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T-Test Hypothetical Analysis of the Causes of Traffic Congestion in Umuahia Metropolis

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Abstract:- *Research on the hypothetical analysis of the causes of traffic congestion in Umuahia metropolis was carried with a view to identify the perpetual causes of traffic congestion most during peak periods and consequently analyse their effects in their various degrees using the T-test. Traffic congestion in Umuahia, the capital city of Abia State, Nigeria has been frustrating and seeking for lasting solutions to this obvious problem was the main objective of this research work. In the process of the present research work, 48 causes of traffic congestion were identified and analyzed statistically from the understandings of "ROAD users" and "FRSC officers" who are major players in the studied environment through a means of responses to a set of questionnaires and severity index rankings. This lead to the establishment of an agreement based on the analyzed causes by both parties through the process of null hypothesis. And by agreement fully represented in the tables and null hypothesis, the ROAD users and FRSC officers collectively highlighted several factors as the most severe causes of traffic congestion in Umuahia; "Wrong parking on traffic pavement" that was ranked 1st and 2nd by ROAD users and FRSC officers with Is of 95.833% and 92.453% respectively. "Impatience and intolerance amongst drivers" that was ranked 1st and 4th by FRSC officers and ROAD users with Is of 93.711% and 90.104% respectively. "Construction of one lane instead of two" that was ranked 2nd and 3rd by ROAD users and FRSC officers with index of 91.667% and 91.195% respectively. "Poor road network" that was ranked 3rd by ROAD users with index of 91.146%. "High uneducated and unlicensed drivers" that was ranked 4th by FRSC officers with index of 90.567%. "Dilapidated roads and potholes" that was ranked 5th by ROAD users with index of 89.063%. "Small width of roadway" that was ranked 5th by FRSC officers with index of 89.937%. Consequently, this result will guide FRSC officers, ROAD USERS and GOVERNMENT in taking steps and making policies to reduce the traffic congestion in Umuahia metropolis.*

Keywords: *Hypothetical analysis, traffic congestion, Umuahia metropolis, T-test.*

1. INTRODUCTION

Urban traffic congestion and transport problem remains one of the nagging problems in urban transportation today. Urbanization according to (Osuji et al, 2009) noted myriad challenges to transportation system in relation to negative extremity such as traffic congestion and environmental risk. However the fact that cars have brought freedom and mobility to many people cannot be overlooked; but there is increasing concern about the health and environmental pollution through the smoke of the steaming vehicle in traffic congestion scene. The emergence of traffic and subsequently traffic congestion has opened up the need for improved traffic flow to ensure reduced travel time, safety and average fuel consumption and healthy environments (Ogwude, 2011). Road traffic congestion can be described as a physical observable fact relating to the manner in which vehicles hinder one another's progression and demand for limited road space approaches full capacity. Traffic congestion occurs when impatient drivers don't allow themselves to manoeuvre each other in a limited capacity road (Awosusi and Akindutire, 2010). The process of traffic congestion is also known as traffic jam or gridlock. Gridlock is a term used in describing the inability to move on a transport network. The study was aimed at identifying the factors which are responsible for traffic problems in Umuahia city, analyze these causes and come up with a clue on how the problem could be solved. Many other researchers have adopted different approaches in proffering solutions to problems relating to traffic congestion in different cities both in Nigeria and the developed countries of the world (Ogwude, 2011; Abbott, 2012; Momoh, 2011; Haruna, 2011; Igwe et al, 2011; Nwosu, 2014a; Oni, 2012; Osuji et al, 2013; Nwosu, 2014b; Popoola et al, 2013; Aderamo, 2010; Aderamo, 2012; Aderamo and Atomode, 2012; Awosusi and Akindutire, 2010; Uwadiegwu, 2013).

2. RESEARCH METHOD AND SAMPLING

Umuahia the capital city of Abia state in southern Nigeria is located between latitude 5^0 32^I and 5.533^000^I North of the equator and longitudes 7^0 29^I and 7.483^000^I East of the Greenwich meridian. It is located along the rail road that lies between Port Harcourt to Umuahia south and Enugu city to its north (Google, 2015). The data was collected by method of questionnaire shared to road users and FRSC agents and their responses collected on the degree of effect of each of the 48 factors identified as possible causes of traffic congestion in Umuahia metropolis. Each factor had respective option from I to IV, i.e. I. (Indifferent), II. (Do not Affect), III. (Mildly Affect), IV. (Strongly Affect).

