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## ASSESSMENT OF PASSIVE SECURITY MEASURES IN MIXED-USE BUILDING KWARA STATE NIGERIA.

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### ABSTRACT

Nigeria in recent times has witness unprecedented level of insecurity (Achumba, et al, 2013). This has made the issue of national security to be a top priority for the government diverting a huge amount of allocations to national security. According to Azazi (2011), different measures have been put in place by the government in order to check the crime rate in Nigeria. The anti-terrorism Act was passed in 2011 as a measure by the government to minimize crime and terrorism in Nigeria, the installation of computer-based Closed Circuit Television cameras (CCTV) in some parts of the country, improvement of surveillance, heightening of physical security measures in the country in order to identify or disrupt potential attacks, strengthening and motivation of the security agencies through the provision of security facilities and the awareness of the public through the broadcast of security tips in mass media.

**Keywords:** Passive; security, building; Nigeria; Crime

### 1.0 INTRODUCTION

The security of every citizen in a country should be the paramount objectives of every government and the state (Achumba, et al, 2013). The government is responsible for the welfare of every citizen in the country. Security is a situation that exists when measures for the protection of persons, information and property against hostile persons, influences and actions are established (Achumba, et al, 2013). It is when the building is integrated with measures that make persons and properties safe.

The Nigerian constitution spelt it out that as a fundamental objective and directive principle of state policy "the security and welfare of the people (of Nigeria) shall be the primary purpose of government".

Nigeria in recent times has witness unprecedented level of insecurity (Achumba, et al, 2013). This has made the issue of national security to be a top priority for the government diverting a huge amount of allocations to national security. According to Azazi (2011), different measures have been put in place by the government in order to check the crime rate in Nigeria. The anti-terrorism Act was passed in 2011 as a measure by the government to minimize crime and terrorism in Nigeria, the installation of computer-based Closed Circuit Television cameras (CCTV) in some parts of the country, improvement of surveillance, heightening of physical security measures in the country in order to identify or disrupt potential attacks, strengthening and motivation of the

security agencies through the provision of security facilities and the awareness of the public through the broadcast of security tips in mass media. However, despite all these measures to curb insecurity, crime rates and attacks have been on the increase creating fear and insecurity among the citizens. According to the Global Peace Index (GPI, 2012), Nigeria was ranked low in the GPI despite all the efforts by the government to reduce crime and terrorism. This implies that there is inefficiency in the security of lives and properties throughout the country.

Public building continues to be a major problem to those who are involved in the design and construction. The designer involved in these buildings are faced with the problem of securing the asset and the building. In the design of these buildings, factors such as the function of the building, the needs of the users and the nature of the work are put in to consideration (Adedayo, et al, 2016). The security level of these buildings is determined by the sensitivity of work in the building. For example, a bank will require high level of security because of its nature of work which is keeping money. The Architect is the leader in the building professional team and also responsible for the design of these buildings. Therefore, he usually integrates passive security during the design stage. Passive security is a design that prevents threats and does not affect the day to day functioning of the building. If a building is designed, it is important to consider how the security

of the building can be achieved sustainably. That is securing a building without antagonizing the users

Public buildings such as mixed-use buildings, malls, Banks, airports, ports, hotels, government offices, markets and police stations are seen as easy and soft target by the terrorist because huge and valuable properties are stored in these places. Therefore, the aim of this research is to assess passive security measures in mixed-use buildings in Kwara State

### 1.1 Passive security

Man to a varying degree needs security; from the ancient castle typology to the earliest hill-fort, architecture has served to be a solution to security of lives and properties. This implies that the necessity of security is so linked throughout the history of built environment. It is important for the Architect or Landscape Architect involved in the design of environment to think about how the design protections can be sustainably met. This is called passive security.

In Architecture, passive security can be defined as incorporating a design feature in a building to prevent threats and attacks while these features remain largely invisible to the users or inhabitants.

Applications of these design features take many forms. This ranges from the entire building annexes, to perforated fence design systems, to blockades giving the impression of art installations. The purpose of all these security measures is to prevent or reduce conspicuous attacks and the idea is to make all the deterrents invisible. Maintaining a secured environment while keeping it totally discreet should be the priority of the Architect and other professionals in the building industry. This will at the long run reduce building maintenance cost and ensure a safe, sound and healthy environment.

### 1.2 Elements of passive security

According to National Capital Planning Commission (2002), various urban design elements can mitigate security threats. Some of these design elements are mailboxes, bollards, bus stop shelters, light poles, works of art, street trees, planters, bicycle racks, seating, newspaper boxes, kiosks, trash receptacles, light poles, planters, benches, street trees (of appropriate size and type), and water fountains.

