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Comparative Assessment of Fire Resistivity of the Construction Materials for Shelves and Bases at Lagos Markets in Nigeria

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Abstract

Reoccurring fire outbreaks in markets is a problem in Nigeria; especially in Lagos. To minimise this problem, a research was conducted on the three major markets in Lagos with the aim of comparatively assessing the fire resistivity of the construction materials for their shelves and bases for keeping goods, in order to provide guidelines for designing shelves and bases of market buildings in Nigeria. The research data were gathered through desktop study; the data were analysed and checked by using contents analyses technique, in order to validate the results. The research findings showed that non-fire resistant wood was used for the construction of shelves and bases such as tables, stools and benches for keeping goods in the markets. Among the recommended guidelines for the design of shelves and bases in Nigerian markets are: design specifications for shelves in markets should be non-combustible metal plates, in order to curtail the rate at which fire spreads from them to other interior building materials, goods and properties in the event of outbreaks of fire. Alternatively, they should be non-fire resistant treated wood, so as to minimise the spread of fire in markets.

Keywords: Designing, Shelves and Bases, Fire, Markets, Nigeria.

INTRODUCTION

The global significance of markets, especially in Nigeria are substantial in value. According to Amiteye [1], the most outstanding livelihood sources for different people are markets; they are places for commerce or business transactions and the ways for the accumulation of wealth. Amiteye (2015) further explained that sales people get the sources of living from the market places and they enable them to contribute to the increase of economy and growth of Nigeria in different avenues. [1] Thus, it became necessary to give importance to fire prevention measures in Nigerian markets and other markets in different countries of the world. According to the Federal Fire Service of Nigeria (2016) [5], fire outbreaks in different markets is a problem in Nigeria. Several fire incidences in markets have been recorded in Lagos State of Nigeria. For example, Premium Times [12] reported that the Lagos State Emergency Management Agency confirmed a fire incident in January, 2022 at the Shanties in Okobaba sawmill (plank market) of Ebute Metta, Lagos; in March 2021, a fire outbreak razed many of the shanties in the area. It was also reported by Radio Nigeria [15] that a fire outbreak has destroyed many shops at Apongbon market in Lagos Island. Furthermore, Vanguard [18] reported that on 9th October, 2022, fire gutted a building at the popular Balogun market in Lagos; sometime in November 2019, 2020, 2021 and earlier 2022, there were fire outbreaks which occurred in the same Balogun markets with several goods worth millions of Naira being destroyed in the process.

To minimise this problem of reoccurring fire outbreaks in Lagos State, a research was made on

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the three major markets in Lagos with the aim of comparatively assessing the fire resistivity of the construction materials for their shelves and bases for keeping goods, in order to provide guidelines for designing shelves and bases of market buildings in Nigeria. According to Internet Geography (2022) [6], Lagos is the largest city in Nigeria and it is located in the southwest of the country on the coast of the Gulf of Guinea, close the border of Benin and Nigeria. From the information obtained from Wikipedia [19], Lagos is the largest city in Nigeria and the second most populous city in Africa with a population of 15.4 million as of 2015 within the city proper; it was the national capital of Nigeria until December 1991 following the decision of government to move their capital to Abuja in the centre of the country. From further information obtained from Wikipedia [19], Lagos is a major African financial centre and is the economic hub of Lagos State and Nigeria at large. Figure 1 shows Nigeria revealing Lagos State as highlighted; its other 35 states and the Federal Capital Territory, Abuja.