Data Sampling

The Severity Index for all the identified causes of pavement failure was conducted as shown in Eq.1 (Al-Hazmi and Asaf, 1987);

$$Severity\ Index\ (Is) = \frac{\sum_{n=I}^{n=IV} a_n x_n}{\sum_{n=I}^{n=IV} x_n} \quad (1)$$

Where a_n= constant expressing the weight given to the n^{th} responses,

a_n= I, II, III & IV for n = I, II, III & IV respectively.

a_i = I is equivalent to "Indifferent"

a_{ii} = II is equivalent to "Do not Affect"

a_{iii} = III is equivalent to "Mildly Affect"

a_{iv} = IV is equivalent to "Strongly Affect"

While X_n is the variable expressing percentage of degree of importance of each factor,

X_I = Percentage of frequency of "Indifference"

X_{II} = Percentage of frequency of "Do Not Agree"

X_{III} = Percentage of frequency of "Mildly Agree"

X_{IV} = Percentage of frequency of "Strongly Agree"

The spearman's correlation coefficient was then carried out to ascertain the degree of agreement and deviation between the two parties under consideration for the causes of pavement failure identified with the expression in Eq. 2 (Inyama, 1995);

$$\lambda = 1 - \left[\frac{6\sum D^2}{n(n^2-1)}\right] \quad (2)$$

Where D= the difference between the rankings of each factor in both contractors and consultants,

n= the number of ranked factors.

Further, a t-test null hypothesis analysis was conducted to establish the degree of agreement between contractors and consultants on the causes of road pavement failure identified from study.

3. RESULTS AND DISCUSSION

Tables 1 and 2 represent the responses from road users and FRSC agents on the effect of the identified factors affecting traffic flow in Umuahia metropolis and the severity index (Is) and degree of ranking determine by Equation 1.

Table 1: *The Responses from 64 Road Users and Survey Evaluation*

S/N	CAUSES OF TRAFFIC CONGESTION	INDIFFERENT	DO NOT AFFECT	MILDLY AFFECT	STRONGLY AFFECT	INDEX Is %	RANK(R)
1	Wrong parking on traffic pavement	1	__	5	58	95.833	1
2	Dumping of refuse on road pavement.	2	1	11	50	90.104	4
3	Use of roadway for social actives.	1	3	14	46	88.021	7
4	Improper turning.	2	__	25	37	83.854	11
5	Use of one carriage way.	3	4	8	49	86.979	8
6	Small width of roadway.	3	2	10	49	88.021	7
7	Use of wrong curves.	__	5	26	33	81.25	13
8	Increase in volume of traffic.	1	4	14	45	86.979	8
9	Construction of one lane instead of two.	1	2	9	52	91.667	2
10	Lack of traffic signs and signals.	4	3	13	44	83.854	11
11	Badly located fuel stations.	4	8	27	25	71.354	25
12	Centralization of cities population.	4	8	22	30	73.958	23
13	Lack of street light in the night.	2	8	24	30	76.042	19
14	Too many schools along the road.	2	8	27	27	74.479	22
15	Excessive rainfall during the peak hour.	2	6	28	28	76.042	19
16	Erosion on the road pavement.	1	1	17	45	88.542	6
17	Wrongly located bus-stops.	3	4	25	32	78.125	17
18	Security checks points.	__	9	24	31	78.125	17
19	Dilapidated roads and potholes.	1	2	14	47	89.063	5
20	Impatience and intolerance amongst drivers.	2	__	13	49	90.104	4
21	Lack of pedestrian route.	4	2	24	34	79.167	16
22	Disregard to traffic regulations.	2	2	19	41	84.896	9
23	High uneducated and unlicensed drivers.	1	5	20	38	82.813	12
24	Absence of traffic warders.	__	4	22	38	84.375	10
25	Poorly maintained vehicles on the road.	1	5	16	42	84.896	9

