

# TRAFFIC VEHICULAR ACCIDENT ANALYSIS AND ITS CORRELATIONS TO TRAFFIC MANAGEMENT OFFICE IMPLEMENTATION

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## Abstract

Puerto Princesa City experiences traffic because of the considerable volume of vehicles in the city, and there are sometimes causing of accidents that cause traffic. This paper presents the vehicular traffic accident analysis, Traffic Situation Analysis, and traffic system implementation and management. This study employed descriptive–correlational methods and document analysis. The results show that the Traffic situation in the city was heavy during peak hours in the morning, noontime, and late afternoon causing a traffic accident high severity ratio high daily vehicle entering and passing within the study area experienced heavy traffic most of the time; 20 hours of traffic congestion daily. The traffic flow rate is higher than the average daily traffic; the road capacity did not sustain the smooth traffic flow. The traffic management implementation program of the city did not affect the traffic systems analysis and the traffic situations, traffic accidents, transport spot speeds, and transport environment. The results of this study are significant and helpful in coming up with a good plan and traffic management systems for the city.

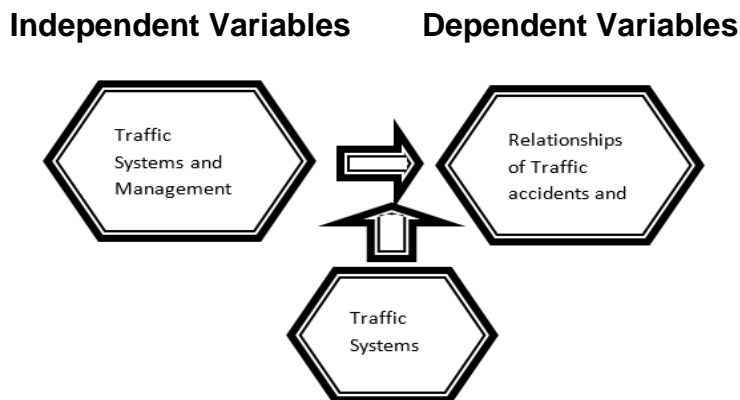
**Keywords:** Traffic Management, Traffic Accident, Traffic Accident Analysis, Traffic Correlation, Vehicular Traffic Accident Analysis, Traffic Situation Analysis, Traffic System Implementation

## INTRODUCTION

The government's biggest problem today is vehicular traffic congestion [1]. The Philippines is losing Php2.4 billion per day [2] due to traffic congestion that eats the time [3] that could have been used for productive pursuits [4]. There's always traffic everywhere, even in urban or rural areas [5]. There are so many ways because the roads become traffic. [6] Sometimes it could have an accident, or the drivers of any kind of vehicle did not give each other pass, especially on the part of intersection roads [7].

Engineers have a significant role in traffic management schemes [8]. They are responsible for creating and managing designs and operations that enable vehicle traffic's safe, efficient, and convenient flow [9]. One of the main roads in the said city, because of the bigger volume of vehicles in the city, there are sometimes causing of accidents cause traffic [10]. The width of the road does not fit the number of vehicles that pass through that road, so the road becomes traffic, and sometimes some vehicles park along the side of the road [11]. "The thrust of the City government on the smooth traffic flows, reducing accidents, and implementation the rules and regulations concerning traffic systems and management should be evaluated as to what extent of the level of implementation [12]. The growing number of vehicles in the city experienced that cause traffic [13], malfunctions of traffic control devices, narrow roads, lack of discipline among drivers, lack of awareness of the pedestrians on traffic codes and regulations, and accidents on roads [14], no centralized terminals for public vehicles are now experienced and happen in our