### 1.3 Site security design

Every public building owner is responsible for providing a safe and healthy place for the occupants. In order to achieve this, it is important to include counterterrorism elements in the design. The inclusions of these elements do not in any way inhibit the functionality of the building.

As a significant presence in the environment, public building derives its quality from the social, economic and environmental context. These qualities can be best derived when security is an integral part of this vital urban development. However, in an attempt to secure these public buildings, protection has come at the expense of the surrounding environments. Site security is not just a requirement, but an opportunity. Therefore, it becomes a challenge for the Architect and Landscape Architect involved in the design of a public building site to do rigorous assessment of site security elements and design considerations to ensure a safe environment.

### 1.4 Guidelines for site design elements

According to the U.S. General Services Administration (2007), passive security design elements can be applied to different areas within the building perimeter after which proper actions are taken. These areas are called "zone". These zones are listed below.

1. Zone 1: Neighborhood
2. Zone 2: Standoff Perimeter
3. Zone 3: Site Access and Parking
4. Zone 4: Site
5. Zone 5: Building Envelope
6. Zone 6: Management and Building Operations

## 2.0 RESEARCH METHOD

The research adopted a qualitative method through the use of observation schedule and personal survey. Personal survey and observation of the selected buildings were conducted to assess the passive security measures considered in the selected buildings. The assessment was conducted in six different mixed-use buildings in Kwara State. Data were collected and analyzed using descriptive statistical tools. Some of the analyzed variables during the survey are:

1. Passive security design elements on site
2. Standoff distances from the building

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3. Site access and parking security measures
4. Neighborhood security elements and actions

The Six different mixed-use buildings studied are listed in Table 1.0

**Table 1.0: Names of the mixed-use buildings selected in Kwara State Nigeria**

S/N	Name of Condominium	Location
1.	Olatinwo House	Offa
2.	Harmony Holdings	Ilorin
3.	Adekanola house	Ilorin
4.	Nicon Insurance	Ilorin
5.	JMK Nig Limited	Ilorin
6.	Aminu Ishola Plaza	Ilorin

Source: Author's fieldwork, 2018.

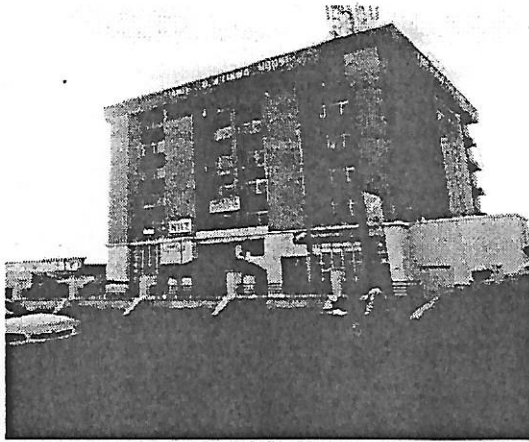


Plate 1: A view of Olatinwo house, Offa      Plate 2: A view of Harmony holdings, Ilorin.

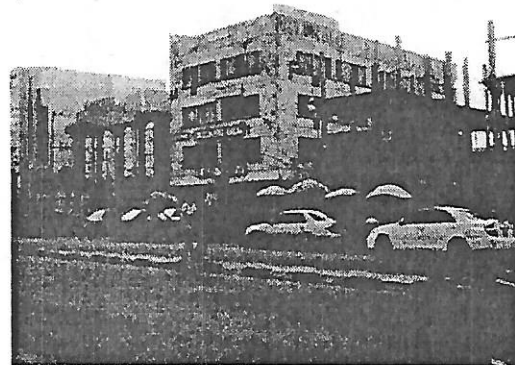


Plate 3: A view of Adekanola house, Ilorin.      Plate 4: A view of Nicon house, Ilorin.



Plate 5: A view of Aminu Ishola Plaza, Ilorin.



Plate 6: A view of JMK Nig limited, Ilorin.

### 3.0 FINDINGS AND DISCUSSION OF RESULTS

Data collected from the survey and observations carried out in the course of the research are presented in tables and charts. These data are further interpreted and discussed. Table 2.0 shows the available passive security design elements in the selected buildings.

