

# Analysis of Human Influence and Physical Influence of Road Accidents in the State of Terengganu: Enforcement Agency Perspective

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**Abstract**— Injuries and deaths that are caused by road accidents are the world's most major factor beside of chronic diseases such as heart disease, stroke, lung infections, and respiratory difficulties. The purpose of this study is to explore the element of road accidents caused by human influence from the point of view of enforcement agencies. This study will analyse the human impacts on the accidents for all types of vehicles in all districts in Terengganu. The data were collected using qualitative methods involving two techniques, namely follow-up observation and interviews with five main respondents representing the implementing agencies and enforcement agencies. The data is then will be analysed using NVivo QSR computer software to get the exact details and explanation pertaining to the issues being studied. The findings show that human influence is one of the main factors in causing road accidents which include negligence and carelessness, the attitude and habits of road users and the constraints of the enforcement agency's role. While physical influence is also one of the causes for the occurrence of road accident cases. These factors include surface and road geography, vehicle conditions, seasons, weather, nature, and solid waste. In conclusion, the trend of road accidents in the state of Terengganu shows that human influence is more dominant than the physical influence in cases of road accidents.

**Keywords**—Human Influence, Road Accidents, Enforcement Agency

## I. INTRODUCTION

The transportation sector is one of the essential elements in the life of today's world. In general, transport refers to a vehicle that carries someone or something from one place to another, usually at a long distance compared to walking [1]. In Malaysia, the transport sector is overgrowing as in developed countries. The number of road vehicles on the road shows a rapid increment every year. According to statistics from the Ministry of Transport Malaysia (2016), the number of land vehicles registered in 2011 was 21,401,269 [2]. However, the significant increase is seen in the next six years at 27,613,264 in 2016, an increase of 22.5 percent [3]. Hence, with the ever increasing number of vehicles at present, especially in urban areas and highway, it has led to various issues and traffic problems, especially road accidents [4].

Recently the problem of road accidents is a phenomenon that is taken seriously by the government because it is a significant

factor in causing death in Malaysia, especially among motorcyclists. WHO Report (2009) shows injuries as a result of road accidents is one of the world's leading killers after chronic illnesses such as heart disease, stroke, lung infection, and respiratory difficulties [5]. Additionally, Lim (2007) explains the recent increase in road accidents cases contributing to the country's social and economic problems [6]. Road accidents are one of the main issues in the country today which involve various aspects, especially socio-economic. The loss of human life among road users is a massive loss in human resource acquisition as well as damage and loss of property [7]. Research on road traffic accidents has been conducted by researchers both from inside and outside the country. Road accidents have become a significant focus in a country, including Malaysia [8]. Several studies have been undertaken to find the real cause of road accidents. Road accidents can occur due to road condition, vehicle, and environmental factors [9]. Occasionally accidents can happen due to one of the factors or combination of these factors. Road user factors are a major contributor to road accidents. These factors include unskilled drivers, negligence, carelessness, and impatience when handling vehicles [10].

## II. LITERATURE REVIEW

Sabey and Staughton (1975) recognize road users are contributing to 95% of road accidents and the factors that correlate between road users and the environment, contributing to 25% of road accidents [11]. For example, Gabany et al. (1997), has conducted studies on factors that promote fast-moving behavior among 1078 respondents [12]. The results of this study found that several factors led to speeding action; ego gratification, risk-taking, time pressure, hatred while driving, and unconscious towards speed [13]. The study of Mayer and Treat (1977), has suggested some aspects of high risk psychological, social and cognitive drivers [14]. This study finds that the driving method is solely due to the social and irresponsible attitude of failure to adapt to social values. Drivers who drive under pressure also will drive recklessly, and this is related to the theory of personal incompatibility [15]. The theory of failure to control the impulse suggests that risk-taking drivers are related to emotional discharge. According to Ahmat, Nor, Zin, and Nor,

(2011), road accidents which lead to death and injuries are among the threat to national development [16]. There is a close relationship between death and injuries due to road accidents with per capita income in Malaysia. This is explained after the study was made according to the Kuznets hypothesis regarding the existence of inverse U relationship [17]. It is parallel to some of the earlier studies in developed countries. In line with the above introduction, this article aims to analyse the trend of road accidents in Terengganu according to the perspective of enforcement agencies for all types of land vehicles.