city as observed traffic problems. This problem needs to be addressed and given immediate attention [15]. The researcher analyzed the traffic systems of Puerto Princesa City to determine if what are the possible solutions needed to make to prevent vehicular traffic accidents. The general objective of the study is to analyze the traffic in Puerto Princesa City and the relation to its traffic management system and the vehicular traffic accidents. Specifically, it aimed to evaluate the traffic management scheme of Puerto Princesa City perceived by drivers and passengers, describe traffic system analysis, and correlate the traffic management scheme of Puerto Princesa City- Traffic Management Office to vehicular traffic accidents. Traffic management strategy performance goals set the traffic management vision, expectations, and goals. It provides accountability to the public needs for mobility and traffic safety. The increase in the population and transport utilities affected the orderly and smooth flow of traffic in the city [16]. However, re-routing, narrow roads, traffic transport systems, and parking along the sidewalks and road gutters affect the traffic encountered problem [17]. Based on these facts, the researcher conceptualizes that the traffic systems and management of the city are necessary to be evaluated as to how it was implemented and effectively and its relations to vehicular traffic accidents. Based on the model, the researcher came up with the researcher paradigm. This is shown below in figure 1.



**Figure 1: Research Paradigm**

## METHODOLOGY

This study used a descriptive design of research. The design is valuable for finding out the Traffic Management System of Puerto Princesa City and analyzing the traffic. In this study, a survey was conducted for the implementation of the Traffic Management System of Puerto Princesa City using a questionnaire. Also, this research used traffic indexing of the passing vehicles between major intersections of Puerto Princesa City. It also utilized the descriptive correlation method of query that compares the respondents on the level of implementation of the traffic system management of Puerto Princesa City and the traffic system analysis. The extent of the perception of the implementation and observance of the traffic system and management of the city was correlated to the traffic system

analyzed. To obtain a representative sample, the researcher used convenience–purposive quota sampling in which the respondents are selected subjectively by the researcher which equal representations of the sample/respondents distributions involved 100 pedestrians, 100 students, 100 Motorcycle Drivers, 100 Cab Drivers, 100 Private Vehicle Drivers, and 100 Tricycle Drivers.

## RESULTS AND DISCUSSION

### 1. Transportation and Traffic System Analysis.

The table below shows the engineering traffic systems analysis of the major cross-sectional intersection of the city. Figure 1-2 shows the different traffic situations during the study.

**Table 1: Traffic Situation Analysis and Traffic Accident Analysis**

Traffic/ Transport System Analysis Indicators	Values	Remarks
<b>A. Traffic Situation Analysis</b>		
Average Daily Traffic Hourly volume Traffic Spacing of Vehicles Traffic density Traffic index	40, 317 vehicle/day 1,680 vehicles/hour 19.86 m / Vehicle 1,472Vehicle/km<1,680vehicle /Km 8.3	Heavy Traffic Situation (Heavily dense traffic)
<b>B. Traffic Accident Analysis</b>		
Total number of Accidents Accident Rate Fatal Accidents Injuries Taken Property Damage Only (PDO) Severity Ratio	56 per day. 4 per million entering vehicles. 12 per day 2, 052 per day 916 per day 0.693 or 69.30 percent	Severe traffic Accident (69.30% traffic risk)

Table 1 shows the traffic/transport system situation of Puerto Princesa City. The traffic system analysis was analyzed according to four categories: traffic situation and traffic accident, the traffic situation analysis shows that the Traffic situation of Puerto Princesa City is heavy or heavily dense traffic which most pedestrians experience during peak hours in the morning, noon, and afternoon. The average Daily Traffic experienced in the city is 40, 317 vehicles /day, which causes congestion in every cross-section. And the Hourly volume of Traffic is 1,680 vehicles /hour, and during traffic hours, the Spacing of Vehicles 19.86 m / Vehicles, and these are close to each other. The daily traffic experienced shows a Traffic density of 1,472 vehicles/km<1,680veh /Km. This traffic analysis shows that the traffic situation in the city is moderate to dense. This traffics causes delays of goods, accidents, and delays of time travel of commuters and travelers. The Traffic Index 8.3. The traffic index determines the traffic situation of the road or intersection, proven by the traffic density of 1,472Veh/km<1,680veh/Km. The traffic accident analysis shows that the traffic accident rate of 4 million entering vehicles involves a yearly accident. The results show that the total number of Accidents is 56 counts per day. This involves all types of vehicular accidents. The Accident Rate of 4 per million

