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Evaluation of Architectural and Other Safety Measures Against Bomb Blasts in Market: An Avenue to Improve Security in Nigeria

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ABSTRACT: *Nigerian markets have been facing the problem of bomb blasts and they occur mostly in the Federal Capital Territory (FCT) and northern part of the country. Thus, conducting a research in FCT market became necessary, since it is located in Nigeria; the aim was to evaluate the architectural and other safety measures against bomb blasts in the market, in order to generate guidelines to improve security in Nigeria. 419 sales points were studied and questionnaires were administered to 419 buyers in the market via random sampling method, in order to obtain the primary research data. Focus group discussions that were made up of five buyers were organised in conjunction with direct observation schedule in the market to also obtain the primary research data. The secondary research data were gotten from the reviews of relevant literatures to this study. Tables and photographs were used to analyse the data of this research. Among the findings from this research are: there are no adequate architectural design against bomb blasts in the market, and the vehicles that are gaining access into the market are not well checked against bomb blasts. Among the recommended guidelines are: adequate architectural design against bomb blasts should be provided in Nigerian markets, and the security personnel should be properly checking the incoming vehicles against bomb blasts in markets in Nigeria.*

KEYWORDS: bomb blasts, guidelines, markets, Nigeria, security.

INTRODUCTION

The threat from bomb blasts in Nigerian markets remains real and serious (Ewetan and Urhie, 2014). Bomb blasts can occur at any time without warning and markets can be directly

or indirectly affected. According to Centre for the Protection of National Infrastructure (2010), the acts of bomb blasts vary in terms of scale and purpose. They are not just about violent attacks on people and properties but the tarnished reputations can cause immediate or long-term harm to businesses. Places of business such as markets need to be prepared against bomb blasts because they have negative effects on the economy of a nation. A considered and up-to-date security plan that is appropriate for markets and in proportion to the risks they face can help to protect against the worst possible consequences. To improve security against bomb blasts in Nigerian markets, the need for the passive and active safety measures against them cannot be over emphasised due to the frequent bomb blasts in the country (Ewetan and Urhie, 2014; Walker, 2012).

Passive safety measure is making building designs against bomb blasts, while active safety measure is an avenue to protect buildings against bomb blasts by means of security gargets and personnel (Centre for the Protection of National Infrastructure, 2010; Smilowitz, 2016). Markets should possess a security plan to protect their most valued assets and prepare their responses against bomb blasts via both passive and active safety measures. The planning of safety measures against bomb blasts must not evolve in an arbitrary or ad-hoc manner (Centre for the Protection of National Infrastructure, 2010). To be effective, the safety plan against bomb blasts must be built on information about almost every aspect of markets in both present time and into the future. It must be fully integrated with everyday operations, supply chains and routines in market places.

Public places such as markets in Nigeria have been experiencing bomb blasts which are traceable to Boko Haram Group; they have led to a severe threat on the socio-economic life in the country (Walker, 2012). Markets are public places where many people go for business transactions (Chabbi-Chemrouk, 2007; Ngugi, 2015). Hence, analysing the passive and active safety measures against bomb blasts in Nigerian markets is absolutely important because of the persistence problem of bomb blasts in the country. According to (Walker, 2012; Elijah, Edem and Etuk, 2015), Nigeria has witness bomb blasts mostly in the northern part and Federal Capital Territory (FCT); among the public places of these threats are markets. For example, bomb blasts killed four people and injured thirteen people on 31st December, 2010 at Mammy market of Sani Abacha Army Barrack in Abuja in the FCT of Nigeria (Telegraph Media Group Limited, 2010). Also, about 20 people died on 29th May, 2011 from bomb blasts at Mammy market of Gadawanta Barracks in Bauchi State of Nigeria (AllAfrica, 2011). Plate I shows the scene and victims of bomb blast at Mammy market of Gadawanta Barracks in Bauchi State.

Plate I: Scene and Victim of Bomb Blast at Mammy Market of Gadawanta Barracks in Bauchi State [Source: Vanguard Media Limited, 2011 (https://www.vanguardngr.com/2011/06/aftermath-of-bomb-blast-survivors-groan-mammy-market-traders-count-losses/)].

