

Analysis of Traffic Congestion and Remedial Measures at Batu Pahat, Johor

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Abstract: Traffic congestion is a worldwide problem that wastes time and energy while also polluting the environment. The growing number of vehicles on the road, combined with increasing urbanization, creates a problem of congestion, which further complicates and hazard on city roads. Traffic congestion in town has gotten worse in recent years as a result of increased traffic volume and development, especially in Batu Pahat, Johor. The aim of this research is to identify the factors that cause the congestion at selected area, to investigate the traffic congestion toward the factors caused the congestion, and to determine the remedial measures to reduce this traffic congestion. For this research, different methods will be use, including document review, observation, and a questionnaire. This study describes the factors that contribute to traffic congestion on urban roads as well as potential solutions to the problem of traffic congestion. Furthermore, it would be beneficial in reducing the number of private motorized vehicles in the area in order to reduce traffic congestion and to prepare Batu Pahat town as a low-carbon city in the future.

Keywords: Traffic Congestion Analysis, Urban Road, Batu Pahat

1. Introduction

Traffic congestion has been increasing in much of the world, developed or not, and all indications are that it will worsen further, posing an undeniable threat to the quality of urban life. Congestion cities is becoming a major issue, particularly in Malaysia. Traffic congestion is a common occurrence in the transportation industry that occurs on congested roads due to the presence of cars and buses. Congestion impedes urban traffic flow and prevents it from flowing smoothly. A growing urban area creates complex traffic problem in daily life.

According to the [1] traffic congestion refers to the physical phenomena related to behavior or situations that prevent the movement of vehicles to each other in order to maximize the limited space on the road. Furthermore, congestion occurs as a result of a long queue of vehicles along the route, and the vehicle is unable to move smoothly due to certain obstacles. A crossroads and traffic lights are examples of barriers that can affect delays, accidents, floods, and road maintenance.

The growing reliance on private motorized transportation has resulted in massive traffic congestion, particularly in Batu Pahat, Johor. In Batu Pahat, Johor, the average daily traffic flow in 2017 revealed a large number of vehicles using the road, with 1,424 vehicles using the road daily basis [2]. Apart from a few specialized industrial zones in Batu Pahat, most of the areas are located near urban areas. This is done to ensure that the manufacturing sectors have a steady supply of labor and raw materials. However, it resulted in an increase in the number of vehicles on the road, which requires further investigation. This paper will analyse the current traffic situation and investigate the factors that contribute to traffic congestion and possible solutions to overcome this problem in the city of Batu Pahat, Johor, Malaysia.

2. Materials and Methods

A review of credible research philosophy and methodology is included in this section. Additionally, the methodology that was used to complete this study is discussed, as well as the techniques for data analysis and software were utilised. An in-depth examination of research methodology is considered necessary for the completion of the research. Observation and questionnaires are two of the methods used by the researcher to gather data and information for this research.

2.1 Material

A review material or instrument will be designed after a thorough review of the literature. Research employs two types of methods, observation and questionnaires.

i. Observation

Observations were made at the research site to calculate the percentage rate of vehicle types that were present at the same time. The data obtained will be presented in the form of bar charts to assist in the research and analysis of information.

ii. Questionnaires

In this method, the question method was chosen as the research method to be used. On Jalan Kluang, questionnaires will be handed out to members of the public who have expressed interest.

2.2 Method

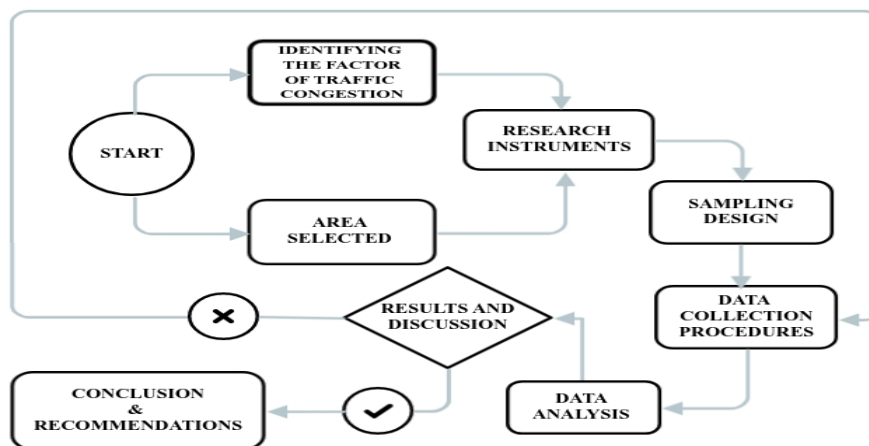


Figure 1: Flowchart of the Workflow of the project

2.3 Data Analysis Technique

SPSS was used as a data analysis tool in this study to aid in the data collection and analysis process. SPSS Statistics is a statistical analysis software package that can be used interactively or batch-processed. SPSS Inc. was acquired by IBM in 2009, and the company is now known as SPSS. SPSS is a statistical analysis programmed that is widely used in social science research. Also using it are market researchers, health researchers, survey firms, governments, researchers in higher education, marketing organisations, and data miners, among others [3].