26	Excessive road bump on a road.	1	19	19	25	68.75	26
27	Lack of overhead bridges.	5	5	17	37	78.125	17
28	Frequent use of sirens.	5	18	17	24	64.583	28
29	Presence of heavy trucks.	4	4	23	33	77.604	18
30	Poor drainage system.	__	3	17	44	88.021	7
31	Lack of road safety fence.	7	7	29	21	66.667	27
32	Poor road network.	3	1	6	54	91.946	3
33	Abandoned break down vehicles along the road sides.	3	3	21	37	81.25	12
34	Increase in number of vehicles due to its affordability.	1	11	23	29	75	21
35	Lack of alternative means of local transport (air or water transportation).	3	10	23	28	72.917	24
36	Unplanned road works with little or no practical diversions.	1	4	18	41	84.896	9
37	Lack of by-pass.	1	5	23	35	81.25	13
38	Waiting of buses during the peak hour while picking or dropping passengers.	1	3	20	40	84.896	9
39	So many cross junctions.	2	6	32	24	73.958	23
40	So many itinerant hawkers, vendors and road side trading.	1	7	21	35	80.208	15
41	Procession or demonstration on the road.	__	8	21	35	80.729	14
42	Accidents.	1	3	13	47	88.542	6
43	Lack of road shoulder.	3	4	23	34	79.167	16
44	Inadequate channelization at intersection.	2	3	25	34	80.729	14
45	Use of long barrier median.	6	7	20	31	72.917	24
46	Lack of auxiliary lanes towards intersection.	2	7	26	29	76.047	19
47	Lack of skid resistance surface.	6	10	22	26	68.75	26
48	Lack of a roundabout at road intersection.	4	9	17	34	75.521	20

Table 2: *The Responses from 53 FRSC Officers and Survey Evaluation*

S/N	CAUSES OF TRAFFIC CONGESTION	INDIFFERENT	DO NOT AFFECT	MILDLY AFFECT	STRONGLY AFFECT	INDEX Is %	RANK (R)
1	Wrong parking on traffic pavement	1	__	9	43	92.453	2
2	Dumping of refuse on road pavement.	2	1	22	28	81.132	13
3	Use of roadway for social actives.	2	6	20	25	76.101	19
4	Improper turning.	1	__	23	29	83.648	10
5	Use of one carriage way.	1	1	17	34	86.164	8
6	Small width of roadway.	__	__	16	37	89.937	5
7	Use of wrong curves.	4	2	25	22	74.214	21
8	Increase in volume of traffic.	1	__	14	38	89.308	6
9	Construction of one lane instead of two.	2	__	8	43	91.195	3
10	Lack of traffic signs and signals.	__	__	22	31	86.164	8
11	Badly located fuel stations.	__	5	34	14	72.327	23
12	Centralization of cities population.	2	3	28	20	74.843	20
13	Lack of street light in the night.	5	8	23	17	66.038	30
14	Too many schools along the road.	3	5	25	20	72.327	23
15	Excessive rainfall during the peak hour.	3	7	24	19	70.440	26
16	Erosion on the road pavement.	3	__	16	34	84.277	9
17	Wrongly located bus-stops.	1	4	14	34	84.277	9
18	Security checks points.	2	7	30	14	68.883	27
19	Dilapidated roads and potholes.	__	__	17	36	89.308	6
20	Impatience and intolerance amongst drivers.	1	__	7	45	93.711	1
21	Lack of pedestrian route.	2	4	20	27	78.616	16
22	Disregard to traffic regulations.	__	2	13	38	89.308	6
23	High uneducated and unlicensed drivers.	1	1	10	41	90.567	4
24	Absence of traffic warders.	__	1	23	29	84.277	9
25	Poorly maintained vehicles on the	1	2	20	30	83.019	11