Various urban design elements can mitigate security threats (National capital planning commission, 2002). Design elements such as planters, bollards,

**Table 2.0: Passive security design elements on site**

Source: Author's fieldwork, 2018

S/ N	Names of building	Passive security design elements								
		Planters	Bollards	Perimeter Fence	Seat bollards	Pedestrian Light	Access Gate	Architectural lighting	Street Furniture	Trees and shrubs
1.	Olatinwo House	0	0	1	0	1	1	1	0	0
2.	Harmony Holdings	1	1	1	0	1	1	1	0	1
3	Adekanola building	0	0	1	0	0	1	1	0	0
4	Nicon Insurance	0	0	0	0	0	0	1	0	0
5	JMK Nig Limited	0	0	0	0	0	0	1	0	0
6	Aminu Ishola Plaza	0	0	1	0	1	1	1	0	1
	<b>Total</b>	<b>15%</b>	<b>15%</b>	<b>70%</b>	<b>0%</b>	<b>50%</b>	<b>70%</b>	<b>100%</b>	<b>0%</b>	<b>30%</b>

fence and walls, seat bollards, pedestrian light, bench, Architectural lighting and street furniture can reduce threats in a building. Assessments of these elements are done in the selected buildings to determine their level of usage.

The result recorded from these buildings through survey are represented below

Key:

1- Available

0- Not Available



Plate 7: Passive security design elements used at Harmony holdings in Ilorin Plate 8: Passive security design elements used at Olatinwo house in Offa

From the Table 2, Architectural lighting, perimeter fence and access gate are the most frequently used elements as a passive security measure while trees and shrubs, bollards and planters are the least frequently used. All the selected buildings employed the use of Architectural lighting as part of security measures, 70% uses access gate, 15% uses planters and bollards, 30% uses trees and shrubs and none of the building uses street bollards and furniture. This implies that all the passive security design elements should be integrated in mixed-use building design as a security measures in order to boost the security of the building.

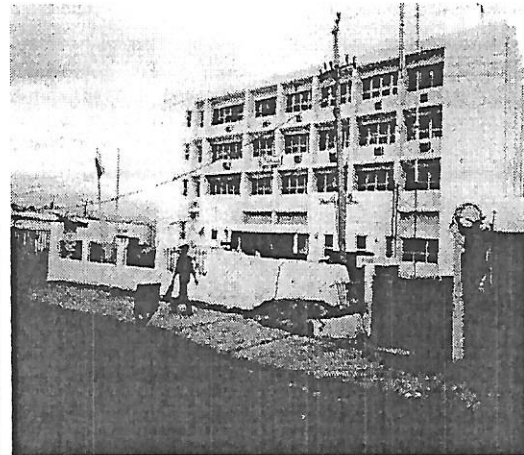
**Table 3.0: Standoff distances from the building**

S/N	Names	Standoff distance			
		Below 5m	5-10m	10-15m	15 & Above
1.	Olatinwo House		●		
2.	Harmony Holdings			●	●
3	Adekanola building		●		
4	Nicon Insurance		●		
5	JMK Nig Limited		●		
6	Aminu Ishola Plaza			●	
	<b>Total</b>	<b>0%</b>	<b>70%</b>	<b>30%</b>	<b>0%</b>



Source: Author's

Plate 8: Stand-off distance observed at Aminu Plaza in Ilorin.



fieldwork, 2018.

Plate 9: Stand-off distance observed at Aminu Ishola Adekanola building in Ilorin.

**Table 4.0: Secured parking areas inside and outside the standoff perimeter**

S/N	Names	Parking areas		
		Inside the standoff perimeter	Outside the standoff perimeter	None
1.	Olatinwo House	•		
2.	Harmony Holdings	•		
3	Adekanola building	•		
4	Nicon Insurance			•
5	JMK Nig Limited			•
6	Aminu Ishola Plaza	•		
	<b>Total</b>	<b>70%</b>	<b>0%</b>	<b>30%</b>

Source: Author's fieldwork, 2018.

Table 4.0 shows the availability of parking spaces both inside and outside the stand-off perimeter in the various buildings. Majority of the selected building have more parking spaces within their stand-off perimeter and very few make provision for parking outside the stand-off perimeter. This implies that it is safe to provide parking spaces within the controlled perimeter. However, parking spaces can be provided outside the perimeter if there is adequate monitoring and surveillance.

**CONCLUSION**

Incorporating Passive security design elements in the design of mixed-use building is very necessary as it can be used to reduce a potential threat or attack in a building. Every mixed-use building may not be able to provide all the required elements but there are some very important elements which must be provided to mitigate threat. As discussed earlier, elements such Architectural lighting, bollards, trees and shrubs, planters, pedestrian light and perimeter

fence are frequently employed to serve as security measures in a building.

