



Traffic Congestion at Rumuokoro Intersection in Port Harcourt; Causes and Solutions

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Abstract Traffic congestion is a challenge along major roads and intersections in Port Harcourt. City. This has led to the construction of new flyovers at major intersections. Yet the problem is still there. This research seeks to identify the problems and provide sustainable traffic flow plan for Rumuokoro Intersection. A detailed traffic study was carried out and the factors causing traffic congestion were identified by the application of the Relative Importance Index (R.I.I) method from a keen questionnaire of 300 shared to road users. Also, traffic volume count was carried out directly during the field survey. Results of this study reveals road side market, inadequate road capacity, poor driver habit, inadequate bus stop facility, no pedestrian crossing facility as the major causes of traffic congestion at Rumuokoro Intersection according to the ranking.

Keywords Traffic congestion, Intersection, Flow, Speed

1. Introduction

Traffic congestion is a situation where the movement of vehicles is delayed because of a variety of reasons which includes bottleneck, bad weather, poor signal training, traffic incidents, ongoing road construction / maintenance, etc. It is as a result of great demand of traffic which causes vehicles to slow the speed of the traffic stream. Traffic congestion gets really extreme when the demand approaches the capacity of the road. Traffic congestion has created an artificial barrier to a cost effective flow of goods and persons along highways leading major towns together. An effective transportation system reflects the economic level and technological advancement of a society. Since the earliest large human settlement, cities and traffic have developed hand-in-hand. The usage and ownership of cars have grown into the current decade leading to induced traffic congestion in Port Harcourt, Rivers State. According to Kumar and Sing, (2017), traffic congestion is one of the intolerable problems of urban areas because of sudden increment in the private transport sector which is affecting the urban society and economy. Road traffic congestion constitutes serious challenges in large and growing cities (Rahane & Saharkar, 2013). According to Kumar and Sing (2017), congestion stops the movement of traffic leading to unbearable increase in travel time. Traffic congestion is a condition in transport that is characterized by increased vehicular queuing, slower speeds and longer trip times. Traffic congestion brings about stress or vexation, delays, inability to forecast travel time accurately and losses to drivers (increase in fuel consumption). In Port Harcourt, traffic congestion has been a constant problem for the sustainability of transportation development.

Various studies conducted in Nigeria's major cities have identified the primary causes of traffic congestion. Physical, technical, land use, and human factors are among the causes of congestion, according to Uwadiiegwu (2013). Numerous recommendations for a long-term fix have also been made. But in this region of the world, the debates tend to be either political or narrow-minded. Ignoring other issues that might be connected across the road network, they primarily concentrate on the issue that is most pertinent to their circumstance.



Traffic congestion at the Rumuokoro intersection has always caused a lot of problems amongst road users in Port Harcourt. In a bid to solve these problems, the state government constructed a flyover as shown in Plate 1 to reduce traffic at the intersection. Instead, traffic problems increased. According to Otto and Ogboda (2022), there are numerous urgings in respect of congestion and its principal cause at intersections where new flyovers were constructed in Port Harcourt based on political alignment without proper studies. The study by Otto and Ogboda (2022) has revealed that the construction of flyovers alone cannot solve traffic problems. This has been confirmed also at the Rumuokoro intersection. Therefore, there may be other factors causing congestion. This study, therefore, tries to identify the main causes of congestion at that intersection and provide sustainable solutions.



Plate 1: Traffic Congestion at the Newly Constructed Flyover at Rumuokoro Junction, Port Harcourt

2. Materials and Methods

2.1. Material

The materials/equipment used during the study include:

1. Tally sheet papers
2. Pen
3. Stopwatch
4. Measuring tape

2.2. Methods

In the field survey, the determination of traffic volumes and the physical geometric features of the adjoining road alignments at the intersection were done. The method adopted in the data collection was the manual counting method. In the manual counting method, field observers with prepared tally sheet papers, pen, stopwatch and measuring tape carried out the studies. The data was collected for one month at a suitable spot along each of the approach legs from 6:30am to 10:30am and 4:30pm to 8:30pm, which are the two-peak traffic periods of the intersection. At each of the spots, traffic counts for various classes of vehicles i.e., motorcycles, minibuses, buses, trucks, passenger cars, tricycles were carried out. The geometric features of the adjoining roads were measured and recorded to check if the road meets the minimum requirements.

Also, 300 questionnaires were shared to road users, including pedestrians, in order to gather data concerning the causes of traffic congestion at the intersection. This survey identified 10 risk factors on traffic congestion created by relevant research in traffic congestion in Port Harcourt. These questionnaires were collected by road



users and responded to appropriately. In the office desk study, computation and analysis of results were carried out. From the analysis done, conclusions and recommendations were made respectively.