2.4 Sampling Design

In this study, time, cost and other constraints, as well as the large population of road users in Batu Pahat, Johor, a convenience sampling method was used to collect data. Allows for the rapid completion of survey questionnaires, which saves money, and ensures that respondents are eager to participate in the study and provide the necessary information. An estimated sample size of 400 respondents will be determined prior to data collection. In terms of sample size requirements, the larger the sample size, the more likely the response will reflect the true picture of the population below [4].

3. Results and Discussion

There have been numerous previous studies on the factors that contribute to traffic congestion that have been identified throughout this study. To gather public opinion on the factors that have been listed, a questionnaire survey was conducted to solicit responses from the general public. To explain the results obtained, several distributions of data extracted from the SPSS software were used to explain the data. In addition, possible solutions to alleviate traffic congestion are listed in this paper and briefly discussed.

3.1 Traffic Volume Intensity

In the junction, a traffic volume study is used to determine the amount of movement of vehicles during a specific time period. It is used to determine how many vehicles are moving during peak and non-peak hours based on these data points.

Direction:

- Towards Parit Raja, Johor
- Towards Batu Pahat, Johor

Table 1: Number of vehicles towards Parit Raja, Batu Pahat on 28/11/2021

Vehicle	TIME		
	8:00- 9:00 AM	12:00-1:00 PM	5:00-6:00 PM
Class 1	95	142	324
Class 2	826	1073	1361
Class 3	27	15	13
Class 4	102	117	64

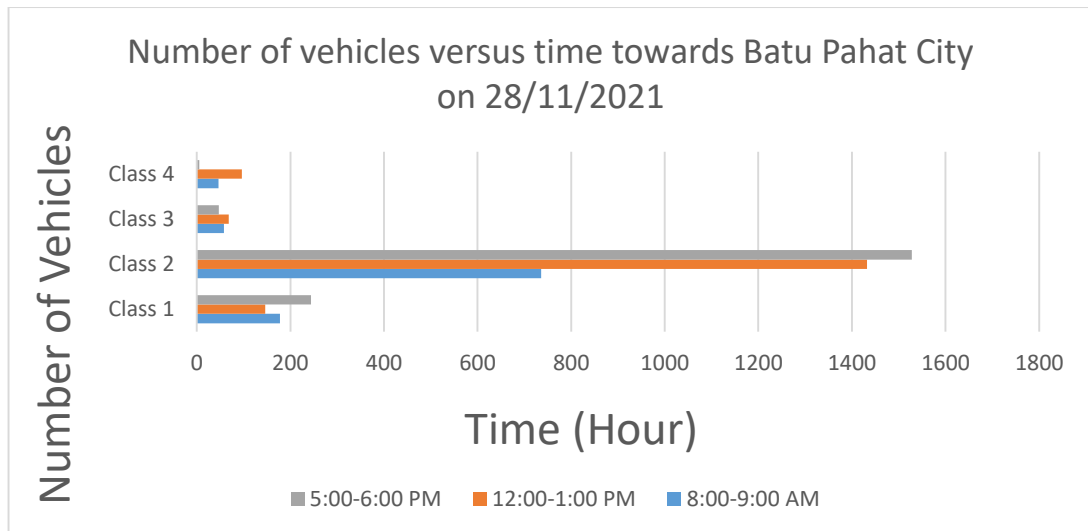


Figure 2: Number of vehicles towards Parit Raja, Batu Pahat on 28/11/2021

Table 2: Number of vehicles heading to Batu Pahat city

Vehicle	TIME		
	8:00- 9:00 AM	12:00-1:00 PM	5:00-6:00 PM
Class 1	178	146	244
Class 2	736	1432	1528
Class 3	58	68	47
Class 4	46	96	113