### III. METHODOLOGY

The main purpose of this study is to examine some of the key factors that have been identified as the main cause of road accidents namely (i) identify the human influence resulting in the occurrence of road accidents in the state of Terengganu and (ii) identify the influence of the physical environment resulting in the occurrence of road accident in state of Terengganu. In this study, the researcher chose to use qualitative research method in explaining the problems related to the road traffic accidents in Terengganu according to the perspective of the enforcement agencies in order to examine the human factor and the physical factors that became the cause of road accidents. This study used qualitative methods to obtain detailed and more accurate information. This method had assisted researchers to obtain direct information with five respondents comprising heads of enforcement agencies in Terengganu. Respondents or samples of this study only involved several implementing and enforcement agencies namely the Royal Malaysia Police (PDRM), Malaysian Highway Authority (LLM), Land Public Transport Agency (SPAD), Road Transport Department Malaysia (JPJ) and Public Works Department Malaysia (JKR).

The data collection process involves three techniques, namely, first observing the accident area and the potentially accidents area, second conducting interviews to obtain more detailed explanation from the implementing agencies and enforcement agencies and the third is conducting a document review to further reinforce the findings obtained from previous research data, which is data from implementing agencies and enforcement agencies. The rationale for the researcher to choose this method is because the data collected will be precised and accurate. This technique provides the opportunity for researchers to study the behavior of the community from various aspects while using road vehicles from the perspective of the implementing agencies and enforcement agencies. The study was conducted for six months beginning in August 2018 until early January 2018. The study was conducted throughout the state of Terengganu involving eight districts namely Kuala Terengganu, Kuala Nerus, Kemaman, Dungun, Marang, Hulu Terengganu, Besut and Setiu. The data of this study is analysed by using QSR NVivo computer software which involves several phases namely transcription, data organization, coding, coding, theme, triangulation, and reporting. The analysis process of

this study focuses on human influence and the physical influence of the occurrence of road accidents in Terengganu.

### IV. RESULTS

#### 1. Road Accidents Due to Human Influence

Based on the findings of the study, many accidents occurred due to human influence. Studies conducted throughout Terengganu indicated that the average accident was due to human influence. Human influence is defined as an attitude or human act that causes a road accident. The results of the analysis show that human influence which is the cause of road accidents in Terengganu state is categorised into three influences namely negligence and carelessness, attitude and habits of road users, and constraints of enforcement agency's role. Explanation of road accidents caused by human influence is as follows;

##### *i. Negligence and Carelessness*

Human influence which is due to negligence and carelessness of humans is very closely related to the attitude of road users who are not careful and negligent when on the road. Most road users consisting of drivers and pedestrians are very tedious about road safety, and some of them do not care about their safety at all while on the road. This negligence and carelessness can be categorised into three aspects. The first aspect is due to the negligence of some drivers which drive in a subconscious state that is driving in a drowsy condition. Due to driving in drowsiness has caused the attention and focus of the drivers to be interrupted and some cases show that the driver was asleep while driving which led to fatal accidents. In this case, the driver may be driving in speed to catch the time to reach the destination without thinking of personal safety, passengers and other users. In this same case, the driver supposedly stops the vehicle in an airy space or rest area to get some rest before continuing the journey. The second aspect is driving in an exhausted and tired body. This situation is similar to the case of the driver that drive in a drowsy state. Based on studies conducted in the state of Terengganu, many drivers drive their vehicles to the final destinations despite in exhausted and tired body condition that they may have been working all day or been driving for a relatively long period. Drivers should not be encouraged to drive in that condition as they may not be able to pay attention because their bodies are tired and cannot afford to continue their journey. The third aspect is driving during sick. For some cases, some drivers are forced to drive in extreme conditions such as accidents, poor health, and others. This is because they have no other people to take them to a specific destination or a nearby hospital. However, such driving can be dangerous to others as they are undoubtedly unable to concentrate fully while driving. There are also road users driving under the influence of drugs, and this is very dangerous, as medicines can make some people lose their focus while driving on the road and cause accidents.