In addition, the Relative Importance Index (RII) was used to analyze the causes of traffic congestion at the intersection. The critical stages of this research methodology includes identification of important causes of congestion, selection of participants using purposeful sampling, evaluation using a questionnaire test, reliability of the questionnaire, interaction and contrast of variables using correlation coefficient, analysis and ranking of causes, etc. The causes of traffic congestion along the intersection were produced from the road users. The causes, effects and solutions were listed in a well-structured questionnaire and were administered to 300 road users. Results gotten from the questionnaires were analyzed using the Relative Importance Index (RII). The RII was used to determine the actual causes of traffic congestion at the intersection, ranking from 1st to 10th. It is a four-scale system converted to R.I.I for each factor as shown below (Lim & Alum 1995).

$$R. I. I. = \frac{4n_1+3n_2+2n_3+n_4}{4N} \quad (1)$$

Where:

- n1 = number of respondents for strongly agree
- n2 = number of respondents for agree
- n3 = number of respondents for disagree
- n4 = number of respondents for strongly disagree

3. Results and Discussions

The results from traffic counts carried out at the intersection are presented in the table below.

Table 1: Average Traffic Volume Count at Rumuokoro Intersection

Direction	Right (Veh/hr)	Left (Veh/hr)	Straight (Veh/hr)	Returning (Veh/hr)	Into Rumuaholu (Veh/hr)	Total (Veh/hr)
From UNIPORT	88	268	248	130	90	824
From Elioizu	132	602	270	86	81	1171
From Airport	68	254	430	142	62	956
From Rumuigbo	280	330	484	434	75	1603
From Rumuaholu	81	130	324	42	31	608
					Total	5162

From the results presented in Table 1, the average traffic volume entering Rumuigbo is the highest. That is, vehicles from Elioizu turning left (602Veh/hr), vehicles returning to Rumuigbo (434Veh/hr), vehicles from Uniport turning right (88Veh/hr), vehicles from Rumuaholu going straight (324Veh/hr) and vehicles from Airport going straight (430Veh/hr) making a total number of 1878Veh/hr.

Considering Table 2, the traffic count shows that private cars are more on the road followed by buses, taxis and then trucks with the following percentages 40.24%, 31.02%, 18.02% and 10.72% respectively. This is expected since there is no functional public transportation system in Port Harcourt coupled with the fact that insecurity has taken the order of the day.

Table 2: Vehicle Distribution in Percentage (%)

Vehicle Type	Taxis	Private Car	Bus	Trucks
Number	930	2077	1601	554
Percentage (%)	18.02	40.24	31.02	10.72

3.1 Causes of Traffic Congestion at Rumuokoro Intersection

During the traffic survey, a well-structured questionnaire was developed from responses made by road users.

The results from the questionnaire are presented in Table 3.



Table 3: Causes of Traffic Congestion at Rumuokoro Intersection

S/N	Causes	n1	n2	n3	n4	N	R.I.I	Ranking
1	Road side market	101	81	33	16	231	0.788961	1
2	Poor driver habit	79	59	44	18	200	0.74875	3
3	Inadequate road capacity	94	85	42	23	244	0.756148	2
4	No packing facility	73	52	43	36	204	0.698529	6
5	No pedestrian crossing facility	61	94	67	42	264	0.664773	9
6	Too many buses and taxis	87	91	65	42	285	0.695614	7
7	Poor traffic control	66	53	55	29	203	0.692118	8
8	Inadequate bus stop capacity	70	55	35	21	181	0.740331	4
9	No U-turning facility under the flyover	100	94	45	34	273	0.738095	5

As earlier stated, 300 questionnaires were given out but 281 were collected. Using the Relative Importance Index (R.I.I), '**road side market**' ranked number 1 showing that it is the major cause of traffic congestion at the intersection. This is true because there are too many pedestrians close to the intersection trying to buy or sell. This has induced bottle neck on the road and as a result, caused congestion. Again, there are no internal roads linking the intersection and there's no on-street parking facility to help reduce congestion. It was also observed that the buses waste so much time at the bus stop for boarding and alighting of passengers, and as a result, causing long queues. On the other hand, more private vehicles were observed traveling and parking on the road based on field observations (See Table 2). If Port Harcourt's population growth is not reined back, this threat will only get worse.

4. Conclusions

The conclusions to this study were made on the basis of a complete findings based on the set objectives. The conclusions are as follows:

- i. The average volume of traffic at Rumuokoro Intersection is five thousand, one hundred and sixty-two vehicles per hour. This comprises of 40.24% of private cars, 31.02% of buses, 18.02% of taxis and 10.72% of trucks respectively.
- ii. The actual cause of traffic congestion at the intersection is '**Road Side Market**'.

5. Recommendations

From the findings and conclusions made in this study the following recommendations were made:

- i. The road side market should be eradicated. This will help to eliminate congestion at the intersection and reduce the risk of accident at the intersection.
- ii. A bus stop bay should be constructed off the road to ensure that the two-lane road at all times is free for traffic movements.
- iii. Introduce pedestrian walkways and crossing facilities to avoid vehicle to pedestrian accident. And also eliminate bottlenecks caused by pedestrians crossing the road.
- iv. Ensure the rule of law is upheld for every road user who acts against traffic laws.
- v. Develop a good public transportation system to reduce private car usage thereby increasing the road capacity.

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