ASSESSMENT OF CAUSES AND UPSHOT OF INDISCRIMINATE INSTALLATIONS OF SPEED-BREAKERS ON TRAFFIC CORRIDORS IN AUCHI, EDO STATE

[1]Aiworo A. Barry & [2]Danjuma Mustapha

[1]Department of Urban and Regional Planning, Edo State Polytechnic, Usen

[2]Department of Urban and Regional Planning, Federal Polytechnic, Auchi, Edo State

Abstract

The main goal of transportation is the conveyance of people, goods and services from origin to destination. The question that arises in the course of movement is how efficient, convenient and safe is the road. The study concentrates on one component of traffic corridors – efficiency, convenience and safety and examine the causes and upshot of indiscriminate installation of speed-breakers on traffic corridors in Auchi. Road users are conscious of safety when on traffic corridors in urban environment. This enhances residents' behaviour and quality of life. Sequel to the above, the study investigates the resultant causes of installation of speed-breakers on the major corridors in Auchi (town or LGA?), examine the negatives and positive effect of speed breakers installation on the major network corridors in the study area and the negatives implications of speed bumps installation on the major traffic corridors in Auchi. 520 structured questionnaires were administered. The stratified random sampling method was applied. This was done by stratifying Auchi into different transport corridors. Table of random sampling was prepared to enable the study select the samples. The findings in the study revealed that the installation of speed bumps have a greater negative effect than positive effect on road users. The findings revealed that when speed breakers are installed indiscriminately on road network, it causes discomfort to drivers and passengers, damage to vehicles especially those with low clearance, increased travel time potentially leading to frustration and aggression, poorly placed speed bumps create traffic congestion, poor maintenance and damage on the sport where the speed bumps are placed. Nonetheless, there is reduction of speed and increased safety, improved pedestrian safety, enhanced traffic calming and so on.

Keywords: Speed-breaker, pedestrian, accident, hump, 'sleeping police'

Introduction

Auchi the administrative headquarters of Etsako West has witnessed tremendous changes in the internal structure due to population increase both natural and migration influx (Olatunde, Igbokwe, Olatunde & Adeboboye, 2014). Due to urbanization and fast development of major urban centre in Nigerian and Auchi in particular, the opening of new roads has become the order of the day for paving ways for physical and socio-economic development coupled with the use of automobile on the road network as a means of transportation in the urban centre. Automobile comes in various forms and types and each designed for a specific use, functions and purposes, such as; passenger vehicles, commercial vehicles, special vehicles, performance and luxury vehicles, alternative fuel vehicles, and so on. All of these vehicles utilize the road network system. The network corridors in densely populated areas most especially the residential and schools located areas are under pressure for one reason or the other - bad nature of roads, narrow roads. Some of the motorist driving those vehicles have no regards for human life and they drive carelessness to the extent, road crashes are on daily bases (Nakitto, Mutto, Howard and Lett, 2008). To prevent such road crashes, speed limit or speed

bumps on the road were introduce to reduce the speed of vehicles along the corridor in the residential and school zones.

Speed-breakers are referred to as 'speed bumps' or 'sleeping policeman' (Okoko, 2006). They are low-lying ridges constructed across the road to slow down the speed of vehicles approaching the intersection. They are often installed to reduce vehicular speeds in residential environment, school's zones and other locations where pedestrian's safety is of concern. The primary purpose is to encourage drivers to slow down and be more aware of their surroundings. Pedestrian safety in areas with high pedestrian traffic, such as near schools, parks, shopping centres, and so on, speed bumps are used to minimized the risk of accidents by forcing vehicles to reduce speed. Accident prevention in areas where accidents have been frequent, speed bumps are seen as an effective way to prevent speeding and reduce the risk of collisions (Aiworo, 2011). Neighbourhood sometime request the installation of speed bumps to address excessive speed or other roads safety concerns in their neighbourhoods.