entering vehicles in a day were experienced. Thus, this means four vehicular accidents in every million passing by vehicles, and the fatality of vehicular accidents were measured. This show that the Fatal Accidents 12 per day. This means a fatal accident involves death or a severe condition that may cause death if a health emergency is not addressed on time. The injuries taken that involves minor accidents such as bumping, self-crash, and massive vehicular accidents shows that Injuries Taken is 2,052 individual per day. And the property damage involved during minor and major accidents resulted in Property Damage Only (PDO) of 916 per day, which means property damage to vehicles and other properties such as personal belongings. The severity ratio of a traffic accident in Puerto Princesa per year is 0.693 or 69.30 percent, this implies that the city is experiencing severe traffic accidents. The transport spot speeds analysis reveals that the peak hour factor of 0.933 reflects that 93.30 percent of the entering and passing vehicles experienced heavy traffic during peak hours.

The road design repetition (Road Lanes) of 29.43 Vehicles/Million indicates that the road should be widened to accommodate 29.43 entering vehicles at times along intersections. It shows that road widening is needed to avoid traffic conditions. Thus the road capacity cannot sustain the entering vehicles, and .this shows that the traffic environment is crowded. The actual photos of the traffic congestion of major intersections in Puerto Princesa City.



**Figure 1: Traffic congestion along Rizal avenue corner Lacao Street**



**Figure 2: Traffic Congestions along national Highway corner Junction 1 and 2**

**Table 2: Correlation with the traffic management scheme of the Traffic Management Office to Traffic Vehicular Accidents**

Traffic Vehicular Accidents	Correlation Coefficient	Relationship/Correlation	df	T - Statistics		Decision	Remarks
				Computed	Tabular (0.5)		
1. Implementations of Traffic System and Management Program	0.1099	Slight Relationship	27	0.5750	2.05	HO: Accepted	No Significant Correlation
2. Traffic Situation	0.8933	High Relationship	28	10.516	2.05	HO: Rejected	Significant Correlation
3. Implementation of the Traffic Codes, Rules, and regulations.	0.8958	High Relationship	29	10.853	2.05	HO: Rejected	Significant Correlation

**Legend:**

- Correlation Coefficient - Correlation
- 0 - No Relationships
- 0.01 to 0.10 - Negligible Relationships
- 0.11 to 0.20 - Slight Relationships
- 0.21 to 0.40 - low Relationships
- 0.41 to 0.60 - Moderate Relationships
- 0.61 to 0.80 - Substantial Relationships
- 0.81 to 0.90 - High Relationships
- 0.91 to 0.99 - Very High relationships
- 1.0 - Perfect Relationships

Table 2 shows that the relationships between the traffic systems analysis and the Implementations of the Traffic System and Management Program of Puerto Princesa City are slight correlation because of the correlation coefficient of 0.1099. The table also shows that the t-computed value of 0.5750 falls short with the t-critical value of 2.05 tested at 0.05 level of significance with  $df = 27$ , then the null hypothesis is accepted. Therefore, there is no significant relationship between Traffic vehicular Accidents and the level of implementation of the traffic system and management of the city. This means that the traffic management implementation program of the city did not affect the traffic Vehicular accident happen. This implies that the success of traffic management programs depends on the proper extent of implementation by concerned agencies. Thus, proper management be addressed to have a sound traffic system in the area. This also signifies that to ensure sound transportation systems and good governance, willpower is required to enforce properly and intensively the traffic management system program, thus causes of vehicular accidents entirely dependent on other factors such as commuters' and driver's behavior. The table shows a high correlation between the vehicular traffic accident and the traffic situations because of the correlation coefficient of 0.8933, and the null hypothesis was also rejected because the t- computed value of 10.516 exceeds the t- critical value of 2.05 tested at 0.05 level of significance with  $df = 28$ . Therefore, a significant relationship exists between traffic system analysis and vehicular traffic

accidents. Thus, the causes of accidents depend on traffic congestion and the number of vehicles entering per day.