	road.						
26	Excessive road bump on a road.	2	10	20	11	52.201	35
27	Lack of overhead bridges.	1	2	35	15	73.585	22
28	Frequent use of sirens.	2	16	25	10	60.377	33
29	Presence of heavy trucks.	__	__	25	28	84.277	9
30	Poor drainage system.	2	4	16	31	81.132	13
31	Lack of road safety fence.	5	20	14	14	56.604	34
32	Poor road network.	__	__	18	35	88.679	7
33	Abandoned break down vehicles along the road sides.	__	3	11	39	89.308	6
34	Increase in number of vehicles due to its affordability.	5	5	30	13	65.409	31
35	Lack of alternative means of local transport (air or water transportation).	2	10	24	17	68.553	27
36	Unplanned road works with little or no practical diversions.	2	2	25	24	77.987	17
37	Lack of by-pass.	3	4	25	21	73.585	22
38	Waiting of buses during the peak hour while picking or dropping passengers.	1	10	14	28	76.730	18
39	So many cross junctions.	4	6	21	22	71.698	24
40	So many itinerant hawkers, vendors and road side trading.	2	7	26	18	71.069	25
41	Procession or demonstration on the road.	3	7	28	15	67.925	28
42	Accidents.	2	1	20	30	82.390	12
43	Lack of road shoulder	1	5	18	29	80.503	14
44	Inadequate channelization at intersection.	__	3	27	23	79.245	15
45	Use of long barrier median.	3	10	23	17	67.296	29
46	Lack of auxiliary lanes towards intersection.	6	__	28	19	71.069	25
47	Lack of skid resistance surface.	9	4	23	17	63.522	32
48	Lack of a roundabout at road intersection.	1	1	21	30	83.648	10

From Table 1, it can be established that the ROAD users ranked "wrong parking on traffic pavement" 1st, "construction of one lane instead of two" 2nd, and poor road network as 3rd and from Table 2, FRSC officers in their assessment ranked "impatience and intolerance amongst drivers" 1st, "wrong parking on traffic pavement" 2nd, and "construction of one lane instead of two" 3rd. Generally, the severity indices were grouped according to respondents rating as follows:

"Strongly affect" causes: $75 < Is \leq 100$

"Mildly affect" causes: $50 < Is \leq 75$

"Do not affect" causes: $25 < Is \leq 50$

"Indifferent" causes: $0 < Is \leq 25$

Base on the ratings above, from Tables 1 and 2, ROAD users rated 37 causes as "strongly affect", 11 causes as "mildly affect", 0 cause as "do not affect" and 0 cause as "indifferent" while FRSC officers on the other hand rated 28 causes as "strongly affect", 20 causes as "mildly affect", 0 cause as "do not affect" and 0 cause as "indifferent". Table 3 shows the combined evaluation of both road users and FRSC officers on the identified factors under study.

Table 6: *Road Users versus FRSC Officers Survey Evaluation*

S/N	CAUSES OF TRAFFIC CONGESTION	ROAD USERS		FRSC OFFICERS	
		INDEX Is %	RANK(R)	INDEX Is %	RANK(R)
1	Wrong parking on traffic pavement	95.833	1	92.453	2
2	Dumping of refuse on road pavement.	90.104	4	81.132	13
3	Use of roadway for social actives.	88.021	7	76.101	19
4	Improper turning.	83.854	11	83.648	10
5	Use of one carriage way.	86.979	8	86.164	8
6	Small width of roadway.	88.021	7	89.937	5
7	Use of wrong curves.	81.25	13	74.214	21
8	Increase in volume of traffic.	86.979	8	89.308	6

9	Construction of one lane instead of two.	91.667	2	91.195	3
10	Lack of traffic signs and signals.	83.854	11	86.164	8
11	Badly located fuel stations.	71.354	25	72.327	23
12	Centralization of cities population.	73.958	23	74.843	20
13	Lack of street light in the night.	76.042	19	66.038	30
14	Too many schools along the road.	74.479	22	72.327	23
15	Excessive rainfall during the peak hour.	76.042	19	70.440	26
16	Erosion on the road pavement.	88.542	6	84.277	9
17	Wrongly located bus-stops.	78.125	17	84.277	9
18	Security checks points.	78.125	17	68.883	27
19	Dilapidated roads and potholes.	89.063	5	89.308	6
20	Impatience and intolerance amongst drivers.	90.104	4	93.711	1
21	Lack of pedestrian route.	79.167	16	78.616	16
22	Disregard to traffic regulations.	84.896	9	89.308	6
23	High uneducated and unlicensed drivers.	82.813	12	90.567	4
24	Absence of traffic warders.	84.375	10	84.277	9
25	Poorly maintained vehicles on the road.	84.896	9	83.019	11
26	Excessive road bump on a road.	68.75	26	52.201	35
27	Lack of overhead bridges.	78.125	17	73.585	22
28	Frequent use of sirens.	64.583	28	60.377	33
29	Presence of heavy trucks.	77.604	18	84.277	9
30	Poor drainage system.	88.021	7	81.132	13
31	Lack of road safety fence.	66.667	27	56.604	34
32	Poor road network.	91.946	3	88.679	7
33	Abandoned break down vehicles along the road sides.	81.25	12	89.308	6
34	Increase in number of vehicles due to its affordability.	75	21	65.409	31
35	Lack of alternative means of local transport (air or water transportation).	72.917	24	68.553	27
36	Unplanned road works with little or no practical diversions.	84.896	9	77.987	17
37	Lack of by-pass.	81.25	13	73.585	22
38	Waiting of buses during the peak hour while picking or dropping passengers.	84.896	9	76.730	18
39	So many cross junctions.	73.958	23	71.698	24
40	So many itinerant hawkers, vendors and road side trading.	80.208	15	71.069	25
41	Procession or demonstration on the road.	80.729	14	67.925	28
42	Accidents.	88.542	6	82.390	12
43	Lack of road shoulder.	79.167	16	80.503	14
44	Inadequate channelization at intersection.	80.729	14	79.245	15
45	Use of long barrier median.	72.917	24	67.296	29
46	Lack of auxiliary lanes towards intersection.	76.047	19	71.069	25
47	Lack of skid resistance surface.	68.75	26	63.522	32
48	Lack of a roundabout at road intersection.	75.521	20	83.648	10