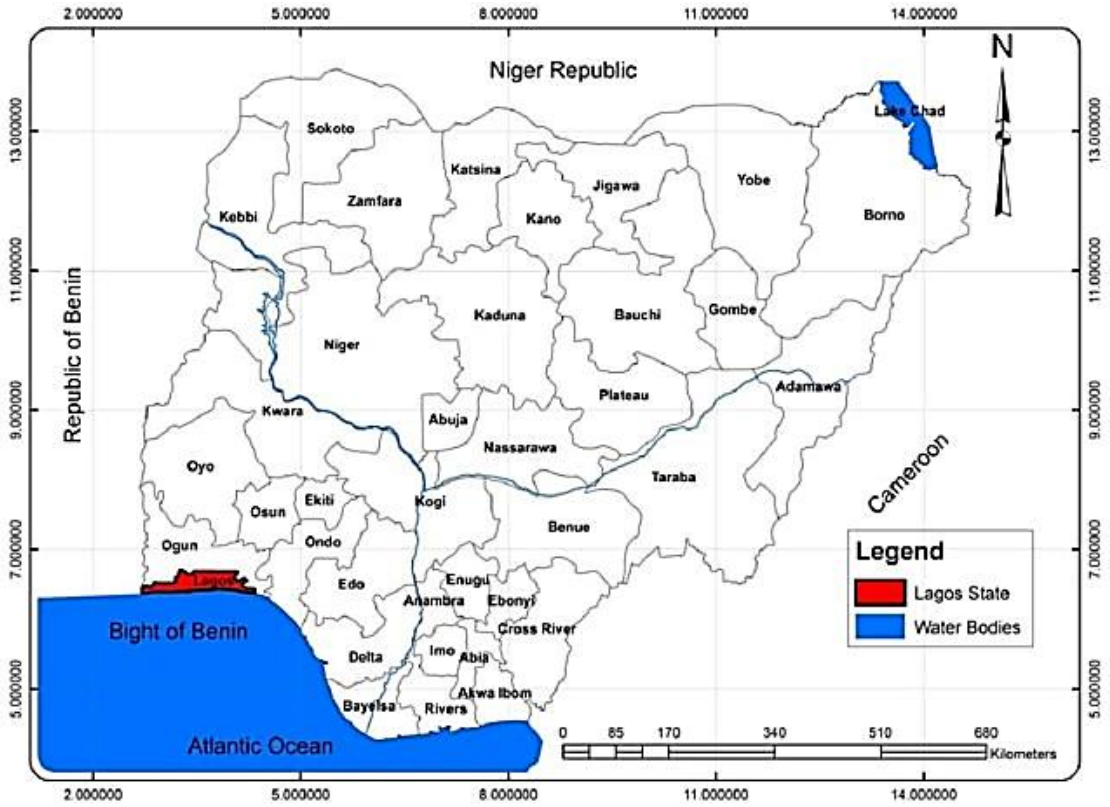

Figure 1. Nigeria showing Lagos State as Highlighted; its other 35 States and the Federal Capital Territory, Abuja [Source: Research Gate, 2020 (https://www.researchgate.net/publication/339642976_Climate_Change_Impacts_in_a_Rapidly_Growing_Urban_Region_-A_Case_Study_of_Ikeja_Lagos_Nigeria/figures?lo=1), Retrieved on 23-12-2022].

METHODS AND PROCEDURES

Descriptive survey method was used for this research and produced qualitative data. The National Population Commission [8] and Nigeria High Commission [10] opined that Nigeria is comprised of 36 states and the Federal Capital Territory (FCT). The research considered comparative assessment of fire resistivity of the construction materials for shelves and bases in Lagos markets because it is a major African financial centre and the economic hub of Lagos State and Nigeria at large (Wikipedia, 2022) [19] with previous cases of fire outbreaks in several times. According to PropertyPro [13], there are ten major markets in Lagos; they are Balogun market, Oshodi market, Alaba market, Jankara market, Tejuosho/Yaba market, Oyingbo market, Computer village market, Mile 12 market, Aswani market and Ladipo market. From these ten markets, three markets: Yaba market, Jankara market and

Oyingbo market were randomly selected for this study.

According to Prashant and Supriya [11], Steve [16]; Suresh and Chandrashekara [17], in a study, 20% sample size of a population is a good recommended sample size. The three markets that were chose for this study are more than 20% of the sample size and these have made the sample size to be acceptable. The research data were acquired through desktop study; different literature, information from media and Internet search were reviewed. The analyses of the data were done and checked through contents analyses technique by comparing the extracted data with the raw desktop (secondary) data, in order to validate the results. The results of the analyses were employed in providing the architectural guidelines of this research.