Road crashes are the ninth leading cause of death among all age groups around the world (WHO, 2002; Aiworo, 2011). One of the most common methods employed for the same is construction of speed humps and other types of speed reducing devices (Lav et al., 2018). Providing speed humps are the most common type of traffic calming devices due to their less price and easy installation (Abdel-Wahed, and Hashim, 2017). In developing economies like India, a high proportion of the population use non-motorized vehicles like bicycle routinely (Patel & Vasudevan, 2016). According to Patel and Vasudevan (2016), speed humps are placed mainly to increase safety of non-motorized vehicles and pedestrians by providing discomfort, through shocks and vibrations, to the passengers and drivers in speeding cars. Due to faulty design of speed humps, the road user approaching the speed hump has to decrease the speed instantly creating sudden deceleration of the leading vehicle which may results in a rear-end collision. According to Abdel-Wahed and Hashim (2017) the presence of faulty speed bumps negatively affect the roadway level-of-service, since they increase delay due to increased travel times.

The study is very significant in reducing the major problems done by the indiscriminate implementations of the normal speed bumps, despite its higher cost and operational maintenance, it theoretically will solve the current problem fetch by the accomplishment of the current speed bumps.

The challenges facing indiscriminate installation of speed bumps on road network corridors include damage to road network, accident, traffic congestion, discomfort to drivers and passengers, damage to vehicles which result to frustration of motorist and other road users. It is against this backdrop that the present study seeks to examine the causes and effects of indiscriminate installation of speed bumps on traffic corridors with special attention given to Auchi, the study area.

Aim and Objectives

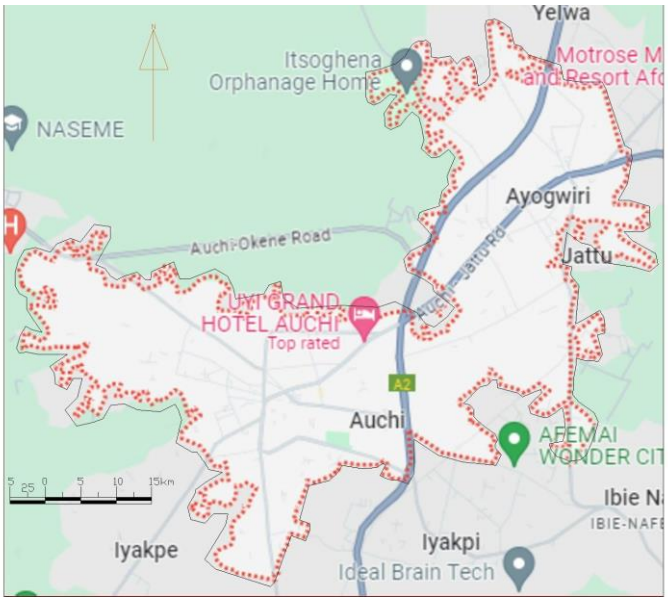
The aim of the study is to examine the causes and effects of the indiscriminate installation of speed bumps on road network system in Auchi. In pursuance of the above stated aim, the following objectives are set out to:

i. investigate the resultant causes of installation of speed breakers on the major corridors in Auchi.
ii. examine the negatives and positive effects of speed breakers installation on the major network corridors in the study area.

Description of Study Area

Auchi is a rapidly developing urban centre and the administrative headquarters of Etsako West Local Government area of Edo State, South-South Nigeria. Auchi is situated in the Northern part of Edo state. It is approximately 130km from the state capital, Benin City which comprises Auchi, Uzairue, South-Ibie, Agbede and Anwain clan. Auchi, is located along the major highway linking the Northern part to the Southern part of the Country (Nigeria) where some of the road corridors link to.

Fig 1: Map of Etsako West Showing Auchi



Source: Goggle Earth, 2025

Reconnaissance Survey

An in-depth study was carried out along the various traffic corridors in the study area to determine the rate of installation of speed bumps as indicated in fig. 2. This study was achieved through the uses empirical research where data collection is done by direct observation in the field, through interviews and the uses of questionnaires. Secondary data was collected before conducting interviews in the study area.