In addition, on 7th March, 2015, there was also a bomb blast that killed 10 people and left other people injured in Baga fish market in Maiduguri, Borno State of Nigeria (Pulse News, 2015). Moreover, bomb blast killed 30 people on 9th December, 2016 at a local market in Madagali in Adamawa State of Nigeria (Premium Times, 2016). Plate II shows the remains of the victims of bomb blast in Madagali market in Adamawa State.

Plate II: Remains of the Victims of Bomb Blast in Madagali Market in Adamawa State [Source: Total and Grand News, 2016 (http://www.tgnews.com.ng/2016/12/11/adamawa-bomblast-police-reports-says-only-33-people-died-and-56-injured/)].

Based on the bomb threats in Nigeria, this study was therefore aimed to analyse the architectural and other safety measures against bomb blasts in the market in FCT, in order to generate guidelines to improve security in Nigeria. Objectives of this study were: to evaluate the architectural design of the market against bomb blasts; to assess the availability and adequacy of security gargets against bomb blasts in the market; to determine the adequacy and effectiveness of security personnel against bomb blasts in the market. The scope of this study is the entire selected market in the FCT with all its buildings and security infrastructures. The market is located at the Abuja Municipal Area Council of the FCT of Nigeria. According to Nnodim (2011), the Federal Capital Territory (FCT) of Nigeria is the capital city of Nigeria and Abuja is located in its central area.

METHODS AND PROCEDURES

This research utilised descriptive survey method; generated quantitative and qualitative data. There are seven regional built-up markets under the control of FCT Markets Management Committee in the Federal Capital Development Authority of Nigeria (Federal Capital Development Authority of Nigeria, 2016). These seven regional built-up markets are few in

numbers. Therefore, by using purposive sampling method, the market in the Abuja Municipal Area Council was selected for this study because it has been rated as one of the largest markets in the FCT of Nigeria (Abuja Markets Management Limited, 2016). Therefore, it became important that lessons should be learnt from this market with regards to the safety measures against bomb blasts.

The instruments that were used to obtain the primary research data are questionnaires, discussions and direct observation schedule. According to the managing company of this market (Abuja Markets Management Limited, 2016), there are 1,365 lock-up shops in the old block and 220 lock-up shops in the new block of the market, making it a total number of 1,585 lock-up shops. Also, there are 500 open stalls and six detached restaurants in the market. Thus, by summing up the numbers of lock-up shops, open stalls and detached restaurants in the market, it mathematically implies that there are 2,091 sales points in this market. 20% sample size of the target population of the study is a good recommended sample size (Prashant and Supriya, 2010; Steve, 2011; Suresh and Chandrashekara, 2012). Hence, 419 sales points in the market were studied at every 5^{th} interval of the sales points in conjunction with other infrastructures. Questionnaires were randomly administered to one buyer in the premises of each of the sales points that was studied; this means that a total of 419 questionnaires were randomly distributed to the buyers in the market. The 419 selected sales points that were studied and where 419 questionnaires were distributed to the buyers are slightly above 20% of the total number of sales points in the market and this in turn has made the sample size to be acceptable.

According to Masadeh (2012); Morgan, Gibbs, Maxwell and Britten (2002), the outstanding benefits of using the method of focus group in a research is acquired in smaller groups of four or five participants. Thus, focus group discussion that was made up of five buyers was organised in the market to adequately and efficiently maximise the outstanding benefits of the research instrument in addition to the direct observation schedule for the purpose of this research. Focus group discussion was conducted with the buyers and questionnaires were administered to them, so that there can be no reluctance in providing true and detailed information to the researchers, since they do not have any connection with the management authority of the market. Secondary research data were collected from the reviews of relevant literatures to this research. Tables and photographs were employed to analyse the research data.

DATA PRESENTATION AND DISCUSSION OF RESULTS

Data from the respondents with respect to the architectural design of the market against bomb blasts; availability and adequacy of security gargets against bomb blasts; the adequacy and effectiveness of the security personnel against bomb blasts in the market were discussed.

