CHALLENGES ASSOCIATED WITH THE USE OF FOOT-BRIDGE FACILITY IN THE NIGER DELTA REGION, NIGERIA.

[1]DAMINABO, SARAH I & [2]OSI S. AKPOGHOMEH

[1]Centre for Logistics and Transport Studies,
University of PortHarcourt
[2]Department of Geography and Environmental Management,
University of Port Harcourt

Abstract

The exponential growth of vehicular traffic has exposed pedestrians in the Niger Delta Cities to accidents and are marginalized with the mobility networks.The aim of this study was to evaluate the challenges associated with the use of foot-bridge facility in the Niger Delta Region. The cross-sectional survey research design was used as a blueprint while the questionnaire wasused to gather data for this study. The descriptive statistics was used for the analysis.The expressed opinion of the respondents revealed that in the Niger Delta Region the major challenges associated with the poor use of footbridge facility were dilapidated structures such as broken floor andpoor construction of the foot-bridges. The study recommends that dilapidated foot-bridges as a matter of urgency needs complete reconstruction, to be attractive to pedestrians to make use of.

Keywords: *Challenges, Foot-bridge, Pedestrians*

Introduction

The increasing number of flyovers coupled with speed, the frequency of accidents involving the pedestrians is on the increase therefore in order to ensure the entitlement of the pedestrians in terms of mobility, safety and convenience, slow and fast vehicular traffic crash barriers, such as dividers and pedestrian railing on the central verge or media are often provided, including the foot-over bridges (FOB). Many at times, the FOB's and pedestrian crossings are underused or neglected along major roads where they are erected. As a result, the pedestrians are seen jaywalking and climbing over the barriers and railings in order to cross highway, high speed roads and flyovers. Thus, it is necessary to provide wide, conducive/convenient and safer pedestrian corridors (Demirbz*et al.*, 2015).

According to theNational Highway Traffic Safety Administration (NHTSA, 2018) report, Pedestrians are involved in 13% of vehicle-related fatalities. In response to the high rate of loss of lives and properties along major highways, foot-bridges were introduced on roads yet compliance to the use of these footbridges has been low especially in developing countries including the Niger Delta region of Nigeria.Ritzatiet al., (2013) identified several factors such as fence installation, directional flow, existing of median, vehicle volume and the distance of this facility as challenges affecting the utilization of the crossing bridges inKuala Lumpur, Malaysia.It is against this background that the study examines the challenges associated with the use of foot-bridge in selected states of the Niger Delta Region of Nigeria.

Literature Review

Empirical Review

Rasanen, et al., (2007) in their study with on the use of foot-bridge crossings found out that the use of foot-bridge facilities was a habitual action rather than being a pedestrian's coincidental behavior. From this outcome, it was concluded that people who utilize the foot-bridge in the past are more likely to use it in the future, and those who usually cross on the street level are going to do so as well. Some other studies found that the main factors of shunning

away from the foot-bridges are: lack of time, laziness and the fear for attacks and robbery.

A study was therefore done by the Department of Civil Engineering, Zarqa University (2013) to evaluate the pedestrian bridges and safety and to relate the percentage use of pedestrian bridges with the possible factors affecting the use of pedestrian bridges using the Regression model. To achieve the objective of the study, samples of pedestrian bridges were chosen especially those found at dangerous crosswalk locations and the following were concluded from the result:

- The pedestrian bridges have a positive impact and a great potential of reducing number of pedestrian fatalities.
- The main factors that were affecting the use of pedestrian bridges are the posted speed limits, the overall width of the crosswalk and the existence of median barrier.
- Results of the analysis revealed the main causes of pedestrian accidents as factors related to the pedestrian, such as ignoring traffic controls and crossing at inappropriate locations and disregarding caution. On the other hand, factors related to the driver are more common, such as speed, disregarding crosswalks and violations of traffic control devices. Effective countermeasures were proposed to reduce the frequency and severity of pedestrian accidents in Jordan.
- The role of pedestrian bridge is not being fully implemented, because over 60 percent of pedestrians still choose not to use the pedestrian bridges for varied reasons. Females use it more than males and children more than adults do.
- Reason of not using the bridge include the discomfort and waste of time due to extra walking distance, the high stairs, health reasons or fear of safety/security.
- The provision of crosswalks/ pedestrian bridges next to schools, decreases injuries to children by car accidents drastically.
- Pedestrian bridges or overpasses are appropriate when there is high speed or high traffic flow, where there is considerable pedestrian delay or high pedestrian accident problems. Proper evaluation of these

parameters can help in identifying the most appropriate locations for installing pedestrian bridges.