Literature Review

Bassani, Dalmazzo and Riviera (2011) evaluated the effectiveness of trapezoidal speed bumps, with an average spacing of 147m in reducing the operating speed of vehicles in the city of Turin (Italy). Among the numerous factors, speeding is considered to be a serious and hazardous factor for safety of road users since speeding upsurges the forces directed against them in a collision and diminishes the reaction time of drivers as well as pedestrians. Traffic engineers practice a diversity of approaches in

their efforts to regulate speeds of vehicles and to prevent crashes triggered by over-speeding. One of the most common methods employed for the same is construction of speed humps and other types of speed reducing devices (Lav, Bilgin & Lav, 2018). Providing speed bumps are the most common type of traffic calming devices due to their less price and easy installation (Abdel-Wahed & Hashim, 2017).

In developing economies like India, a high proportion of the population use non-motorized vehicles like bicycle routinely (Patel, & Vasudevan, 2016). According to Patel and Vasudevan (2016), speed humps are placed mainly to increase safety of nonnotarized vehicles and pedestrians by providing discomfort, through shocks and vibrations, to the passengers and drivers in speeding cars. According to Abdel-Wahed, and Hashim, (2017) the presence of faulty speed bumps negatively affect the roadway level-of-service, since they increase delay due to increased travel times. In such a traffic situation, providing speed humps regularly will only cause more discomfort and delay to road users.

Okoko (2006) assessing the usefulness of bumps on traffic corridors, opined that bumps are used in conjunction with other road signs for example, to give way to traffic on the left or children crossing. This method of traffic control assumes that motorist will behave rationally, obey traffic regulations and pay due cognizance to the bumps.

Methodology

Ten selected routes were focused on and these corridors include Auchi Polytechnic Road and ICE Road, Ottaru Road, Old Prisons Road, Jattu Road, Ekhie Girls Road, Old Igarra Road, Warake/Constance Momoh Road, Igbie Road, Secretarial Road, Public Field Road. Acceptable sample sizes were selected from arterial roads and the adjoining collector and distributor roads. It was estimated that, about 200 buildings each are located along the identified roads and 50 buildings each for 5 adjoining collector and distributor roads in the Auchi. A total of 520 questionnaires were distributed for this research. Nevertheless, a table of random sampling was prepared to enable the researchers select the samples.

Sampling procedure

In this study, the stratified random sampling method was applied. This was done by stratifying the Auchi into different transport corridors. Thereafter, the lists of houses in the various transport corridors and the randomly picked adjoining streets were obtained from the field before the houses to administer questionnaire for the research were chosen from each transport corridor and the adjoining street.

Methods of Data Analysis

To achieve the stated objectives, data that were collected from various sources were analyzed descriptively and statistically. Descriptive analysis involved description of data using charts, tables and other cartographic methods. Statistical analysis on the other hand involved the use of figures and statistical methods.

Results and Discussion

From the study, the results from data analysed are discussed thus as follows:

Table 1. Age Distribution of Respondent

Age	Frequency	Percentage
11 -20	16	3.1
21 -30	84	16.2
31- 40	143	27.5
41- 50	171	32.9
51 -60	102	19.6
61 and above	4	0.8
Total	**520**	**100**

Source: Field Survey, (2024)

Table 1 shows age distribution of respondents. Bulk of the respondents are within the ages of 21 - 30, 31 - 40, 41 - 50 and 51 - 60. These represent 16.2%, 27.5%, 32.9% and 19.6% respectively. Only 3.1% and 0.8% are within the ages of 11 – 20 and 61 and above respectively.

Table 2. Sex Distribution of Respondents

Sex	Frequency	Percentage
Male	368	70.8
Female	152	29.2
Total	**520**	**100**

Source: Field Survey, (2024)

Table 2 shows sex distribution of respondents. The respondents were made up of 70.8 percent and 29.2 percent of male and female respectively.

Table 3. Monthly Income of Respondents

Income (naira)	Frequency	Percentage
30,000 – 69,999	70	13.5
70,000 – 120,000	107	20.6
121,000 – 200,000	178	34.2
201,000 -300,000	90	17.3
301,000 – 400,000	67	12.9
401,000 and above	8	1.5
Total	**520**	**100**

Table 3 shows the economic status of the respondents. 20.6% of the respondents falls in the monthly income of 70,000 – 120,000 naira. 34.2 % of respondents earn 121,00 - 200,000 naira monthly. 17.3% and 12.9% interviewed said their monthly income fall within 201,000 -300,000 naira and 301,000 – 400,000 respectively. Only 1.5% of respondents have a monthly income of 401,000 and above.