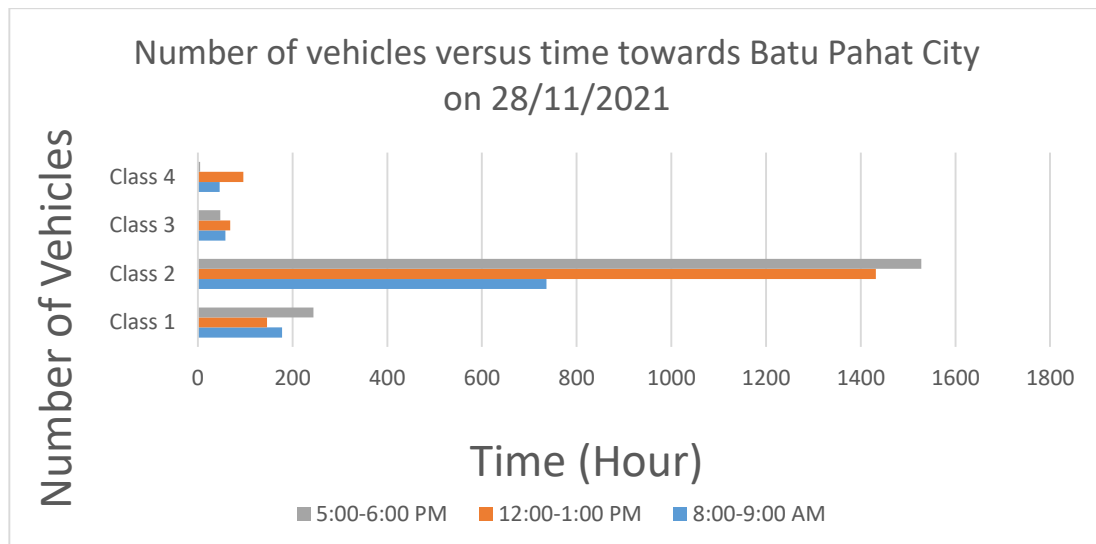


Figure 3: Number of vehicles versus time towards Batu Pahat city on 28/11/2021

3.2 Questionnaire/ Survey

This analysis is based on 400 responses from Jalan Kluang-Batu Pahat Road users, especially to Batu Pahat community. The questionnaires consist of 3 sections of question which are Section A (Demographic), Section B (The factor caused the traffic congestion) and Section C (Possible solution to reduce the traffic congestion). The process of gathering information about the opinions or experiences of a group of people through the use of questions.

3.3 Factor caused traffic congestion

According to the results, respondents support researchers in solving problems and determining the cause of road congestion problems in their area. Based on observations in the study area, the probability of the factor causing traffic congestion was determined to obtain the public's opinion on this list.

Table 1: Factors causing traffic congestion

Factor caused traffic congestion	Answer	
	Yes	No
	Count	Count
1. Do you think that traffic congestion worsens during the school day?	394	6
2. Did you experience the presence of animals on the roads and cause traffic congestion?	334	66
3. Do you think political, religious, and social rallies cause and increase traffic congestion?	333	67
4. Do you think young and less experienced drivers cause traffic congestion?	234	166
5. Are you satisfied with the infrastructure facilities on the federal road?	32	368
6. Are you satisfied with the performance of traffic police during traffic congestion?	46	354
7. Have you experienced severe traffic congestion due to a road accident?	378	22
8. I have difficulty staying in the correct lane.	232	168
9. I always check the condition of my vehicle before starting a journey.	204	196

3.4 Possible solution to reduce traffic congestion

Congestion can be alleviated by reducing traffic flow or increasing road capacity. Since the cause of this problem is local rather than generic, the solution is also unique to this case and cannot be applied to other cases in different cities. The summary statistics for the solutions proposed in this document are listed in the table 4 below.

Table 4: Number of vehicles heading to Batu Pahat City

Solution to reduce traffic congestion	N	Minimum	Maximum	Mean	Std. Deviation
1. Feel comfortable while crossing the road crossing during traffic congestion.	400	1	5	2.84	1.003
2. Use alternative routes to go to home during traffic congestion.	400	1	5	4.22	.686
3. Change the departure time to avoid possible traffic congestion.	400	1	5	4.26	.682
4. Support the idea of making pedestrian bridges on urban roads with traffic congestion	400	1	5	4.46	.591
5. Use public transport if the parties involved improve the public transport system.	400	1	5	4.32	.724
6. Carpooling rather than driving alone.	400	1	5	4.47	.656
7. Enforce existing road traffic laws for bad driver behavior.	400	1	5	4.53	.592
8. Create a simulator to optimize traffic time management so that the timers on each track have the intelligence to predict the right time.	400	1	5	4.52	.575
9. Adding additional roadway capacity by building entirely new roads and additional lanes.	400	1	5	4.54	.574
10. Faster assistance to vehicles involved in a collision.	400	1	5	4.52	.617
Valid N (listwise)	400				

4. Conclusion

In this paper, the factors of road traffic congestion caused by several factors and the possible solution to reduce traffic have been determined. Past studies are extremely valuable as a source of inspiration for the current research and as a means of determining whether the current research meets all of the criteria and theories. This study provides the government with an opportunity to assess the state of road safety in the country, review institutional policies, arrangements, and capacity, and take appropriate action.

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