Theoretical Review

Configurational Model

Configurational model emphasizes on the role that various aspects of the built environment have on influencing pedestrian movement dynamics. The most well researched and widely utilized application of configurational approaches is the space syntax approach, which originated at the University College London in the United Kingdom in the early 1980's (Hillier and Hanson, 1984). Over 300 articles and four books have been published using space syntax, as well as a variety of reviews which focus on space syntax. The method has also been used successfully in a variety of applied planning and transportation studies in the United Kingdom and abroad (SSL, 2004). The space syntax approach is based on measuring objective patterns of spatial relationships and linking these to patterns of movement within urban environments (Hillier *et al* 1993). This is done through topological, graph-based analysis of pedestrian networks, which represents accessible spaces as nodes in a graph and processes their relationships using standard graph theory measures (Hillieret al., 1993). This model is linked to this study in that pedestrians in the region have difficulties in assessing built pedestrian infrastructures.

Methodology

Research Design

The cross-sectional research survey design was used for this study. The choice of this design is due to the fact that it enabled the researcher to ask random sample of individual questions about their backgrounds and past experiences as well as the challenges they face in using footbridges in the region.

Participants

The population for this study consisted of pedestrians in the capital cities of the Niger Delta region of Nigeria. The pedestrians comprised of school children (primary and secondary school children), the aged (Elderly road

users), the hawkers (those that hawk things along traffic and major roads were pedestrian footbridges are located), young adults, and wheel barrow peddlers.

Study Area

The research study area is the Niger Delta region of Nigeria. The Niger Delta region consists of nine (9) states and they are Abia, AkwaIbom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers. However, the study focuses on six (6) out of the nine (9) states. The states include AkwaIbom, Bayelsa, Cross River, Delta, Edo and Rivers. Consequently, the choice of the states was informed by the need to analyse the level of pedestrian foot-bridge usage in the states historically connected traditions and lifestyles. The traditional occupation of people in this area is predominantly fishing and farming.

Table 1: Population Projection of Selected Niger Delta States/Capitals

State	Capital	2013	2014	2015	2016
AkwaIbom	Uyo	4,785,078	4,950,568	5,121,781	5,482,117
Bayelsa	Yenagoa	2,088,154	2,149,597	2,212,849	2,277,961
Cross River	Calabar	3,544,120	3,648,404	3,755,757	3,866,269
Delta	Asaba	5,144,961	5,312,262	5,485,004	5,663,362
Edo	Benin	3,906,039	4,012,938	4,122,764	4,235,595
Rivers	Port Harcourt	6,595,659	6,823,767	7,059,764	7,303,924
Total		26,064,011	26,897,536	27,757,919	28,829,228

Source: *NDR Survey-Based on National Population Commission, 2016*

Research Instrument

The research instrument used in this study is the structured questionnaire. This was directed to the respondents (road users). The questionnaire was administered to the respondents in order to ascertain information about the challenges associated with the use of foot-bridge facilities in the Niger Delta region of Nigeria.

Validity and Reliability of the Research Instrument

A pilot test was conducted from sampled population for the purpose of establishing the validity of the research instrument before administering to the target population. The result of the pilot test was used to correct vague noticed in the initial draft of the instrument. The content validity of the instrument was assessed by a Lecturer in the Department of Geography and Environment, University of Port Harcourt.

Sample and Sampling Techniques

The survey was carried out on all road users. A systematic sampling technique was used in administering the instrument. The reason for this approach was to give room for every category of pedestrian to be selected. On each of the foot-bridge, the instrument was administered by selecting each respondent after the interval of two.

