Menace of Inferior Materials' Usage on Building Deterioration in Nigeria: An Overview

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Abstract
Deterioration of buildings has been a recurring menace over the years. Architects, having designed buildings; with all detailed specifications and thereafter analyzed structurally by qualified Structural Engineers are required to stand for years with little or no apparent depreciation of values in functions, purpose and aesthetics. The arbitrary acts of concerned stakeholders in the building industry to checkmate this kind of perpetual use or application of inferior building materials is emerging even to the highest level. This paper therefore examined various effects of these inferior materials on the building deterioration. Various causes of such deteriorations and the appropriate remedies were highlighted. A theoretical research approach through review of some relevant literatures was employed. It was revealed that high-cost, low supply, ignorance, hastiness and so on were traced to the views of building owners/occupants and the resultant effects which include foundation weakening, cracking of walls, roof leakage, wracking of doors and windows were highlighted. It was concluded that appropriate measures be put into practice. This study recommends that a long-lasting existence of buildings can be achieved through appropriate measures both in quantity and quality control.

Keywords: architect, engineer, building materials, deterioration

Introduction
Building materials often exist as indigenous, conventional or improved ones, being used for construction purposes; specifically, buildings and other structures. Many naturally occurring substances such as clay, rock, sand and wood, even twigs and leaves, have been used to construct buildings. Apart from naturally occurring materials, many man-made products are in use, some more and some less synthetic. The manufacture of building materials is an established industry in many countries and the use of these materials is typically segmented into specific specialty trades such as carpentry, insulation, plumbing and roofing work. They provide the make-up of habitats and structures including homes.
A deteriorating or deteriorated building may get collapsed suddenly arising from the gradual weakening, tearing, and peeling, dismantling and breaking of building elements.

The use of inferior materials could therefore be traced to the frequency of 11% of the total occurrence of building collapse (Abimbola O. *et al* 2012).

The aversion of this indulgence or patronage as encouraged by all the concerned stakeholders can reliably reduce the rampancy of building deterioration to a greater extent and as well avert the occurrence of building collapse to a reasonable level.

Professional assertions by Architect designing with detailed specification notes on good and durable materials; Structural Engineer specifying reliable steels and other components for installation, construction and building purposes and as well ensuring proper adherence to their details and instructions will alleviate the trend.

Constant maintenance culture in cyclical, planned or regular manner will further prolong the durability of such buildings.

It is appalling to note that the maintenance system has somehow be neglected by the building owners, claiming that economy does not give room for such habitual intent.

Ignorance has also taken a special role as building owners cannot differentiate between two or more materials, with respect to their quality and the ability to recognize good and standard materials has however been jeopardized.

Literature Review

The use of substandard or inferior materials has been one of the causes of building deterioration in Nigeria (Ayedun, C.A *et al,* 2012). Substandard products in form of building materials have over the years remained an hindrance in Nigeria's attempt at embarking on successful and sustainable industrialization and in fact, the housing sector seems to bear the greatest brunt. In the same vein, the unstoppable trend in their use for construction could be traced to their incessant flooding the market system. This trend has however done some damages that are unquantifiable to the Nigerian industrialization and indeed Nigerian economy.

Building deterioration is a global menace that is more prevalent in all the developing countries like Nigeria. The handicapped capacity of the Standard Organization of Nigeria (SON) caused by various lapses to regulate the influx of substandard materials into the country further aggravate the menace (Maduka, 2016). This was attributed to the partial neglect in their mandate to support and regulate locally produced materials in Nigeria.

The acts had however resulted into a huge variation between the prices of the imported materials and the locally made ones; with the latter being sold at cheaper prices at the detriment of their quality.