## *ii. Consumer Habits and Attitudes*

The second factor is the behaviour and attitude of the road users themselves. Traffic users in the state of Terengganu were more susceptible to commit acts that violated road rules set by the government and enforcement authorities. Some drivers prefer to drive recklessly because they are in a rush state or late to a particular destination. Also, they also drive recklessly because of the selfish attitude of the individual and their passion towards aggressive driving style without fair consideration over other road users. The case of violation of traffic lights is also an attitude that is often done by some road users in the state of Terengganu. The impatient human attitude and do not want to wait for the traffic light lead them to break the rules. In addition, there are also some drivers, which drive at the maximum speed when the traffic light turns yellow because they do not want to wait and waste time on the traffic lights without thinking of the current traffic conditions. Mobile phone abuse is also one of the causes of road crashes. Most drivers used mobile phones while driving, and this causes them to lose focus and cannot control their vehicles properly. Besides, the attitude of road users in the state of Terengganu also found to be driving fast at the same time breaking the speed limits set by the government and enforcement authorities. Some drivers do not care about the laws and choose to violate the rules, especially in Lebuhraya Pantai Timur 2 (LPT2). According to respondents, when drivers drive beyond the speed limit, they have directly placed them in a dangerous situation and harm others who also use the same road. Among the other frequent misconducts by some of the road users in the state of Terengganu were driving over the speed limit, making U-turns at prohibited places, cutting off double lines, stopping the vehicle suddenly, stopping the vehicle in the wrong place, driving in the emergency lane, does not give signal when turning the vehicles and so on. Due to the attitudes and behaviours of these individuals, it will cause more negative impacts and become the source of increased traffic accidents especially in the state of Terengganu.

## *iii. Constraints of Enforcement Agency's Role*

The third human influence is seen from the perspective of the role of the enforcement agency, and it is divided into two parts, namely the enforcement constraints and overlapping of the work scope. The weaknesses of law enforcement had been seen from the lack of monitoring in "hot spots" areas. This is due to the shortage of members in charge, and the distance of the area is far from the supervision of the enforcement authorities. In the case of the overlapping of the work scope, it is found interdependence between them in carrying out the enforcement and maintenance tasks for example in terms of repairs, improvements in infrastructure and road monitoring amongst the implementing agencies and enforcement agencies. This is due to the high-cost overhaul being one of the reasons for the overhaul implementation as it is cannot be implemented within a short period of time due to many processes that need to be done to ensure that the

implementation is in place.

In general, human influence is the main cause leading to road accidents. Due to negligence, irresponsible consumer behaviour, and the role of enforcement agencies and enforcement authorities have caused innocent individuals to endure long-term impacts and effects such as vehicle damage, property damage and loss of life. Therefore, relevant parties should play an essential role in the incidents of road accidents in the state of Terengganu whether they are to be contained or reduced.

## *2. Road Accident Due to Physical Influence*

Physical influence is one of the causes that contribute to road accidents in the state of Terengganu. Among the physical influences are:

### *i. Surface and Road Geography*

The physical effects caused by poor road conditions are among the contributors to accidents among road users in the state of Terengganu. Analytical studies show that accidents caused by road conditions in the state of Terengganu can be divided into two aspects, namely road damage and road type. Road accidents caused by road damage are due to three factors: the roads are filled with stagnant water, perforated roads, and corrugated roads. In the other hand, road accidents caused by the road types involve straight and long road factors, uneven roads, dark roads, sharp turns, and bending roads. In addition, due to limited monitoring, inter-agency task constraints and high cost of improvements, it has led to a lot of unfavourable road conditions such as traffic lights, sharp roads, curved roads, roads damaged by natural disasters, road infrastructure has long been used, frequent use by heavy vehicles and other road damage. For example, rural areas involving the use of unmanaged roads so that all types of vehicles can use the unmanned roads including overloaded vehicles, and this has accelerated further road damage. Also, development projects have also forced road conditions to be disturbed, such as drilling holes for pipe works, installing signboards and so on. This has caused road conditions to be in danger of being used by users. The impact of the imperfect road conditions on the road has caused many cases of accidents to occur that have led to severe and deadly injuries.