DATA PRESENTATION AND DISCUSSIONS

The materials that were found in Lagos markets are non-fire resistant wood that were used for the construction of shelves and bases such as tables, stools and benches for keeping goods. Table 1 shows the distribution of shelves and bases: tables, stools and benches that were made from non-fire resistant wood in Lagos markets. The use of non-fire resistant tables was found in Yaba market and Oyingbo market; the use of non-fire resistant shelves and benches was only found in Jankara market, while the use of non-fire resistant stools was found in Jankara Market and Oyingbo Market.

Table 1. Distribution of shelves and bases: tables, stools and benches that were made from non-fire resistant wood in lagos markets.

S/N	Market	Construction Materials
1	Yaba Market	Non-fire Resistant Wood for Bases: Tables
2	Jankara Market	Non-fire Resistant Wood for Shelves and Bases: Stool and Benches
3	Oyingbo Market	Non-fire Resistant Wood for Bases: Tables and Stools

**Source: Reviewed Work, 2022.*

Yaba Market

Non-fire resistant wood can easily burn and increase the rate of spread of fire when there is fire outbreak in buildings (Chen *et al.,* 2015 [3]; Civil Engineering Home, 2017 [4]; Iwami *et al.,* 2004 [7]). However, the use of non-fire resistant wood for bases such as tables for keeping goods was found in this market. Figure 2 shows a burnt building and the use of non-fire resistant tables in Yaba market.

Figure 2. Burnt Building and the Use of Non-fire Resistant Tables in Yaba Market [Source: Nigerian Tribune, 2016 (https://tribuneonlineng.com/yaba-market-inferno-traders-victims-recount-losses/), Retrieved on 24-12-2022].

Jankara Market

The use of non-fire resistant wood for shelves and bases such as stools, and benches for keeping goods was found in this market, and this is contrary to the information obtained from Building and Construction Authority [2] ; Neufert and Neufert [9] and Quarles [14] that stated that materials in buildings against fire outbreaks should be able to resist surface flame spread. Figure 3 shows the use of non-fire resistant wood for shelves and bases such as stool, and benches in Jankara market.

Figure 3. Use of Non-fire Resistant Wood for Shelves and Bases such as Stool and Benches in Jankara Market [Source: Facebook Page of Jankara Market, 2018 (https://www.facebook.com/JankaraMarketLagos/), Retrieved on 24-12-2022].

Oyingbo Market

The use of non-fire resistant wood for the construction of bases such as tables and stools for keeping goods were found in this market, and wooden materials are not resistant to fires. Figure 4 shows the use of non-fire resistant tables and stools in Oyingbo market.

Figure 4. Use of Non-fire Resistant Tables and Stools in Oyingbo Market [Source: Travel Adventures, 2022 (http://www.traveladventures.org/continents/africa/oyingbo-market09.html), Retrieved on 24-12-2022].

CONCLUSION AND RECOMMENDATIONS

This research comparatively assessed the fire resistivity of construction materials for shelves and bases for keeping goods at Lagos markets in Nigeria due to the problem of reoccurring fire outbreaks in Nigerian markets and it served as an avenue to generate guidelines for designing shelves and bases in market buildings in Nigeria. The research findings showed that non-fire resistance wood was used for the construction of shelves and bases such as tables, stools and benches in the markets. Having considered these findings, the following guidelines are therefore recommended for designing shelves and bases for keeping goods in Nigerian market buildings:

Guidelines for Designing Shelves and Bases for Keeping Goods in Nigerian Market Buildings

i. Design specifications for shelves in markets should be non-combustible metal plates, in order to curtail the rate at which fire spreads from them to other interior building materials, goods and properties in the event of outbreaks of fire.
ii. Alternatively, the design specifications for shelves in markets should be non-fire resistant treated wood, so as to minimise the spread of fire in markets.
iii. Design specifications for bases such as tables, stools and benches should be non-combustible metal plates, in order to reduce the rate at which fire spreads from them to other interior building materials, goods and properties in the event of outbreaks of fire.
iv. Alternatively, the design specifications for bases such as tables, stools and benches should be non-fire resistant treated wood, so as to minimise the spread of fire in markets.

This research only considered the design specifications for shelves and bases for keeping goods in market buildings without considering the design of the entire market buildings in Lagos and this is a research gap. In the next research of this kind, this gap should therefore be addressed.

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