This means that the traffic systems analysis of traffic situation, traffic accidents, transport spot speeds, and transport environment is affected by the possible causes of the traffic that resulted in vehicular traffic accidents. This implies that the perceived causes of traffic congestion cause traffic system problems. Thus, the respondent's perception that causes traffic problems is correct and eventually resulted in vehicular traffic accidents. This further signifies that this problem, as perceived by the respondents, causes traffic problems such as traffic situations being heavy, a traffic accident being highly experienced, transport spot speeds limiting vehicular speeds, and transport environments resulting in traffic congestion.

The table above reveals that the correlation coefficient is 0.8958. Thus, the correlation between a vehicular traffic accident and the level of implementation of traffic codes, rules, and regulations is high. The table also reflects that the  $t$ -computed value of 10.853 is greater than the  $t$ -critical value of 2.05 tested at 0.05 level of significance with  $df = 29$ , then the null hypothesis is rejected. Therefore, there is a significant relationship between vehicular traffic accidents and the level of implementation of traffic codes, rules, and regulations. This means that traffic codes, rules, and regulations affect the traffic systems, such as traffic situations and traffic accidents. This implies that improper implementation and observance of the traffic codes, rules, and regulations will cause traffic system problems resulting in vehicular traffic accidents. This further signifies that observance of traffic codes, rules, and regulations will affect the traffic system. Thus, self-discipline among pedestrians, drivers, and traffic law enforcers is required to have a smooth traffic system in the area. In general, an excellent and smooth traffic system is affected by proper implementations of traffic management schemes/programs, traffic codes, rules, and regulations, and it was also observed that existing traffic problems are caused by perceived causes of traffic. This implies that existing traffic systems analysis was affected by the perceived existing problems and level of implementation of traffic codes, rules, and regulations. Thus, they were correlated with each other.

## **CONCLUSION**

From the findings of the study, the following conclusions were drawn. The causes of traffic were the parking of different vehicles along sidewalks, slow investigation on the road, vehicular accidents that cause the increasing number of vehicles along the road, traffic light malfunctions, and the lack of discipline among pedestrians. Also, the community or the people were not aware of the traffic codes and regulations imposed by the city traffic management office, and some drivers had lack of self-discipline. The Traffic situation of the city is heavy during peak hours in the morning from 7:00 to 9:00, noontime from 11:00 to 1:00, and afternoon from 5:00 to 7:00. The Traffic accident severity ratio is severe in general, while traffic injuries, fatal accidents, and property damage are experienced moderately. The entering and passing vehicles in the major intersections experienced heavy traffic most of the time. The traffic flow rate is higher than the experienced average

of daily traffic. The road capacity did not sustain the smooth flow of traffic due to greater congestion and a heavy traffic environment.

The Traffic management implementation program of the city did not affect the traffic systems and the vehicular traffic accidents. The traffic accidents caused by traffic and transport systems analysis, over the crowded road, narrow roads, and lack of road networks and diversion roads, sidewalks were used as parking spaces. Thus, the implementation of traffic rules, codes, and policies affected vehicular traffic accidents. The best possible solution to minimize the cause of traffic problems and accidents was determined accordingly from more applicable to less applicable.

## **RECOMMENDATIONS**

Based on the conclusions made, the following are the recommendations and policy implications for consideration.

This study could be helpful as information for the awareness of traffic management in Puerto Princesa City. Also, this could be used to improve the existing management system of Puerto Princesa City. The result of this study will serve as a basis to evaluate the efforts of the Puerto Princesa City traffic management group to maintain the smooth flow of traffic and implement the rules and regulations on the roads and revisit the existing traffic codes of the City. This will increase people's consciousness of the importance of obeying traffic rules and regulations. When the proper traffic systems are implemented, it will lessen the carbon emission to our environment, and sound traffic transport systems will cause a good economy and attract investors.

To the traffic management and accident investigation office, this will serve as the basis of planning and could be the possible solution to the existing traffic problems. To the City Engineering Office of Traffic and Transportation, this gives insights and information regarding the implementation of traffic management systems existing in the city and will be a basis of proper planning for the city's traffic systems. For future researchers, this will serve as the basis and deepen the studies not cited here.

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