### *ii. Vehicle Condition*

The physical effects caused by vehicle conditions are among the factors that cause the occurrence of road accidents. Physical implications due to vehicle conditions are divided into three aspects: old vehicles, a vehicle with unscheduled for maintenance services, and vehicle with modification. Based on the analysis, there are still many people in the state of Terengganu who is still using vehicles over the ages and become a culture to buy overage vehicles and use this vehicle as long as they can move. That is, many vehicles are not suitable for use since the age factor of the vehicle has long been used but is still being used on the road. Such actions are

seen to be able to invite dangers to other road users. Unmanaged vehicles are also one of the causes of accidents due to technical damage when driving such as non-functional brakes, broken tires, vehicle light damage, vehicle signal damage, engine failure and loss of steering control while driving resulting in road accidents. Vehicle modification activities are also among the factors that have been detected by the authorities and become one of the causes of accidents involving motorcycles. The desire of motorists especially among the youth in the state of Terengganu is to modify the vehicle's engine speed and the use of spare parts that are not worthy of invitation, as many of them are involved in road accidents. In this regard, enforcement authorities have often reminded road users to be sensitive to drive vehicles by conducting road traffic monitoring and campaigning and road restrictions in order to overcome and save more lives.

### *iii. Celebration and School Holiday Season*

Malaysia is a country known for its many races, religions, and cultures. All races in Malaysia will celebrate the festive season according to their respective religions and cultures throughout the year. Usually, this festive season will be celebrated during the school holidays. Among the big celebrations celebrated by Malaysians are the Eid Fitri (Malays), Chinese New Year (Chinese) and Deepavali (Indian). Every time during the festive season and school holidays, people living in big cities usually will prepare to go back to their hometown. This situation has made the number of vehicles on the road increased during the festive season and school holidays. The same situation was also experienced among road users in the state of Terengganu. Based on the analysis made, the increase of vehicles dramatically in the festive season and school holidays, especially in LPT2 is seen to have limited the limits of the tendency of the movement to become congested. Due to massive traffic movements and rush to get to the final destination, there are a few road users that drive their vehicle at high speed and doesn't care about their safety and other road users. This will make it more difficult for traffic movements especially when it comes to road accidents. The increase in traffic congestion is not only felt in urban areas and highways but also felt in other areas, especially in rural areas, which became an option for shortcut road among consumers to reach to their destination.

Among the frequent mistakes and negligence of users during the festive season and school holidays are not sensitive to rules, unplanned travel schedule, always showing impatience and selfishness. It also contributes to the cause of road accidents which turns the happy mood to celebrate a festival into a gloomy mood for the family members if the member of the family is seriously injured and died in the road accidents. The analysis shows that the failure of users to make travel plans during this season became the cause of road accidents. The road users should plan early for long journey trip such as take an early holiday and ensure that the condition of the vehicle is in good condition. Also, the road users should be in physically good before continue with traveling. Unfortunately,

the results from the analysis show that this situation is rarely practiced by the road users which resulting the driver is driving in tired, drowsy, time-consuming situations that cannot control the vehicle properly. This situation not only invites danger to them but also creates the dangers of other road users.

