ENVIRONMENTAL SCIENCES AND THE CHALLENGES OF COLLAPSE BUILDINGS IN NIGERIA

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ABSTRACT

This study aimed at exploring the relationship between environmental sciences and the challenges of collapse buildings in Nigeria. It adopted literature review as its research design, whereby causes of buildings failure and collapse in Nigeria were enunciated. The problems associated with collapsed of building were find to based on lack of compliance on building ethics such as carrying out work on soil that lacks engineering properties lack of carrying soil test, use of salty soil, inappropriate selection of contractors and use of sub-standard materials. It was recommended among others that professionals should ensure the compliance with the Nigerian code of practice, as well as enforcement of the use of standard materials for construction work in Nigeria.

INTRODUCTION

Buildings are faced with various threats especially their maintainability, in order to retain their economic, social and structural values Buildings depreciate with time when necessary remedial measures are not applied. However, when a building is allowed to get to a state of dilapidation that is, when the cost of repairs is almost equal to the cost of erecting a new one, it is advisable not to carry out any maintenance work on it, the best solution is to demolish. The reason being that it has cost its social economic and structural value and it is not even safe for human habitation. Failure or collapse of buildings due to neglect of maintenance responsibility leads to loss of lives and properties.

However, in the construction industry many lives are lost through sick buildings e.g. tsunami disaster in parts of Asia and earthquakes in Iran. This is a clear indication that building failure attributed to the nature of the environment. Environment is defined as a natural world in which people, animals and plants lives (Advanced Learners Dictionary of current affairs, 1974). It could also be seen as the condition that affects the behavior and development whereas; collapse is the full down of buildings after breaking apart. This could be as results of wind, heavy snowfalls, use of salty water, use of soil that lacks engineering properties or poor construction etc. Buildings are structures that are designed to support certain loads without deforming excessively. The loads are the weights of people and objects, the weight of rain and snow and the pressure of wind (live loads) and the dead load of the building itself (Calvert, 2002). The progressive collapse of a building is imitated by an event that causes local damage which the structural failure system cannot absorb and subsequently propagates throughout the structure all system or a major portion of it leading to a final damage state, that is, disproportionate to the local damage that imitated it (Ellingwood, 2006).

Collapse of buildings is not new to Nigeria, neither is it only peculiar to Nigeria. However, collapse of buildings can happen to any kind of building but the casualty of multistory buildings can be so terrible. High rise buildings are either constructed because of social status, people wants to be recognized in the society not minding the consequences. Commercial viability of a location also makes more people to build storey structures in an area to get contact with their customers or clients. The tendency of man habiting very close to water because of the opportunity of controlling the water ways which gives opportunity for inter trade between Nations; like the dredging of river Niger and upper Benue in Nigeria. Therefore, this study is aimed at exploring the relationship between environmental sciences and the challenges of collapse buildings in Nigeria.

Failure is an unacceptable defense between expected and observed

performance. A failure can be considered as occurring in a component when that component can no longer be relied upon to fulfill its principal functions. Limited deflection in a flow which causes a certain amount of cracking/distortion in partitions could reasonable be considered as defect but not a failure where as excessive deflection resulting in serious damage to partitions, ceilings and floor finishes could be classed as a failure (Roddis, 1993).

Those who investigate and report on failure of engineered facilities are in a good position to identify trends leading to structural safety problems and to suggest topics for critical research to militate against this trend (Chapman, 2000). Frequently, consultants in the office, when they visit sites, see the same mistakes being made time and time again. Many of these are indicators of lack knowledge on the part of the people undertaking the construction. It is strange to see well fired houses that have associated poor construction details that results in large subsequent repair bills. Unfortunately many of the explanation given for these poor practices are common trade practices. This leads to repetition of bad practices resulting in construction failure (Philip, 2002).

Failures in buildings could be cosmetic failure that occurs when something has been added to or subtracted from the building thus affecting the structural outlooks. On the other hand structural failures affects both the outlook and structural stability of the building in Nigeria, building failure have been attributed to the following causes design faulted (50%), fault on construction sites (49%) and product failure (10%) (Emmanuel, 2007). Hall (1984). Ascribed faulty design, faulty execution of work and use faulty materials as major causes of structural failures. Frederick and James (1989) suggested that the overturning of structures due to heavy wind loads, sliding of structures due to high wind, roof uplift or sliding, and building sway due to lateral loads are major types of building failures. However Akinpelu (2002) categorized the following as major causes of structural failures environmental changes, natural and man - made hazards; improper presentation and interpretation design.