Architectural Design of the Market against Bomb Blasts

Most of the participants (buyers) in this research responded that there are no adequate architectural design against bomb blasts in the market. Out of 419 questionnaires administered to the buyers in the market, 32.5% of them showed that the architectural design of the market against bomb blasts is adequate, while 67.5% of them showed that the architectural design of the market against bomb blasts is not adequate. Table 1 shows the responses from the questionnaires with regards to the percentages of adequacy and non-adequacy of the architectural design of the market against bomb blasts.

Table 1: Responses from the Questionnaires with Regards to the Percentages of Adequacy and Non-adequacy of the Architectural Design of the Market in FCT against Bomb Blasts.

S/N	Respondent	Number (Percentage) of Adequacy	Number (Percentage) of Non-adequacy	Summed Percentage
1	Male Buyers	63 (15.1%)	99 (23.6%)	162 (38.7%)
2	Female Buyers	73 (17.4%)	184 (43.9%)	257 (61.3%)
3	Total Buyers	136 (32.5%)	283 (67.5%)	419 (100%)

Source: Researchers' Field Work, 2020.

It was revealed via the focus group discussion with the participants (buyers) that the entire landmass of the market is fenced. However, the observation showed that the fence walls are made up of sandcrete blocks without burglary proof design on some parts of them and also, the market gates have no burglary wire on them to resist the bombers from jumping over them. Plate I shows one of the exit gates of the market without burglary wire or any other security protective device on it. The discussion with the participants showed that all the entrance and exit gates of the market are not bomb detecting type. Observation showed that the market is not landscaped to monitor the movement of bombers; if the bombers can get into the market, it will be easy to attack people. Plate II shows the part of the market without ground cover for landscape.

Plate I: Exit Gate of the Market in FCT without Burglary Wire or any other Security Protective Device on it (Source: Researchers' Field Work, 2020).

Plate II: Part of the Market in FCT without Ground Cover for Landscape (Source: Researchers' Field Work, 2020).

Observation showed that car parking spaces are not defined in the market and as a result of this problem, people park cars indiscriminately in any available space. In this case, there is poor security check against bomb blasts because the bombers can use this opportunity to bomb the market. Plate III shows indiscriminate parking of cars closed to the lock-up shop buildings in the market. Observation also showed that the buildings in the market are made up of sandcrete block walls; this type of wall can easily collapse when there are bomb blasts on it and this is because it has been stated by Pe (2017) and National Academies Press (2003) that through effective structural design the overall damage levels may be reduced to make it easier for people to get out of building environment in time of explosions. Moreover, it was observed that the spaces between buildings range from two metres to four metres in some areas of the market. When there is a bomb blast on one building in this case, the probability of the nearby buildings to damage is significantly rated high. Plate IV shows the lock-up shop buildings in the market with inadequate spaces between them.

