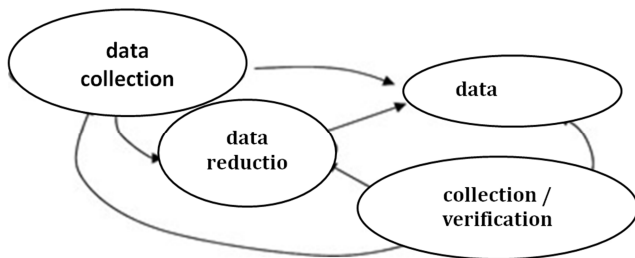


Figure 1. Data analysis (Source: Miles & Hubberman (1992)).

Problem Formula

The fluctuating number of traffic accidents in the Province of the Special Region of Yogyakarta and the increasing number of vehicle users, both motorcycles and cars, have the potential for accidents to occur on that route. Accidents that often occur as a result of hitting a vehicle or truck with the heaviest axle load of more than 8 tons parked on the shoulder of the road are still common. Therefore, with the problems and scope of research, the authors formulate the problem as follows:

- 1) What are the factors that encourage drivers of vehicles or trucks not to install safety triangles properly when parking or in emergency situations?
- 2) What is the government's responsibility in implementing regulations related to the use of the safety triangle?
- 3) Are the government's efforts to prevent accidents related to the frequent cases of other road users crashing into vehicles or trucks while parked?

So based on the formulation of the problem above, it is very urgent to do research so that a study is needed on the occurrence of accidents in cases of hitting vehicles that are parked and stopped on the shoulder of the road, especially heavy vehicles such as trucks on the highway. Yogyakarta Special Region Province.

Objective Study

Conducting investigations into the causes of accidents due to drivers hitting vehicles or trucks while parking and emergencies in the Province of the Special Region of Yogyakarta.

Special Goals

- 1) Researcher identify the factors of traffic accidents on the road.
- 2) Analyze the level of vulnerability to traffic accidents on the road due to hitting a vehicle or truck that is

parked on the shoulder of the road.

- 3) Provide recommendations for handling by the government so that there is an improvement in regulation on the use of safety triangles on heavy vehicles or the heaviest axle load above 8 tons.

Benefit Study

- 1) As a basic reference so that the use of a safety triangle is better to reduce accident rates.
- 2) As input and consideration in improving regulatory standards regarding the use of safety triangles.
- 3) As input and consideration for all parties who are responsible for prioritizing and improving road safety.

Scope Study

The location study was carried out in the territory of the Provincial Government of the Special Region of Yogyakarta which is a strategic location with an accident rate.

4. Analysis and Discussion

The rapid development of transportation indirectly increases the risk of traffic problems. Traffic accidents according to Law Number 22 of 2009 concerning Traffic are unexpected and unintentional road events and there is no vehicle involvement with or without other road users resulting in human and/or property loss. Past traffic accidents can occur because vehicle drivers violate traffic traffic signs [16]. The driver drives the vehicle at will, ignorance of the rules, unskilled driving, and a low level of driver awareness. Traffic accidents are no exception, drivers drive their vehicles while drowsy, drunk and easily provoked by other road users [17]. Vehicle factors that cause the most accidents are tires that are damaged, brakes not working properly, equipment that is not suitable for use, not replaced and various other causes that cause traffic accidents [18]. The following is the author's discussion of the absence of regulations for installing safety triangles on the road which causes accidents. As written in the Minister of Transportation Regulation Number 74 of 2021 concerning Motor Vehicle Safety Devices it is stated in the following article: Article 9.

- 1) The Safety Triangle as referred to in Article 3 paragraph (1) letter c must be installed by every Motorized Vehicle driver when stopping or parking in an emergency on the highway.
- 2) The Safety Triangle as referred to in paragraph (1) must comply with the following conditions:
 - a) at least 2 (two) sheets;
 - b) red and reflective; And
 - c) closely to the inside of the Motorized Vehicle.
- 3) The Safety Triangle as referred to in paragraph (1) must meet the following requirements:
 - a) the retro-reflex surface must be red;
 - b) having dimensions on each side of at least 500 (five hundred) millimeters;
 - c) having inner edge width for Safety Triangle type I (one) of at least 25 (twenty five) millimeters and a maximum of 50 (fifty) millimeters; And
 - d) has inner edge width for Safety Triangle type II (two)

of at least 50 (fifty) millimeters and a maximum of 85 (eighty five) millimeters. -9-

- 4) Safety Triangle as referred to in paragraph (1) is installed with the following conditions:
 - a) on freeways or toll roads the first Safety Triangle is installed at a distance of at least 30 (thirty) meters measured from behind the Motorized Vehicle and the second Safety Triangle is installed at a distance of 30 (thirty) meters from the first Safety Triangle;
 - b) on a 2 (two) way road, the first Safety Triangle is installed at a distance of at least 30 (thirty) meters measured from behind the Motorized Vehicle and the second Safety Triangle is installed at a distance of at least 30 (thirty) meters. meters are measured from the front of the Motorized Vehicle; And
 - c) on bends must be installed Safety Triangle before and after the bend.