Richard (2002) opined that deterioration of reinforced concrete could occur as a result of corrosion of the reinforcement caused by carbonation of chloride ingress; cracking caused by overloading, subsidence or basic design faults and construction defects.

CAUSES OF COLLAPSE BUILDING

The cause of building failures is almost unique and not new to Nigeria or peculiar to Nigeria but a general issue that posed for a concern. Collapse of building can happen to any kind of building; however, the casualty of multistory can be so terrible. The following are factor responsible for the collapse of buildings.

Quality of Blocks used: The quality of material used is a factor in building failure e.g. the 9 inch hollow blocks used for the construction of external walls of residential buildings, there support the weight of the decking and other floors above it in conjunction with pillars since the strength of the blocks depend on the ratio of cement to sand used for the moulding, the right proportions must be used for moulding the blocks to ensure its strength and durability. Most of the so - called ready - made blocks do not measure up to standard. Some block industries mass produce the blocks and in a greedy bid to get the most number of blocks per bag of cement, they used more sand than cement resulting in very weak blocks.

The Quality of Concrete: Concrete is used for the construction of foundation footing, lintels, decking, German floor, because and columns. Concrete is made up of sand, cement and aggregates. And when rods are added, it is called reinforced concrete the strength of reinforced concrete depends o the proportion of cement sand, aggregate on it. After the design of the building by the architect, the structural engineer calculates the amount of weight the building will carry (structural analysis) the engineer therefore determines the sizes of beams and pillars that will help carry that weight. He also determined the number and sizes of the rod that would be used infect the opposite is the case resulting to building failures.

Bad Design: Bad design does not only mean errors of computation, but a failure to take into account the loads the structure carries, however, erroneous theories, reliance on inaccurate data, ignorance of the effects of repeated or impulsive stresses. Ad improper choice of materials or misunderstanding their properties the engineer is responsible for these failures which are created at the drawing board.

Poor compaction and Consolidation: Lack of adequate compaction of the soil makes the foundation to sag as a result of void. If the soil is not properly compacted before the German floor is cast as construction progresses, settlement occurs causing cracks on the walls and German floor that invariably leads to structural failure.

Weak Soil: Due to geologic make up, some layers of soil are just not strong enough to carry the weight of a building. This is mainly applicable to the top layer of the soil which is not suitable for construction. If this factor is neglected and the building is constructed on the soil differential settlement of the building starts and leads to cracking of the walls and continues to sink and this can be seen in many parts of Lagos (Emmanuel, 2007). However, if the test of soil investigation reveals the presence of weak soil on the upper layers of the piece of lad, the structural design rectifies by calling for a deeper than normal foundation.

Faulty Construction: This has been the most important cause of structural failure for example Abuja recorded build failure in recertifies the engineer also at fault, if inspection has been loti. This includes the use of salty sand to make concrete, the substitution of inferior steed for that specified bad riveting or even improper tightening

tongue of musts excessive use of the drift pin to make hotels line up bad udelds, and other practices well known to construction workers even an excellently deigned and constructed structure does not stand on bad foundation Although the structure might carry its loads the earth beneath it may not. The leaning Tower of Pisa is a famous example of bad foundation. The old harmony in St Paul Minnesota, Sank 20feets or more into soft clay, but did not collapsed the displacements due to bad foundation may alter the stress distribution significantly

Extraordinary Load: These are often natural such as repeated heavy snowfalls, or the shaking of an earthquake, or the winds of a hurricane. A building that is intended to stand for some years should be able to meet these challenges. A flimsy flexible structure may avoid destruction in an earthquake, while as solid masonry building would be destroyed earthquake may cause foundation problems when most filled land typifies.

CONCLUSION

Collapsed of building is as a result of using sub-standard materials, adding load that differ from the original design and non-compliance on the professional ethics these and many more leads to destruction of live and properties. Thus, lost of lives and properties is the adverse effects of collapsed building which is a serious threat to the construction industry. Invariably poor construction leads to economic crisis, and waste of time and money. In this case, it is obvious to recommend that professionals must ensure the compliance with the Nigerian code of practice. Proper supervision must be enforced as sub-standard materials should not be used for construction work in Nigeria.

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