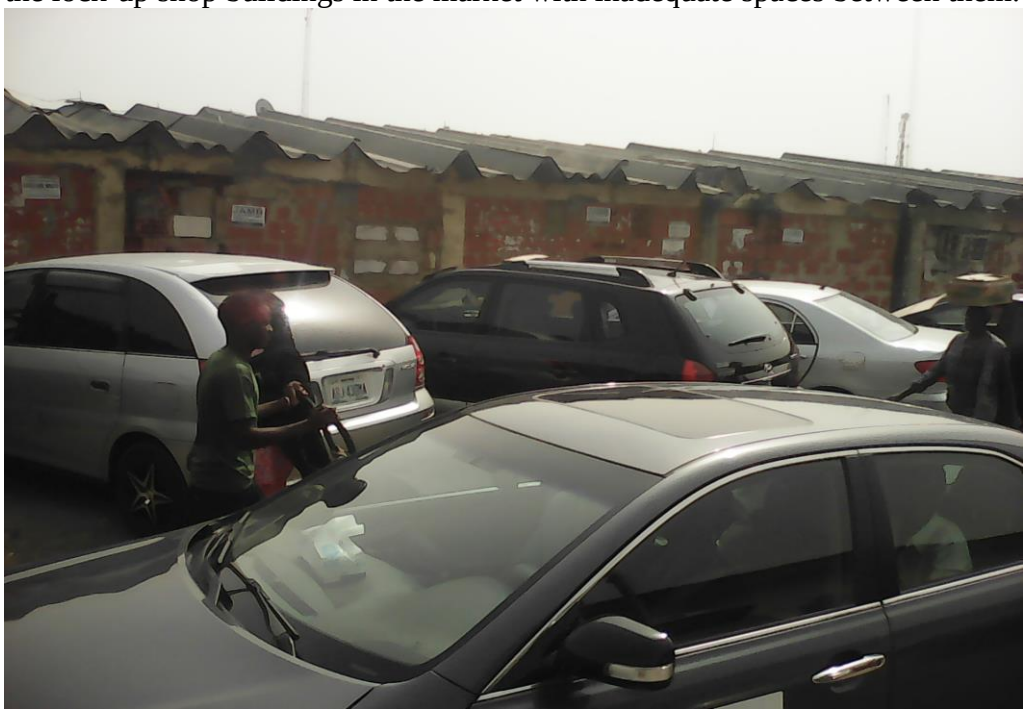

Plate III: Indiscriminate Parking of Cars Closed to the Lock-up Shop Buildings in the Market in FCT (Source: Researchers' Field Work, 2020).

Plate IV: Lock-up Shop Buildings in the Market in FCT with Inadequate Spaces between them (Source: Researchers' Field Work, 2020).

In addition, it was seen that there are no adequate road networks in the market; this issue is leading to traffic congestion in the market. In this case, there is a chance for the bombers to release explosions in the midst of traffic congestion in the market. Plate V shows a traffic congestion in the market.

Plate V: Traffic Congestion in the Market in FCT (Source: Researchers' Field Work, 2020).

Availability and Adequacy of Security Gargets against Bomb Blasts in the Market

Most of the participants (buyers) in this research responded that there are no adequate security gargets against bomb blasts in the market. Out of 419 questionnaires administered to the buyers in the market, 37.5% of them revealed that the security gargets against bomb blasts in the market is adequate, while 62.5% of them revealed that the security gargets against bomb blasts is not adequate. Table 2 shows the responses from the questionnaires with regards to the percentages of adequacy and non-adequacy of the security gargets against bomb blasts in the market.

Table 2: Responses from the Questionnaires with Regards to the Percentages of Adequacy and Non-adequacy of Security Gargets against Bomb Blasts in the Market in FCT.

S/N	Respondent	Number (Percentage) of Adequacy	Number (Percentage) of Non-adequacy	Summed Percentage
1	Male Buyers	66 (15.8%)	96 (22.9%)	162 (38.7%)
2	Female Buyers	91 (21.7%)	166 (39.6%)	257 (61.3%)
3	Total Buyers	157 (37.5%)	262 (62.5%)	419 (100%)

Source: Researchers' Field Work, 2020.

It was revealed through the focus group discussion with the participants that there are Closed-circuit Television (CCTV) Cameras in the market but the detectors against bomb blasts are not available in the market. However, observation revealed the use of only mobile metal detectors in the hands of some security men at the entrance gates of the market. Mobile metal detectors are less reliable with regards to bombs detection (Mint Premium, 2020). Thus, they have limit at which they can work because when metals are hidden in a rubber container they cannot be effectively detected by the device.

Adequacy and Effectiveness of Security Personnel against Bomb Blasts in the Market

Most of the participants (buyers) in this research responded that there are no adequate security personnel against bomb blasts in the market. Out of 419 questionnaires administered to the buyers in the market, 35.3% of them pointed out that the security personnel against bomb blasts in the market is adequate, while 64.7% of them pointed out that the security personnel against bomb blasts in the market is not adequate. Table 3 shows the responses from the questionnaires with regards to the percentages of adequacy and non-adequacy of security personnel against bomb blasts in the market.

Table 3: Responses from the Questionnaires with Regards to the Percentages of Adequacy and Non-adequacy of Security Personnel against Bomb Blasts in the Market in FCT.