Many had an accident when the truck broke down [19]. Stopping on the highway or at the side of the road is extremely dangerous, especially if the road is turning, in areas with poor lighting or poor visibility due to weather conditions. This is included as a contributor to accidents. Many don't know how to install and use a safety triangle, so many don't do it to keep themselves and others safe after an incident. Learning the proper placement of the emergency triangle can save not only your life, but that of those around you.

The following is a collection of accident events due to unclear danger signs or safety triangles not being seen by other motorists:

- 1) Wonosari, (kupass.com) – A motorbike rider named Jayadi (23), a resident of Jalan Rawa Indah, Pegangsaan Dua, North Jakarta, died after crashing into a four-wheeled truck that was parked on Jalan Agus Salim Padukuhan Kepek II, Kepek Village, Kapanewon Wonosari, Friday (09/09/2022). The victim died at the scene due to severe head injuries [20].
- 2) KULON PROGO, KOMPAS.com – Another accident occurred on the national road in Kulon, Progo Regency, Special Region of Yogyakarta (DIY). In the accident, a motorist collided with a parked truck [21].
- 3) Solopos.com, KLATEN -- The fuso truck carrying candlenut overturned and crashed into a Honda Accord on Jalan Solo-Jogja, to be precise north of Pasar Delanggu, Klaten, Tuesday (9/3/2021) at 05.00 WIB.
- 4) A traffic accident (accident) involving a motorbike hitting a parked truck occurred on Jalan Magelang Kilometer 13, Triharjo, Sleman, yesterday (17/11). It is suspected that the passenger was not concentrating while driving. As a result, two lives were lost.

The reality in the field is that accidents that occur due to unclear installation of triangles still occur frequently. The installation was not effective in terms of providing understanding or awareness to vehicle owners regarding the use of the safety triangle and the distance between the safety triangle and the vehicle [22].



Figure 2. Position of Parked Heavy Vehicles.

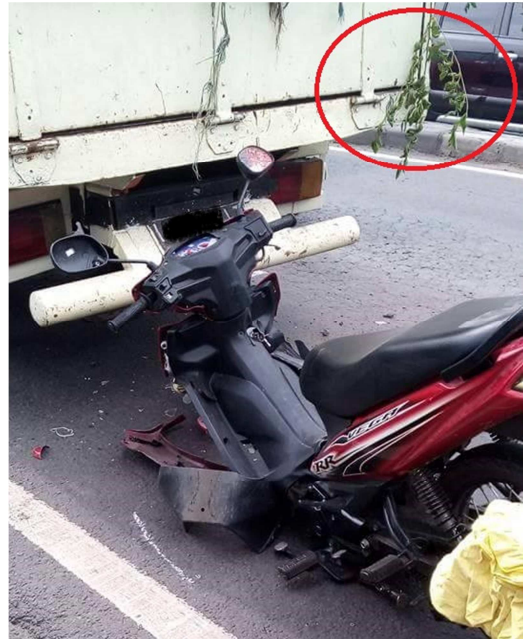


Figure 3. The vehicle (box truck) is in the Stop position Use the safety triangle.

As a result, the community considers the implementation of this policy only limited to the government's responsibility, and community involvement is only an obligation. regardless of the weak role of good communication between implementers and the community itself [23].

5. Conclusion

Based on the results of the study it can be concluded that:

Conditions related to the function and use of the safety triangle when the vehicle is stopped in an emergency position it is not yet serious for law enforcement officials to take action and socialize how important it is to install a safety triangle on vehicles when parking on the shoulder of the road and the condition of a damaged truck stopping on the road so that the stop position is still in the road space can cause an accident.

There are still many drivers and vehicle managers who do not know how to install and use a safety triangle during an emergency.

To prevent casualties, it is appropriate that all work together to prevent accidents.

Acknowledgements

Thanks to Widya Mataram University, Yogyakarta, Chancellor, Dean and lecturers and friends of the Master of Law students for their support and participation.