### *iv. Weather and Disaster*

Physical influence due to weather and disaster factors is expressed when involving rain and flood situations. The state of Terengganu is one of the states that often receive heavy rainfall especially during the monsoon season which started at the end of November until the end of January. The monsoon season is a season that causes rainwater to overflow and drown the lowlands areas around the Terengganu region. Based on the analysis, weather and disaster conditions contribute to three implications - road conditions, vehicle conditions, and infrastructure damage. Implications to road conditions happen when the overflowing rainwater has caused road conditions to be smooth and can cause vehicles to lose control especially when the user is driving at the fast speed. The weather conditions of heavy rain and floods have caused stagnant water on the road surface especially at the surface of the uneven road, and consequently, the consumer will crash when trying to avoid falling into the stagnant water or holes. The implication of heavy rain weather is also expressed as a problem to the condition of the vehicle, especially the driver's vision. This situation has caused road users unable to control the vehicle well because the driving focus is disturbed due to unclear vision. The implications of rain and flood events have caused infrastructure facilities to be damaged due to heavy rain and stagnant water. This becomes a constraint to the implementing agencies and enforcement agencies as the cost of repairing the infrastructure involves a high cost and requires a prolonged procedure. Hence, the increase in road accidents is caused by weather and physical factors that have more physical impacts. However, if road users are constantly cautious, road accidents can be avoided.

### *v. Natural Environment*

Natural environment factor is one of the causes of road accidents among road users. Accident cases due to natural environment factors become a nightmare to road users in the state of Terengganu. This is because the situation is difficult to anticipate and is beyond the control of road users. The analysis of the study shows that local people living in rural areas are involved in husbandry activities such as breeding goats, chickens, and cows and become the side source of income for them. These livestock are occasionally controlled by their owners and occasionally released. The selfish attitude and careless actions by releasing uncontrolled animal feed such as cows, buffaloes, sheep, and goats have adverse effects on local communities and road users. This makes their pets wandering around the main roads throughout the district in the state of Terengganu. This has led to the threat of accidents to road users, especially at night. Although enforcement has

been made against the owners and arrests of livestock, have been made, but livestock owners are still unconscious and be regret of the offenses committed. This situation gives the impacts to residents and road users due to the arrogance and stinginess of livestock owners to monitor their livestock. In the other hand, the accident also involves the cases involving road users and wild animals (tapir, tiger and wild boar) also occur especially in dark areas near the forest area. In fact, there are cases reported; fatal accidents often occur at night mostly involving vehicles and animals. Based on the accident data recorded by the LPT2, the accidents involving wild animals and livestock were the highest contributors to the category of physical influences in LPT2 of which 428 accident cases were recorded throughout the operation. This is a huge number and will increase if it is not resolved. However, the analysis shows that this factor has been successfully managed by highway management by establishing monitoring and fencing operations along the highway to prevent aggression from domestic animals and wild animals. As a result, the LPT2 managed to reduce the rate of accident cases involving wild animals and livestock in the LPT2 area each year.

#### vi. Solid Waste

Among the next physical factors that cause the accident are the effects of solid waste on the road. Based on the analysis, it shows that solid waste such as trash or waste that falls from vehicles such as trucks and Lorries is one of the causes of accidents. This is because the cargo on the rear of the vehicle is not placed in a safe and secure state. Waste from vehicles such as tires or pieces of broken tires that are often in the middle of the road may cause other drivers failed to avoid solid waste and rubbish which lead an accident. Additionally, solid waste factors are not just life-threatening and endanger other road users and pollute the environment. This is because these actions are done by some unmannered road users such as removing rubbish, especially plastic food bags and cigarette waste through vehicle windows. Due to these actions among consumers, it is unconsciously contributing to road accidents. Such treatment is a bad habit that needs to be changed in the community so that the cleanliness and safety of the roads are always ensured. Therefore, if each party has an awareness of their respective responsibilities, the traffic condition will go well, and road accident cases due to solid waste can be reduced.

As a conclusion, physical influence is one of the causes of road accident cases in the state of Terengganu. The analysis shows physical influences such as roads, vehicle conditions, seasons, weather, natural environment, and solid waste are among the causes of accidents occurring among road users in the state of Terengganu. While physical influence is one of the root causes of road accidents, road accidents cases due to physical influence is still low. Based on the case of an accident that has occurred, physical influence is interconnected and influenced by human influence.