Prevalent Use of Inferior Building Materials in Nigeria

Inferior buildings materials are basically substandard materials made or produced without being regulated by a governmental body called Standard Organization of Nigeria (SON), by not complying with the current Nigeria Industrial Standards (NIS). The SON has the mandate to support and regulate made-in-Nigeria goods as a way of developing the economy and at the

same time check imported goods (Maduka N., 2016). The production of inferior materials could either be locally or outside the country; whichever means, the affected country often bear the brunt of endangering the health of nation (Lekan, 2016). However, the dominancy of this menace could be traced to the following sources as opined by Maduka (2016).

1. **Illegal vessel discharge**: Boarders are not properly controlled; hence vessels conveying all kinds of goods are not properly and cautiously examined thereby dumping goods that originally would be regulated out of the country.
2. **Illicit discharge by law enforcement agent**: Some law enforcement agents at the boarders are being bribed or tipped unlawfully without regulating the imported goods hence, are detrimental to the nation.
3. **Inadequate Policy implementation**: Implementation of policy that results into the manufacture of goods that do not match with the local standard thereby making some already banned and abandoned at the ports without moving them into the country.
4. **Poor economy**: Most especially during the period of recession ascribing to the prominence of building collapse; poverty wise, some security officers receive inducement from importers to allow for the conveyance of these inferior products into the country e.g. sanitary wares.
5. **Business environment:** Improper regulation of Nigerian environment as caused by unpatriotic nature of some Nigerians to support security agents; hence influx of inferior materials into the country.
6. **Surplus of imported goods**: The unflinching flare for imported goods by most Nigerian even after being banned, discourage the made-in Nigeria goods; which are still imported by the elites on a pretence that they meet up with the regulations as stipulated by the Standard Organisation of Nigeria (SON).
7. **Technological Glitch**: The current technology does not provide for the matching equipment to measure their standard accurately.

   The causes of influx of inferior materials as submitted by Maduka (2016) can be ameliorated through a proper re-orientation of the regulatory body by the Nigerian government.

In spite of all the above sources for the dominancy of inferior materials in Nigeria, its resultant effects on individual, environment and the country at large cannot be over-emphasized.

Individually, application of inferior building materials in quality and quantity could be one of the major causes of building deterioration resulting into structural deformation due to cracked walls, leaking roofs, foundation weakening, door and windows wracking, peeling of wall surfaces and many others; which are the predominant effects for building deterioration. Therefore, any individual that indulges in the habit of ignorance, hastiness, unprofessionalism,

low-cost interest and too-know attitude towards the procurement of inferior materials, will surely find his/her building deteriorating faster than he thinks.

Environmentally, the conglomeration of deteriorating buildings within a typical environment will vitiate the quantity, value and aesthetics of that settings. Both lives and properties within such environment would be abysmally secured and a physical dent would be apparently noted for such area.
Country-wise, the economic, social and technological status would be affected; depreciating in trends locally and intentionally. Therefore, it becomes a place of danger for expatriates or foreigners to dwell, establish and invest.

In the foregoing, it is evident that the existence of deteriorated buildings in any environment adversely affect the national values including the living condition of the citizenries. The international reputation on environmental standard and security of any affected nation may be jeopardized.

Various Causes of Building Deterioration
Deterioration is a term often used interchangeably with dilapidation, to denote decay or damage, state of disrepair as a result of unceasing neglect in maintenance and repair either willingly, negligence or ignorance.

A deteriorated building, could therefore be likened to a battered vehicle that is left unserviced for a long while still in –use; which automatically can pack off momentarily unnoticed. As a pre-eminence to sudden collapse, that relies majorly on the quality and quantity of materials composition without necessarily violating the supervisory requirements as stipulated by the professionals such as architects, builders, engineers, land surveyor, environmentalist town planner, geologist etc

The use of inferior materials as a major cause of buildings deterioration, only hasten dilapidation of buildings by aptly reducing the physical life of such buildings. However, other physical causes act as complements to the occurrence (Zeeshan, 2016) and they include the following

1. **Natural decay and ageing**: As a natural phenomenon, having employed good and quality materials in appropriate quantity under a specified proportion or amount by the professionals; these materials possess life span before starting to depreciate in value thereby causing the buildings to gradually deteriorate.
2. **Improper maintenance**: Improper or delay in repairing any affected part of a structure could cause early decay and deterioration.
3. **Misuse of building:** Using building in a bad manner will surely aggravate its deterioration. For instance, conversion of residential use to commercial use will affect the strength and sustainability of such building.