References

- [1] J. Odgen, *The Psychology of Eating*. London: John Wiley & Sons, Inc, 2010.
- [2] C. J. Khisty, *Manipulation Transport*, no. Issue 3. Ciracas, 2005.
- [3] C. Caliendo and G. Genovese, "Quantitative Risk Assessment on the Transport of Dangerous Goods Vehicles Through Unidirectional Road Tunnels: An Evaluation of the Risk of Transporting Hydrogen," *Risk Anal.*, vol. 41, no. 9, pp. 1522–1539, 2020.
- [4] M. N. Mustafa, "A REVIEW OF THE CURRENT ROAD SAFETY SITUATION IN MALAYSIA," 2010.
- [5] C. Widyastuti and Mulley, "The Casualty Cost of Light Motorcycle Injury in Surabaya Indonesia," *Transp. Commun. Bull. Asia Pacific*, vol. 74, 2005.
- [6] R. H. Karsaman, "Toll Road Safety Audit in Indonesia (Case Study of Cikampek - Padalarang / Cipularang Toll Road)," vol. 14, no. 3, pp. 135–142, 2007.
- [7] Sugiyono, *Quantitative Qualitative Research Methods and R&D*. Bandung: Alfabeta, 2017.
- [8] B. Bungin, *Qualitative Research Data Analysis*. Jakarta: Rajawali Pers, 2012.
- [9] Moleong and J. Lexy, *Qualitative Research Methods*, Revised ed. Bandung: PT. Juvenile Rosdakarya, 2013.
- [10] X. Dong, Z. Xu, and L. Yuan, "Quantitative Risk Analysis of Dangerous Goods Road Transport Vehicles and Networks," *Smart Commun. Intell. Algorithms Interact. Methods*, vol. 257, pp. 105–110, 2022, doi: https://doi.org/10.1007/978-981-16-5164-9_13.
- [11] Nasution, *Scientific Research Research Methods*. Jakarta: Bumi aksara, 2011.
- [12] S. Arikunto, *Qualitative Research Methods*. Jakarta: Bumi aksara, 2006.
- [13] P. Aspers and U. Corte, "What is Qualitative in Qualitative Research," *Qual. Sociol.*, vol. 42, pp. 139–160, 2019.
- [14] U. Kukartz, *Qualitative text Analysis : A Systematic Approach*. 2019.
- [15] E. Nancy, Betz, and G. Hackett, "Career Self-Efficacy Theory: Back to the Future," *J. Career Assess.*, vol. 14, no. 1, pp. 3–11, 2006.
- [16] A. Baru, A. Azazh, and L. Beza, "Injury severity levels and associated factors among road traffic collision victims referred to emergency departments of selected public hospitals in Addis Ababa, Ethiopia: the study based on the Haddon matrix," *BMC Emerg Med*, vol. 19, no. 2, 2019, doi: <https://doi.org/10.1186/s12873-018-0206-1>.
- [17] A. Nugroho, N. Susanto, and S. Fadlilah, "Factors Associated with Traffic Accidents in Sleman, Yogyakarta, Indonesia," *Int. Med. J.*, vol. 29, no. 6, pp. 366–368, 2022.
- [18] H. Xiong, Y. Shen, and L. Fu, "Traffic Safety Evaluation and Accident Prediction of Freeway: Evidence from China," *Teh. Vjesn.*, vol. 28, no. 6, 2021.
- [19] G. Gumawang and R. Ginanjar, "Traffic Safety for Drivers of Stone Transportation Activities Through Compliance Audits Based on Law Number 22 of 2009 concerning Traffic and Road Transportation at Pt Batu Alam Persada, Rumpin District, Bogor Regency 2019," *Promotor*, vol. 4, no. 5, pp. 404–411, 2021.
- [20] F. Risdiyanto, "Hit a Truck Parked on the Side of the Road, Jayadi Passed Away," *Kupascom*, 2022.
- [21] D. J. Zebua, "Collision with a Parked Truck, a Teacher in Kulon Progo Dies," *Kupascom*.
- [22] P. PARADITA, "EVALUATION OF THE APPLICATION OF ADDITIONAL LIGHT REFLECTING DEVICES AND UNDER SHIELD ON GOODS TRANSPORT VEHICLES," ROAD TRANSPORTATION SAFETY POLYTECHNIC, 2022.
- [23] A. C. W. Yuanda, R. D. A. Dewilly, and P. Dijunmansaputra, "Legal Protection Against Errors in Enforcement of Traffic Violations," *IS*, vol. 4, no. 3, pp. 63–72, 2020.