In determining the sample size for this research, the Taro Yamane's formula given as *(equ 1)* will be used:

$$n = \frac{N}{1 + N(e)^2} \quad \text{..... (equ 1)}$$

Where:

n = sample size
N = population size (28,829,228)
e = level of significance (our level of significance is chosen at 5%)

Applying the formula at significant level of 5%;

$$\frac{28{,}829{,}228}{1+28{,}829{,}228\,(0.05)^2} = \frac{28{,}829{,}228}{72{,}074.07} = 399.99$$

Therefore, the calculated sample size was approximately 400. However, for more reliability of the sample mean as an estimator of the population, the sample size was increased by 100% to give a sample size of 800 for the study. Thereafter, a total of 580 road users were sampled. This figure excluded road users fromBayelsa and Delta which do not have foot-bridges at the time of this survey. Furthermore, a total of 483 questionnaires were retrieved and used for the analysis (See Table 2).

Table 2: Computed Sample Size Proportional Allocation to Selected Niger Delta States

S/No.	Niger Delta State	Capital	Population of capital city	Sample size (principle of proportionality)
1	AkwaIbom	Uyo	5,482,117	$\frac{5,482,117}{28,829,228} \times 800 = 152$
2	Bayelsa	Yenagoa	2,277,961	$\frac{2,277,961}{28,829,228} \times 800 = 63$
3	Cross River	Calabar	3,866,269	$\frac{3,866,269}{28,829,228} \times 800 = 107$
4	Delta	Asaba	5,663,362	$\frac{5,663,362}{28,829,228} \times 800 = 157$
5	Edo	Benin	4,235,595	$\frac{4,235,595}{28,829,228} \times 800 = 118$
6	Rivers	Port Harcourt	7,303,924	$\frac{7,303,924}{28,829,228} \times 800 = 203$
	Total		28,829,228	800

Source: *Researchers field survey, 2019*

Method of Data Analysis

The use of simple statistical techniques like tables, percentages, and chartswere employed to show distribution. The adoption of descriptive statistics is to enable the researcher get an express opinion of the participants.

Results and Discussion

Data Distribution

Table 3: Questionnaires Administered to the Respondents

S/No.	State Capitals	Number of administered questionnaire	Number of questionnaire retrieved	Response Rate (%)
1	Uyo	152	102	67.1
2	Yenagoa	0	0	0
3	Calabar	107	84	78.5
4	Asaba	0	0	0
5	Benin	118	105	88.9
6	Port Harcourt	203	192	94.6
	Total	**580**	**483**	**83.3**

Source: *Field Survey, 2019/2020.*

Table 3 shows the distribution of questionnaires to respondents in individual states. The Table shows that Yenegoaand Asaba have no foot-bridge as at the time of this research,hence no questionnaire was administered to those city capitals. Consequently, the sample size was reduced to 580. Furthermore, a total of 483 questionnaires were retrived and used for analysis (see Table 2 and 3).

Challenges Associated with Foot-bridge Usage

The challenges associated with the use of foot-bridge compliance in the Niger Delta region are shown in Table 4 and Fig. 1,state by state.

Table 4: Summary of Challenges of Foot-bridge Usage Acrossthe Niger Delta Region

S/N	Challenges	AkwaIbom	Cross River	Edo	Rivers	Grand Mean (Relative %)
1	Dilapidated structures such as broken floor	3.17	3.15	3.23	3.11	3.17(45.3)

2	They are poorly constructed	2.99	3.08	3.25	3.16	3.12 (44.6)
3	Lack of shelter or cover	2.78	2.81	2.80	2.96	2.86(40.9)
4	Robbery cases	2.72	2.80	2.97	2.85	2.83(40.4)
5	Absence of Railings	2.69	2.73	3.11	2.72	2.81(40.1)
6	Inadequate space to accommodate high volume of users	2.25	2.42	2.81	2.56	2.53(36.1)
7	Kidnapping	2.31	2.26	2.49	2.26	2.33(33.3)

Mean Criterion: If mean score is greater than the mean criterion of 2.50 we accept the factor otherwise reject.
Source: *Researchers field work 2019/2020*