From Table 3, it could also be observed that both parties rated most of them as "strongly affect" but different ranking for example "wrong parking on traffic pavement" as strongly affect while their rankings were 1st from ROAD users and 2nd from FRSC officers respectively. "Impatience and intolerance amongst drivers" rated as strongly affect was ranked 1st by FRSC officers and 4th by ROAD users. Some were rated as "mildly affect" while none was rated as "do not affect" and "indifferent".

Table 4 shows the deviation of responses between the two parties whose observations as they bother on the effect of the identified causes of traffic congestion are analyzed.

Table 7: *Computation of $\sum D^2$ and Spearman's Constant (λ)*

S/N	CAUSES OF TRAFFIC CONGESTION	ROAD USERS		FRSC OFFICERS		D^2
		INDEX Is %	RANK(R)	INDEX Is %	RANK(R)	
1	Wrong parking on traffic pavement	95.833	1	92.453	2	1
2	Dumping of refuse on road pavement.	90.104	4	81.132	13	81
3	Use of roadway for social actives.	88.021	7	76.101	19	144
4	Improper turning.	83.854	11	83.648	10	1
5	Use of one carriage way.	86.979	8	86.164	8	0

6	Small width of roadway.	88.021	7	89.937	5	4
7	Use of wrong curves.	81.25	13	74.214	21	64
8	Increase in volume of traffic.	86.979	8	89.308	6	4
9	Construction of one lane instead of two.	91.667	2	91.195	3	1
10	Lack of traffic signs and signals.	83.854	11	86.164	8	9
11	Badly located fuel stations.	71.354	25	72.327	23	4
12	Centralization of cities population.	73.958	23	74.843	20	9
13	Lack of street light in the night.	76.042	19	66.038	30	121
14	Too many schools along the road.	74.479	22	72.327	23	1
15	Excessive rainfall during the peak hour.	76.042	19	70.440	26	49
16	Erosion on the road pavement.	88.542	6	84.277	9	9
17	Wrongly located bus-stops.	78.125	17	84.277	9	64
18	Security checks points.	78.125	17	68.883	27	100
19	Dilapidated roads and potholes.	89.063	5	89.308	6	1
20	Impatience and intolerance amongst drivers.	90.104	4	93.711	1	9
21	Lack of pedestrian route.	79.167	16	78.616	16	0
22	Disregard to traffic regulations.	84.896	9	89.308	6	9
23	High uneducated and unlicensed drivers.	82.813	12	90.567	4	64
24	Absence of traffic warders.	84.375	10	84.277	9	1
25	Poorly maintained vehicles on the road.	84.896	9	83.019	11	4
26	Excessive road bump on a road.	68.75	26	52.201	35	81
27	Lack of overhead bridges/ fly over.	78.125	17	73.585	22	25
28	Frequent use of sirens.	64.583	28	60.377	33	25
29	Presence of heavy trucks.	77.604	18	84.277	9	81
30	Poor drainage system.	88.021	7	81.132	13	36
31	Lack of road safety fence.	66.667	27	56.604	34	49
32	Poor road network.	91.946	3	88.679	7	16
33	Abandoned break down vehicles along the road sides.	81.25	12	89.308	6	36
34	Increase in number of vehicles due to its affordability.	75	21	65.409	31	100
35	Lack of alternative means of local transport (air or water transportation).	72.917	24	68.553	27	9
36	Unplanned road works with little or no practical diversions.	84.896	9	77.987	17	64
37	Lack of by-pass.	81.25	13	73.585	22	81
38	Waiting of buses during the peak hour while picking or dropping passengers.	84.896	9	76.730	18	81
39	So many cross junctions.	73.958	23	71.698	24	1
40	So many itinerant hawkers, vendors and road side trading.	80.208	15	71.069	25	100
41	Procession or demonstration on the road.	80.729	14	67.925	28	196
42	Accidents.	88.542	6	82.390	12	36
43	Lack of road shoulder.	79.167	16	80.503	14	4
44	Inadequate channelization at intersection.	80.729	14	79.245	15	1
45	Use of long barrier median.	72.917	24	67.296	29	25
46	Lack of auxiliary lanes towards intersection.	76.047	19	71.069	25	36
47	Lack of skid resistance surface.	68.75	26	63.522	32	36
48	Lack of a roundabout at road intersection.	75.521	20	83.648	10	100
						$\sum D^2$=1973