S/N	Respondent	Number (Percentage) of Adequacy	Number (Percentage) of Non-adequacy	Summed Percentage
1	Male Buyers	72 (17.2%)	90 (21.5%)	162 (38.7%)
2	Female Buyers	76 (18.1%)	181 (43.2%)	257 (61.3%)
3	Total Buyers	148 (35.3%)	271 (64.7%)	419 (100%)

Source: Researchers' Field Work, 2020.

Observation revealed that the incoming vehicles to the market are not well checked against bomb blasts as vehicles gain access into the market indiscriminately. Plate VI shows the incoming vehicles to the market without a proper check against bomb blasts.

Plate VI: Incoming Vehicles to the Market without a Proper Check against Bomb Blasts (Source: Researchers' Field Work, 2020).

CONCLUSION AND RECOMMENDATIONS

The research considered the issues associated with bomb blasts as they can occur at any time without warning which vary in terms of scale and purpose among other related issues of explosion in Nigeria. This consideration has led to the study of the market in the Federal Capital Territory (FCT), since the territory has previously witnessed bomb blasts; the aim was to analyse the architectural and other safety measures against bomb blasts in the market, in order to generate guidelines to improve security in Nigeria.

The research findings showed that: there are no adequate architectural design against bomb blasts in the market; the fence walls are made up of sandcrete blocks without burglary proof design on some parts of them and also, the market gates have no burglary proof design on them to resist the bombers from jumping over them; all the entrance and exit gates of the market are not bomb detecting type; the market is not landscaped to monitor the movement of bombers; car parking spaces are not defined in the market and as a result of this problem, people park cars indiscriminately in any available space; the buildings in the market are made up of sandcrete block walls, and this type of wall can easily collapse when there are bomb blasts on it; there are inadequate spaces between buildings in some areas of the market and when there is a bomb blast on one building in this case, the probability of the nearby buildings to damage is significantly rated high; inadequate road networks are leading to traffic congestion in the market and in this case, there is a chance for the bombers to release explosions in the midst of traffic congestion.

Other research findings are: there are no adequate security gargets against bomb blasts in the market; the detectors against bomb blasts are not available in the market; there are no adequate security personnel against bomb blasts in the market; the vehicles that are gaining access into the market are not well checked against bomb blasts. Having considered the findings of this research, the following guidelines are therefore recommended to improve security against bomb blasts in Nigeria:

Guidelines for the Architectural Design of Markets against Bomb Blasts in Nigeria

i. Adequate architectural design against bomb blasts should be provided in the markets.
ii. The fence walls of markets should be made up of stones or reinforced concrete blocks with a complete burglary proof design on them to resist the bombers from jumping over them.
iii. The market gates should have burglary proof design on them to resist the bombers from jumping over them.
iv. All the entrance and exit gates of the markets should be bomb detecting type.
v. Markets should be landscaped to monitor the movement of bombers.
vi. Car parking spaces should be defined in the markets to reduce indiscriminate parking of cars in any available space, in order to properly check the activities of bombers.

vii. Buildings in the markets should be made up of stones or reinforced concrete block walls, so that in case of bomb blasts, they can considerably withstand their effects on them.
viii. Adequate spaces of at least eight meters between market buildings should be provided at the design stage of markets, so that in case there is a bomb blast on one building, the probability of the nearby buildings to damage will be low.
ix. Adequate road networks should be provided at the design stage of markets to reduce traffic congestion that can create chances for the bombers to release explosions in such condition.

Guidelines for the Security Gargets and Personnel against Bomb Blasts in Markets in Nigeria

i. The government of Nigeria should provide adequate security gargets against bomb blasts in the markets.
ii. The government of Nigeria should provide adequate security personnel against bomb blasts in the markets.
iii. The security personnel should be properly checking the incoming vehicles to the markets against bomb blasts.

This research did not consider the fear of bomb blasts and the psychological effects of the fear on the people in the market in the Federal Capital Territory of Nigeria; this is a gap in knowledge. Therefore, in subsequent research of this kind, this gap should be filled.

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