4. **Use of underspecified materials**: No doubt, materials used in lesser quality as against the specified amount will cause deterioration in buildings.
5. **Bad workmanship**: Poor workmanship often result into imbalance in load bearing system thereby causing internal stresses within the structure and hence early decay of the structure.
6. **Effect of aggressive environment/environmental effect**: Emission of aggressive chemicals, gases etc into the environment will automatically affect external parts of structure such as corrosion of metallic parts; hence deterioration accelerates gradually.
7. **Force majeure**: Natural and unforeseen disastrous event or happening such as flood, fire, warfare, earth quake, storm and so on often cause serious damage to buildings and hence start deteriorating.

   The disuse of inferior materials automatically reduces the rate of dilapidation in buildings thereby rendering such buildings durable, sustainable and efficient for optimum use in various capacity and purpose.

Restorative Measures on Deteriorated Buildings

A dilapidated building is one that has experienced severe damage arising from decay of various parts or members; specifically, the structural members thereby resulting into an imbalance in load transfer system. Any affected building whether fully or partially occupied, can still be rehabilitated or restored to its original values through thorough inspection of structural and non-structural members (Zeeshan, 2016). After inspection, evaluation of their strength should be done and finally dilapidation report and schedule presented before any renovation can be carried out. The following are the systematic steps suggested by Solanke (2017) towards taking proper restorative measures

- **Assessing the Building Condition**: A very critical and most important step often taken initially with full and thorough involvement of professionals like Architects, Engineers, Town Planners, Quantity Surveyor, etc. All these specialists look into any areas of concern and they all prepare their assessment report.
- **Stopping further decay or deterioration**: Following the assessment on the extent of deterioration, the building affected should be prevented from dilapidating further which might increase the gravity of dilapidation trend.
- **Preparing budget for repairs**: Quantity surveyor, already quantified based on the assessment report of other professionals and arrive at the total construction cost. The building owner or client will therefore work towards obtaining fund that will cater for the prompt and full completion of work. Any renovation work should not be done half-way as it will demand for additional money if delay or suspended for a while.
- **Applying for government consents**: Renovation permit as statutory consent should be obtained from government by the local planning authority primarily to safeguard the health of neighbouring structures and their occupants.

- **Stabilising the structure**: A dilapidating structure is an unstable one whose condition needs to be stabilised following the acquisition of government consent.

Having ensured ready availability of construction materials and tools such as water and power, the next task is to carry out all works as identified and specified by the architect in the construction drawings and also listed in the dilapidation schedule.

Conclusion

The use of inferior building materials have been partly and in some cases fully responsible for the high prevalence of building deterioration in the developing countries especially Nigeria. The wide vacuum created by all the concerned stakeholders through negligence towards curbing this menace has however led to various cases of structural deformations which some buildings experience frequently. Invariably, the use of inferior building materials cannot make such buildings sustainable and hence may not be standing years to come even for future generations. It is therefore pertinent for all stakeholders to rise up to their respective roles towards taking appropriate measures on the application of standard building materials both in quantity and quality, remarkably for the people not to just build to save cost but to make their building a worthy and sustainable investment.

Recommendations

- Application of good and standard materials in both quality and quantity as specified by the building professionals such as Architects and Engineers for construction purposes.
- Regular maintenance culture should be embraced and practiced by the building owners.
- Government's statutory consent should be sought for before any renovation works can commence.
- Any case of existing dilapidated buildings should be reported to the government's planning authority or any other agency/organization such as the Building Collapse Prevention Guild (BCPG); charged with the responsibility of procuring a safe and healthy environment.

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