Table 4: Road Corridor and Levels of Installation of Speed breakers in Auchi

S/No	Road Corridors	No of Speed Breakers on Each Road Corridor
1	Auchi Polytechnic and ICE Road Corridor	16
2	Ottaru Road	9
3	Old Prisons Road	10
4	Jattu Road	11
5	Ekhie Girls Road	21

6	Old Igarra Road	17
7	Warrake/Constance Momoh Road	19
8	Igbe Road	14
9	Secretariat Road	8
10	Public Field Road	4
Total		**129**

Source: Field Survey, (2024)

Table 4 shows that Ekhie Girls Road, Warrake/Constance Momoh Road, Old Igarra Road, Auchi Polytechnic and ICE Road Corridor and Igbe Road have 21, 19, 17, 16, and 14 speed bumps respectively in Auchi, while Jattu road, Old Prison road, Ottaru road, Secretariat road and Public Field road corridors have speed bumps installation of 11,10, 9, 8 and 4 respectively. Igbe Road has a direct link to the high way, occupied by residential and commercial buildings along the road corridor and a hub for commercial activities. These activities led to indiscriminate installation of speed bumps on the road for traffic calming and reduction of speeds. These conditions are applicable to Auchi Polytechnic and ICE Road Corridor, Ottaru road and Jattu road. Old Igarra Road is the location of Government Reservation Areas (GRAs) and also occupied by administrative building such as Etsakao West Ministry of Commerce, State Security Service Office, Immigration Office, NYSC Office, Ministry of transportation, Water Board, Etsako West Ministry of Education and others.

Table 5: Type of Road Network

Type of Road Network	Frequency	Percentage %
Arteria Roads	1	1
Distributor/Collector Road	39	37.5
Local Access Road	65	61.5
Total	**105**	**100**

Source: Field Survey, (2024)

Table 5 reveals the type of roads in the study area. From the results 61.5% of the roads are local access road, while 37.5% are distributor/collector roads and only 1% is arterial road. Thus, this confirming that the majority of roads with breakers installation in the study area the local access roads in the built up area.

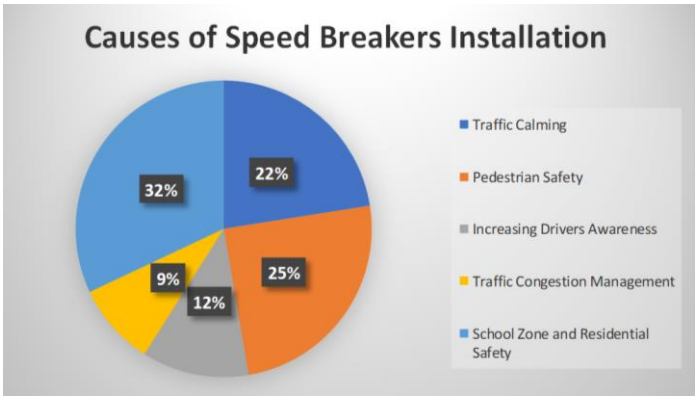


Fig. 3: The Causes of Speed Breakers Installation on Road Network.

Source: Field Survey, (2024)

According to the respondents, Fig. 3 shows the major causes of speed breakers installation on roads in the study area. These include school zones and residential safety (32%), pedestrian safety (25%) and traffic calming (22%).

Table 6: The Negative Effects of Speed Breakers on Road Network

The Envisaged Negative Effects of Speed Breakers on Road Corridors	Frequency	%
Discomfort to Drivers and Passengers	95	18.8
Damage to Vehicles	90	17.6
Increasing Travel Time	155	29.6
Maintenance and Repair Costs	105	20
Damaging of Road Network System	75	14
Total	**520**	**100%**

Source: Field Survey, (2024)

Table 6 shows the negative effects of speed bumps installation on road in the study area. 29.6% of the entire respondent said that the indiscriminate installation of speed bumps increases travel time in the study. This corroborate the work of Abdel-Wahed, and Hashim, (2017) that the presence of faulty speed humps negatively affects the roadway level-of-service, since they increase delay due to increased travel times. 20%, 18.8% and 17.6% were of the opinion that indiscriminate installation of road bump increases maintenance cost of vehicle and automobile, causes discomfort to drivers and passengers and damage to vehicles respectively.