The spearman's rank correlation coefficient between the ROAD users and FRSC officer's was calculated using Equation 2; ΣD^2= 1973; n = 48 thus;

$\lambda = 1 - [\frac{6x1973}{48(48^2-1)}] = 0.893$.

Test of Null Hypothesis

The null hypothesis, H_0 states that ROAD USERS and FRSC OFFICERS do not agree on the severity index ranking of the factors causing traffic congestion in Umuahia metropolis.

The t – test was used for this hypothesis.

Confidence limits = 95%

Degree of significance $\alpha = 0.05$

Decision rule: if $-\frac{t_\alpha}{2} < t < \frac{t_\alpha}{2}$ (Accept H_0)

If $t > \frac{t_\alpha}{2}$ (reject H_0)

Using $t = \lambda [\sqrt{(n-1)}]$ where $\lambda = 0.893$ and n = 48

$$t = 0.893\sqrt{(48 - 1)} = 6.122$$

From t – test table, $\frac{t_\alpha}{2}$ = 1.94 (Inyama and Iheagwam, 1995)

Thus t > $\frac{t_\alpha}{2}$ (Reject H_0), (Where H_o states that Road Users & FRSC Officers do not agree on the Severity index Ranking of the factors).

Therefore Rejecting "H_o" Implies that both ROAD Users and FRSC Officers agree on the causes of road pavement failure in Nigeria based on the analyzed factors.

4. CONCLUSION

From the foregoing, it can be deduced as follows;

- "Wrong parking on traffic pavement" was ranked 1st and 2nd by ROAD users and FRSC officers with index of 95.833% and 92.453% respectively.
- "Impatience and intolerance amongst drivers" was ranked 1st and 4th by FRSC officers and ROAD users with index of 93.711% and 90.104% respectively.
- "Construction of one lane instead of two" was ranked 2nd and 3rd by ROAD users and FRSC officers with index of 91.667% and 91.195% respectively.
- "Poor road network" was ranked 3rd by road users with index of 91.146%.
- "High uneducated and unlicensed drivers" was ranked 4th by FRSC officers with index of 90.567%.
- Dilapidated roads and potholes" was ranked 5th by ROAD users with index of 89.063%.
- "Small width of roadway" was ranked 5th by FRSC officers with index of 89.937%. from the results as shown in the Tables 1,2,3 and 4 and the null hypothesis test conducted, there strong agreement on the views of ROAD users and FRSC officers who are mojor players in the studied area and consequently recommend that drivers must be trained and re-trained to be properly enlightened on traffic rules, commercial drivers/buses should be relocated to approved parks to ease traffic at the heart of the town and strict enforcement on defaulters, functional traffic lights should be installed at major intersections in Umuahia to avoid traffic clashes or to improve traffic control, road maintenance agency in Umuahia should work on dilapidated roads and potholes and make the road useable by vehicles, There should be provision for picking and alighting of passengers along the road, and two lanes in place of one should be constructed to enhance easy movement of vehicles.

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