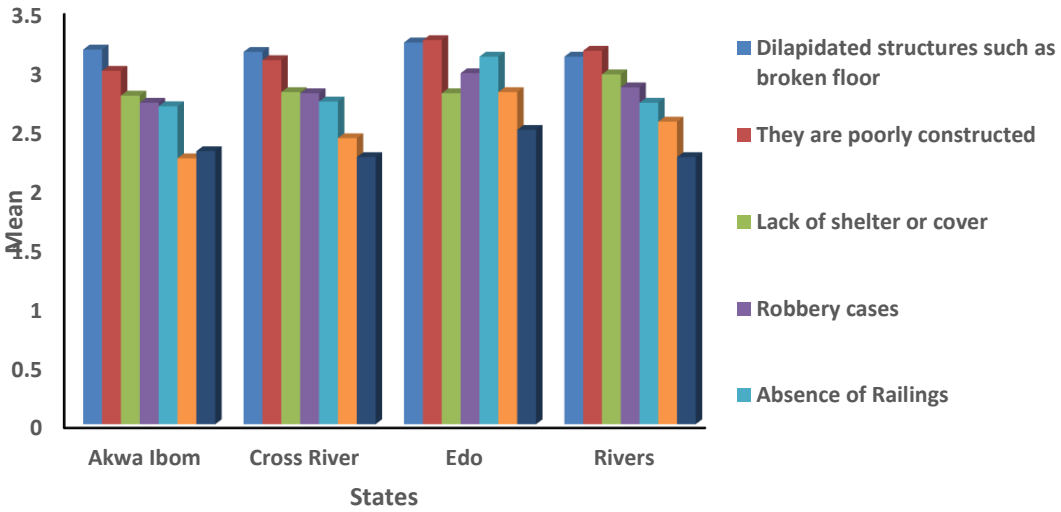


Figure 1: Challenges of foot-bridge usage across the Niger Delta Region

Table 4 and Fig 1show relative contribution of each challenge associated with the use of foot-bridge facility in the Niger Delta region of Nigeria. It shows that dilapidated structures such as broken floor had a higher percentage of

45.3% when compared to other challenges, they are poorly constructed (44.6%), Lack of shelter or cover during sun or rain (40.9%), robbery cases (40.4%), absence of railings (40.1%), Inadequate space to accommodate high volume of users (36.1%) and kidnapping (33.3%). The following sub-sections discussed each perceived challenge in ascending order;

- **Dilapidated Structures**



Plate 1: Showing the dilapidated state of the foot-bridge at presidential/federal secretariat, Port Harcourt

Table 4 shows that dilapidated structures was a major concern associated with the use of footbridge facility in the Niger Delta Region as it ranked 1st with a mean value of 3.17. Plate (1) clearly shows that the foot-bridge structures available in this region are poorly maintained; shaky structures, broken floor, rusted railings etc. This also coincides with the study of Hilary *et al.,* (1993) who opined that infrastructure collapse is as a result of poor maintenance, poor materials and dilapidated suspended bridges.

Poorly Constructed Foot-bridges



Plate 2: Showing poor construction of the Foot-bridge at Watt market, Calabar

This challenge ranked 2nd from the pool of responses of respondents as a challenge associated with the non-use of foot-bridge facility in the Niger Delta Region. It was observed that most footbridges within the study area are poorly constructed in terms of inadequate space, broken floor, no handrails, unpaved floor, absence of coverings etc.

Lack of Shelter during Rain



Plate 3: Showing the Presidential/Federal Secretariat foot-bridge, Port Harcourt without covering.

Lack of shelter during rain/Sun was identified as another challenge associated with the use of footbridge facility in the Niger Delta Region by respondents accounting for 40.9% when compared to other challenges. The high level of non-compliance to the use of foot-bridge facility could be attributed to the fact that all the pedestrian foot-bridges in the Niger Delta Region are without shelter, but for the one by NDDC, making pedestrians vulnerable in an event of a rainy or sunny weather, bearing in mind that the Niger Delta Region is located in the heart of the Tropical rain forest where it rains for most months of the year.

Robbery Cases

Further examination of Table 4, revealed that robbery cases is another form of challenge inhibiting the use of foot-bridge as it ranked 4th with a mean value of 2.83. In an interview with one of the respondents by name Ola, he said “I was once robbed at the UNIBEN foot-bridge on my way from lectures to my house as a result of overcrowding, the pick-pocket criminal took my wallet and my

phone in the midst of the crowd since then I don't bother using the foot-bridge as its always crowded".