Table 7: The Positive Effects of Speed Bumps on Road Network

The Envisaged Positive Effects of Speed Bumps on Traffic Corridors	Frequency	%
Reduction in Speed	140	26.9
Improved Pedestrian Safety	210	40.4
Reduction in Accident Rates	135	26
Reduction in Noise Pollution	25	4.8
Enhanced Drivers Awareness	10	1.9
Total	**520**	**100%**

Source: Field Survey, (2024)

Table 7 shows the positive effects of speed bumps installation on traffic corridors in the study area. 40.4% of the respondent says that the installation of speed bumps improves Pedestrian Safety within the study area. 26 percent of the respondents admit that installation of speed breakers has reduced accident rate in Auchi. 26.9 percent respondents opined that speed breakers brought about the reduction in speed of automobiles within the study area. 4.8 percent and 1.9 percent of respondents were of the view that installation of 'sleeping police' accentuated to reduction in noise pollution and enhanced drivers' awareness respectively.

Conclusion

In conclusion, the speed bumps installation on road network corridor has a greater negative effect most especially when installed indiscriminately. It was revealed from interview that the indiscriminate installation of speed bumps in the study area causes discomfort to drivers and passengers, damage to vehicles especially those with low clearance, increased travel time which potentially leading to frustration and aggression, poorly placed speed bumps create traffic congestion, poorly maintenance and damage on the sport which the speed bumps is placed and so on.

Recommendations

The research however recommends that;

1. Installation of speed bumps should follow the prescribed standard such as the minimum distance as recommended by ministry of roads and bridges in Edo State.
2. Individuals should not be allowed to install speed bump except on the supervision of the ministry concerned.
3. Speed breaker should be placed between 40-60m apart to achieve overall speed of 20-30km/hr and greater spacing up to 100m can be used for speed of 50km/hr.
4. The design of speed bumps should be circular speed bump or trapezoidal speed bump.

Reference

Abdel-Wahed, T. A., and Hashim, I. H. (2017). Effect of speed hump characteristics on pavement condition. Journal of traffic and transportation engineering (English edition), 4(1), 103-110.

Aiworo, B. A. (2011) Access Pattern and Travel risks among School Children in Benin City. Department of Urban and Regional Planning, Faculty of The Social Science, University of Ibadan, Ibadan. *Unpublished M.Sc. Thesis.*

Abdulmawjoud, A. A., Jamel, M. G., and Al-Taei, A. A. (2020). Traffic flow parameters development modelling at traffic calming measures located on arterial roads. Ain Shams Engineering Journal.

Bartlett, J. E., Kotrlik J. W. and Higgins C. C. (2001) Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning, and Performance Journal, 19(1).*

Bassani, M., Dalmazzo, D., and Riviera, P. P. (2011). Field Investigation on the Effects on Operating Speed Caused by trapezoidal humps. In Proceedings of the Transportation Research Board 90th Annual Meeting, Washington, DC, USA (pp. 23-27).

Lav, A. H., Bilgin, E., and Lav, A. H. (2018). A fundamental experimental approach for optimal design of speed bumps. Accident Analysis & Prevention, 116, 53-68.

Nakitto, M.T; Mutto, M; Howard, A. and Lett, R. (2008) Pedestrian Traffic Injuries among School Children in Kawempe, Uganda, Makerere Medical School, Uganda, *African Health Science,* 2008 September; 8(3)

Okoko, E. (2006) *Urban Transportation Planning and Modelling*, Akure, Millennium Publishers.

Oladunde, I. O. and Adeboboye, O. (2014). Application of GIS and remote sensing techniques in land use analysis of Auchi urban centre, Edo State, Nigeria. International Journal for Engineering and Management Science (JEMS), 5(II)

Patel, T., and Vasudevan, V. (2016). Impact of speed humps of bicyclists. Safety science, 89, 138-146.

WHO, Department of Gender and Women's Health (2002) Gender and Road Traffic Injuries. Geneva.