Stand-off distance is the distance between a potential threat and the building. The bigger the distance, the safer the building and the occupants within the building. 70% of the buildings studied have their stand-off distance between 5-10m and the rest have theirs at more than 10m. This is a poor security design strategy in a building as criminals will find it very easy to invade a building that is not more than 10m. Therefore, it safer to create a bigger standoff distance as this will help minimize or prevent crime and attack in the building.

Passive security elements are meant to protect the building and the occupants from attacks and not in any way inhibit the welfare and day to day running activities of the users or visitors. Therefore, if these elements are used appropriately, the users of the building will be safe and there will be a sustainable built environment.

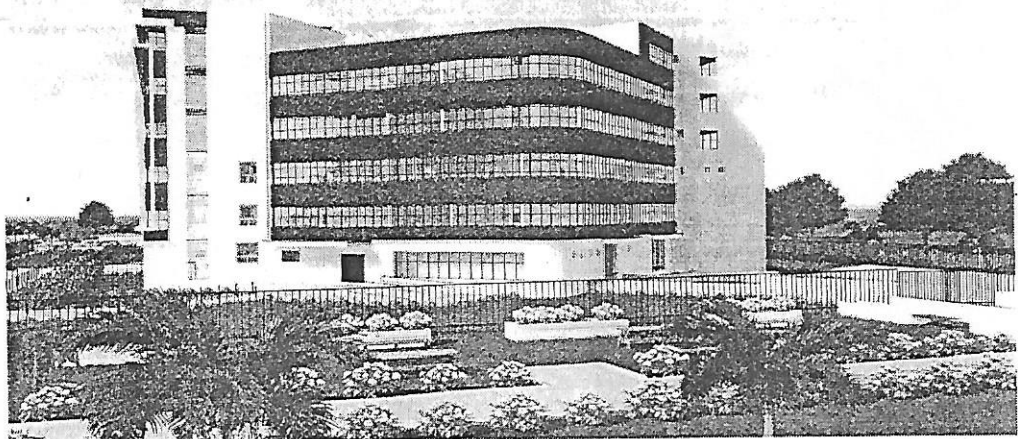


Fig 1: A view showing the application of defensive plantings, planter and fence as security measures in the proposed design.



Figure 2: A view showing applications of anti-ram low walls, fixed bollards, outdoor benches, jersey barriers, perimeter fence and defensive plantings as security measures in the proposed design.

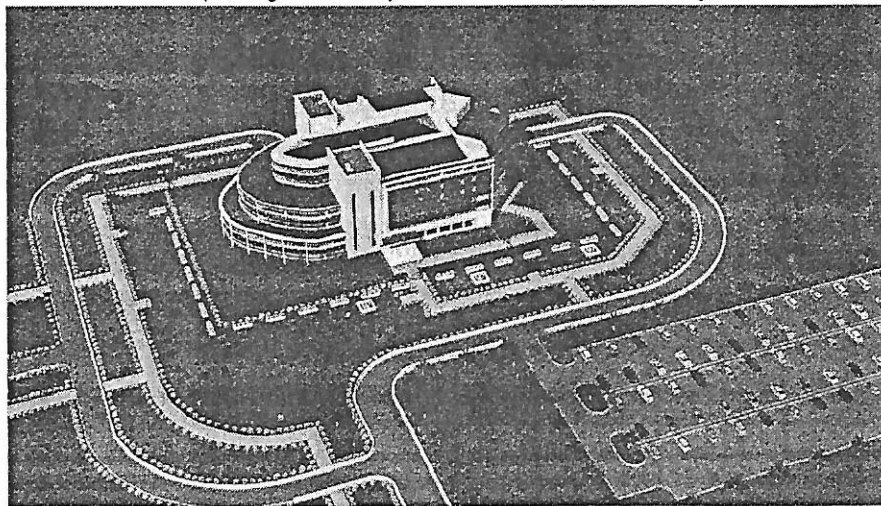


Fig 3: A view showing various passive security measures applied in the proposed design.

#### RECOMMENDATION

1. Maximum clear distance between adjacent vehicular security barrier elements should not be more than 1200mm. This is to prevent encroachment of vehicles beyond the blast stand-off perimeter while maintaining convenient access for pedestrians, wheel chairs and push chairs.
2. Structural elements having 1200mm clear distance should have a height not less than 600 mm. However, it is better if such structures have an increased height of 900mm or more to reduce penetration of impact hostile vehicles.
3. Chicane and offset approach to a building or asset should be provided because it helps to reduce hostile vehicle approach speed and it significantly reduces threat from a potential vehicle borne attack.
4. Passive security design elements such as bollards, planters, trees and shrubs, architectural lighting, perimeter fencing, fountains and low-screen walls should be integrated in the design right from the design stage.
5. Minimum height of perimeter fence should be 2000mm. This is to prevent invasion from an unauthorized visitor or potential terrorist.
6. Stand-off distance should be provided between structures.
7. Appropriate security elements should be provided in different zones within the site.
8. Parking spaces should be provided within the stand-off perimeter. However, parking spaces can also be provided outside the stand-off perimeter provided there is adequate surveil