Absence of Railings



Plate 4: Showing absence of railing on the air force/first bank foot-bridge Port Harcourt

This was seen as another challenge seating on 5th position with a mean of 2.81. Although, few foot-bridges in the study area had hand railings, but they were too old, shaky, rusty, dusty and dangerous to touch as seen in Plate 4

Inadequate Space to Accommodate High Volume of Users

Pedestrians in the Niger Delta region ranked this challenge 6th with a mean score of 2.53 accounting for 36.1%. As it was observed in the study that during the peak period when there is vehicular traffic, the tendency of using the footbridge becomes high, thence as a result of insufficient space to accommodate the influx of individuals, pedestrians prefer to take the risk of running across the road rather than squeezing themselves at foot-bridge locations.

Conclusion and Recommendations

The study concluded that dilapidated structure such as broken floor was a major challenge associated with the poor use of foot-bridge facility in the Niger Delta Region. Hence, the study recommends that:

- Dilapidated footbridges as a matter of urgency needs complete reconstruction, to be attractive to pedestrians to make use of.
- Efforts should be made by the state governments to relocate insane citizens that have turned footbridges into their place of abode into mental or rehabilitation centers. This will give pedestrians the confidence that they won't be attacked by these mentally deranged people.
- Foot-bridges should be made user friendly during its construction. This will include giving it a standard cover to encourage its use during the raining and high sunny days, bearing in mind the wet nature of the Niger Delta Region.
- Constant maintenance culture should be enforced by the government or relevant ministry concerned.
- Refuse collection centers should be placed far from the pedestrian bridges to discourage the practice of dumping refuse at the foot of the steps that gives access to the pedestrian bridges like the case at the pedestrian bridge at St John Port Harcourt.
- The proper lighting of foot-bridges at night should be enforced, to keep hoodlums away from the foot-bridges at night.
- Foot-bridges should be constructed to accommodate pedestrians with disability by addition of ramps to enable wheelchair users to have access to the foot-bridges.
- The location of foot-bridges should be at busy areas with heavy clusters of pedestrians, for example, bus stops, schools, churches, mosques, markets, federal and state secretariat complexes etc.

- The relevant bodies responsible for the construction of foot bridges in the various states of the Niger Delta region should ensure they make the walkway of foot-bridges wider to accommodate nursing mothers pram, disable wheelchair, and pedestrians should also see the act of climbing the foot-bridge to cross the road as a means of exercising their bodies and aiding their heart to function better.

- Yenegoa, the capital city of Bayelsa State is in dire need of pedestrian foot-bridge as Opolo market days (Thursdays) in the city causes heavy traffic jam due to high pedestrian traffic, same traffic is witnessed around Okaka Community Primary school where a market (which buys on Tuesdays) is also located. Same traffic is observed at Suwali market. The construction of pedestrian bridges at these busy centers will help protect the lives of children, and other pedestrians.

References

Demirbz, Y. I. Onelcin. P., & Alver. Y., (2015). Illegal Road Crossing Behavior of Pedestrians at Overpass Locations: Factors Affecting Gap Acceptance. Crossing Times and Overpass Use. *Accident Analysis and Prevention*, 80 (1), 220—228.

Ferreira, M. A. & Sanches, S. P. (2001). Índice de QualidadedasCalçadas - IQC. *Revista dos TransportesPúblicos,* 91(2), 47-60.

Hillier, B. & Hanson, J., (1984). *The Social Logic of Space.* Cambridge University Press, Cambridge.

Hillier, B., Penn, J.H,M & Grajewski T.J. Xu, (1993). Natural Movement: or Configuration and Attraction in urban Pedestrian Movement. *Environmental and Planning B Planning and Design* 20(1): 29-66.

Institute of Health Metrics and Evaluation, (2017). Global Report on Safety.

Rasanen, M., Lajunen, T., Alticafarbay, F. & C. Aydin, (2007). Pedestrian Self-reports of Factors Influencing the use of pedestrian bridges. *AccidentAnalysis and Prevention,* 2(1):969–973.

Ritzati, H., S.Z. Ishak & I.R. Endut. (2013). The Utilization Rates of Pedestrian Safety in Malaysia. *In IEEE Business Engineering and Industrial Applications Colloquim (BEIAC)*, Langkawi, Malaysia, 646-650.