## V. CONCLUSION

Based on the findings and discussions, the causes of road accidents in the state of Terengganu are largely due to two influences namely human influence and physical influence. However, based on the information obtained, the cases of accidents occurred are dominated by human influence such as negligence and human habits, drivers' fitness levels and also do not comply with rules and regulations. Due to the influence of human beings, the rate of road accidents in the state of Terengganu is difficult to overcome only by the enforcement authorities. However, physical influence is also the cause of road accidents such as surface and geography of roads, vehicles, seasons, weather, natural environment, and solid waste. Obviously, this study has proven that road accidents are caused by two factors namely human influence and physical influence. Therefore, preventive measures need to be made to address them, involving both parties, the most important of which is that road users themselves are the enforcement agency and implementing agency.

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## REFERENCES

- Ahmat, N. B., Nor, N. G. M., Zin, A. M., & Nor, A. H. S. M. (2011). Hubungan Kecelakaan Trafik dengan Pembangunan Ekonomi Malaysia. *Jurnal Ekonomi Malaysia*, 45(1), 81-87.
- Gabany, S. G., Plummer, P., & Grigg, P. (1997). Why drivers speed: The speeding perception inventory. *Journal of Safety Research*, 28(1), 29-35.
- Kementerian Pengangkutan Malaysia (2016). Indeks Kematian Akibat Kemalangan Jalan Raya.
- Lim, A. K. (2007). *Hubungan Sikap Pengguna Dengan Keterlibatan Dalam Kemalangan Jalan Raya: Kajian Kes Di Negeri Melaka [HE5614. 5. M2 L732 2007 f rb]* (Doctoral dissertation, Universiti Sains Malaysia).
- Mayer, R. E., & Treat, J. R. (1977). Psychological, social and cognitive characteristics of high-risk drivers: A pilot study. *Accident Analysis & Prevention*, 9(1), 1-8.
- Mohd Sunif, S. F. (2011). *Perkhidmatan Pengangkutan Awam Di Malaysia*. Fakulti Pendidikan Universiti Teknologi Malaysia. Universiti Teknologi Malaysia.
- Sabey, B. E., & Staughton, G. C. (1975). Interacting roles of road environment vehicle and road user in accidents. *Ceste I Mostovi*.
- WHO (2009) Global Status Report on Road Safety. 20 Avenue Appia, Geneva 27. [Cited 16 November 2014]. Available from: [www.who.int/violence\\_injury\\_prevention](http://www.who.int/violence_injury_prevention).
- Manan, M. M. A., Jonsson, T., & Várhelyi, A. (2013). Development of a safety performance function for motorcycle accident fatalities on Malaysian primary roads. *Safety science*, 60, 13-20.
- Borhan, M. N., Ibrahim, A. N. H., Aziz, A., & Yazid, M. R. M. (2018). The relationship between the demographic, personal, and social factors of Malaysian motorcyclists and risk taking behavior at signalized intersections. *Accident Analysis & Prevention*, 121, 94-100.
- Manan, M. M. A., Várhelyi, A., Çelik, A. K., & Hashim, H. H. (2017). Road characteristics and environment factors associated with motorcycle fatal crashes in Malaysia. *IATSS Research*.
- Sagberg, F. (1999). Road accidents caused by drivers falling asleep. *Accident Analysis & Prevention*, 31(6), 639-649.

- [13]. Petridou, E., & Moustaki, M. (2000). Human factors in the causation of road traffic crashes. *European journal of epidemiology*, 16(9), 819-826.
- [14]. Jones, I. S. (2016). *The effect of vehicle characteristics on road accidents*. Elsevier.
- [15]. Ismail, R., & Zaini, N. (2017). Pemanduan Berisiko Dan Agresif Serta Penilaian Terhadap Bahaya Dan Kemalangan Jalan Raya (Risky and Aggressive Driving, Perception towards Hazardous Situation and Road Accident). *E-Bangi*, 14(5).
- [16]. Biggs, J., Sherwood, S., Michalak, S., Hansen, L., & Bare, C. (2004). Animal-related vehicle accidents at the Los Alamos national laboratory, New Mexico. *The Southwestern Naturalist*, 49(3), 384-395.
- [17]. Mosedale, J., Purdy, A., & Clarkson, E. (2004). Contributory factors to road accidents. *London: Department of Transportation*.