## REFERENCES

- Achumba, I. C., Ighomereho, O. S., & Akpor-Robaro, M. O. (2013). Security Challenges in Nigeria and the Implications for Business Activities and Sustainable Development. *Journal of Economics and Sustainable Development*, 4(2); 79-99.
- Centre for protection of natural infrastructure. (2007). Integrated Security Guide: A public realm design guide for hostile vehicle mitigation-Second edition. Retrieved from <http://www.cpni.gov.uk> on June 18, 2018.
- U.S Department of Homeland Security. (2007). Site and Urban Design for Security: Guidance against Potential Terrorist Attacks. Retrieved from <http://www.wbdg.org/> on June 12, 2018.
- Adedayo, O. F., Ailoyafen, D., & Adebayo, O. A. (2017). Landscaping for passive security and adaptation to climate in Church environment, Niger State, Nigeria. *Nigerian Journal of Technology (NIJOTECH)*, 36(1); 7-17.
- Passive security in Architecture – Designing for security without sacrificing beauty. (2017). Retrieved from <http://www.azahner.com/blog/passive-security-in-Architecture> on June 10, 2018.
- Adedayo, O. F., Oyetola, S. A., Adebayo, A. J., & Adebayo, O. A. (2017). Users perception of security measures within church Premises North Central Nigeria. *Lagos Journal of Environmental studies*, 8(2); 97 – 108.
- Azazi, A. (2011). Responding to the emerging trends of terrorism in Nigeria. Retrieved from [www.cleen.org/responding to the emerging trends of terrorism in Nigeria.pdf](http://www.cleen.org/responding-to-the-emerging-trends-of-terrorism-in-Nigeria.pdf) on June 20, 2019.
- Institute for Economics and Peace (2012). Global Peace Index. Retrieved from [www.economicsandpeace.org/wp-content/uploads/2015/06/2012-Global-Peace-Index-Report.pdf](http://www.economicsandpeace.org/wp-content/uploads/2015/06/2012-Global-Peace-Index-Report.pdf) on June 20, 2019.
- Security For Building Occupants And Assets (2017). Retrieved from [www.wbdg.org/design-objectives/secure-safe/security-building-occupants-assets](http://www.wbdg.org/design-objectives/secure-safe/security-building-occupants-assets) on May 16, 2019.
- U.S General Services Administration (2007): The Site Security Design Guide. Office of the Chief Architect 1800F street, NW. Washington DC 20405 June 2007.
- Retrieved from [www.wbdg.org/FFC/GSA/site\\_security\\_dg.pdf](http://www.wbdg.org/FFC/GSA/site_security_dg.pdf) on October 25, 2018.
- Mixed-use development. (n.d). Retrieved from [securipedia.eu/mediawiki/index.php/Mixed\\_use](http://securipedia.eu/mediawiki/index.php/Mixed_use) on March 12, 2019.
- Auckland Design Manual (n.d). Mixed-use configuration. Retrieved from [www.aucklanddesign manual.co.nz/sites](http://www.aucklanddesignmanual.co.nz/sites) on March 30, 2019.
- National Capital Planning Commission (2002): The National Capital Urban Design and Security Plan. Retrieved from [www.ncpc.gov/docs/National\\_Capital\\_Urban\\_Design\\_and\\_Security\\_Plan.pdf](http://www.ncpc.gov/docs/National_Capital_Urban_Design_and_Security_Plan.pdf) on May 5, 2019.
- The Architect's Handbook Of Professional practice; 13<sup>th</sup> edition 2000. Site Analysis and Selection. Retrieved from [www.vantagearchitects.com/site-analysis-selection](http://www.vantagearchitects.com/site-analysis-selection) on June 27, 2019.
- Building and Construction Authority (2005). Enhancing Building Security: Useful and Practical Measures. Retrieved from [www.bca.gov.sg/Publications/BuildingSecurity/](http://www.bca.gov.sg/Publications/BuildingSecurity/) on August 15, 2018.
- Tony, K. (n.d). Public Building Security. Retrieved from [www.worldsecurity-index.com/Public Building Security](http://www.worldsecurity-index.com/Public_Building_Security) on August 15, 2019.