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ASSESSING THE EFFECTS OF DEFECTS IN BUILDING STRUCTURES IN NIGERIA

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ABSTRACT

Defective Construction works resulting from non-compliance to the expressed requirements of construction contracts, such as drawings and specification have been identified as one of the major causes of complete structural failures. The causes of defects in building structures are varied and at times not easy to determine. The study aimed at determining the effect of various factors responsible for defects in building structures in Nigeria, by identifying common defects in building through intensive literature search. A second objective was to determine the impact of these defects on the health of the building with the aid of a structured closed ended questionnaire administered to building professionals. Sixty questionnaires were administered fifty were returned and analyzed. The study found that total collapse of building is the major consequence of defective building, while permanent deformity of building element and loss of building prestige were ranked second and third respectively. To minimize the adverse effects of defects in building projects, participants in a building from the client and his consultants, to the contractors and suppliers, the various building regulatory bodies are advised to shun negligence.

Keywords: Defects, Building Construction

INTRODUCTION

Watt (1999) defines building defect as failing or shortcoming in the function, performance, statutory or user requirements of a building, and manifests itself within the structure, fabric, services or other facilities of the affected building. Campbell (2001) asserts that building defects are emotive terms with diverse concept to people, depending largely on their perspectives. According to Nielsen, *et al* (2009) defect is used as a common term for a physical defect when a building material or part of a structure lacks abilities which are expected according to the construction contract, public requirements or good building practice. Building structures are products of the construction industry, in line with this, Oyedele (2010), described Construction defects as the unacceptable quality of a project which can be identified and remedied, hence, defective construction works as those that fell short of complying with the requirements of the contract, especially designs and specifications together with any implied terms and conditions as to its quality, workmanship, durability, aesthetic, or performance. Nielsen, *et al* (2009) opined that a process defect is considered when there is a significant loss of resources during the construction process compared to an optimal process. The incidence of building failures and collapses has become major issues of concern in the development of this nation as the frequencies of their occurrence and the magnitude of the losses in terms of lives and properties are now becoming very alarming. In fact, building collapse has now become a familiar occurrence, even to layman on the street in Nigeria, Fagbenle *et al* (2010). Lavers (2011) stated that "Defects will occur in buildings and it is one of the great certainties in construction; this in order brings about generating solution to a problem in a proactive manner. Though a defect does not necessarily mean that something fails to fulfill its function but a lack of compliance with specification may render a building defective.

MATERIALS AND METHODS

The study sought the views of consulting professionals on the causes and effect of defect on building construction projects in Lagos state, Nigeria. The study was based on the assessment of building projects via the use of questionnaire. Sixty questionnaires were administered fifty were returned and analyzed. Questionnaires were administered to consultants, comprising of architectural, builders, engineering and quantity surveying practitioners in South Western Nigeria. The respondents were selected randomly. The choice of South Western Nigeria for the study was based on the fact that it comprises Lagos (Nigeria's commercial capital), which according to Dada (2005), has the highest concentration of construction activities in Nigeria. Severity Index was used to analyze the data with the aid of SPSS software.

RESULTS AND DISCUSSIONS

Table 1 below depicts the severity of the effect of defects on buildings (Figure 1) ranked in order of severity. Six of the effects had very high Severity Index (SI) ranging between 77 and 92. The only effect outside this range is Inadequate Security (58) however; this also above 50, which is above average, Total collapse of building (SI) 92, Permanent deformity of building element (84) and the building losing its prestige (82) were the three most severe effect of defect on building structures.

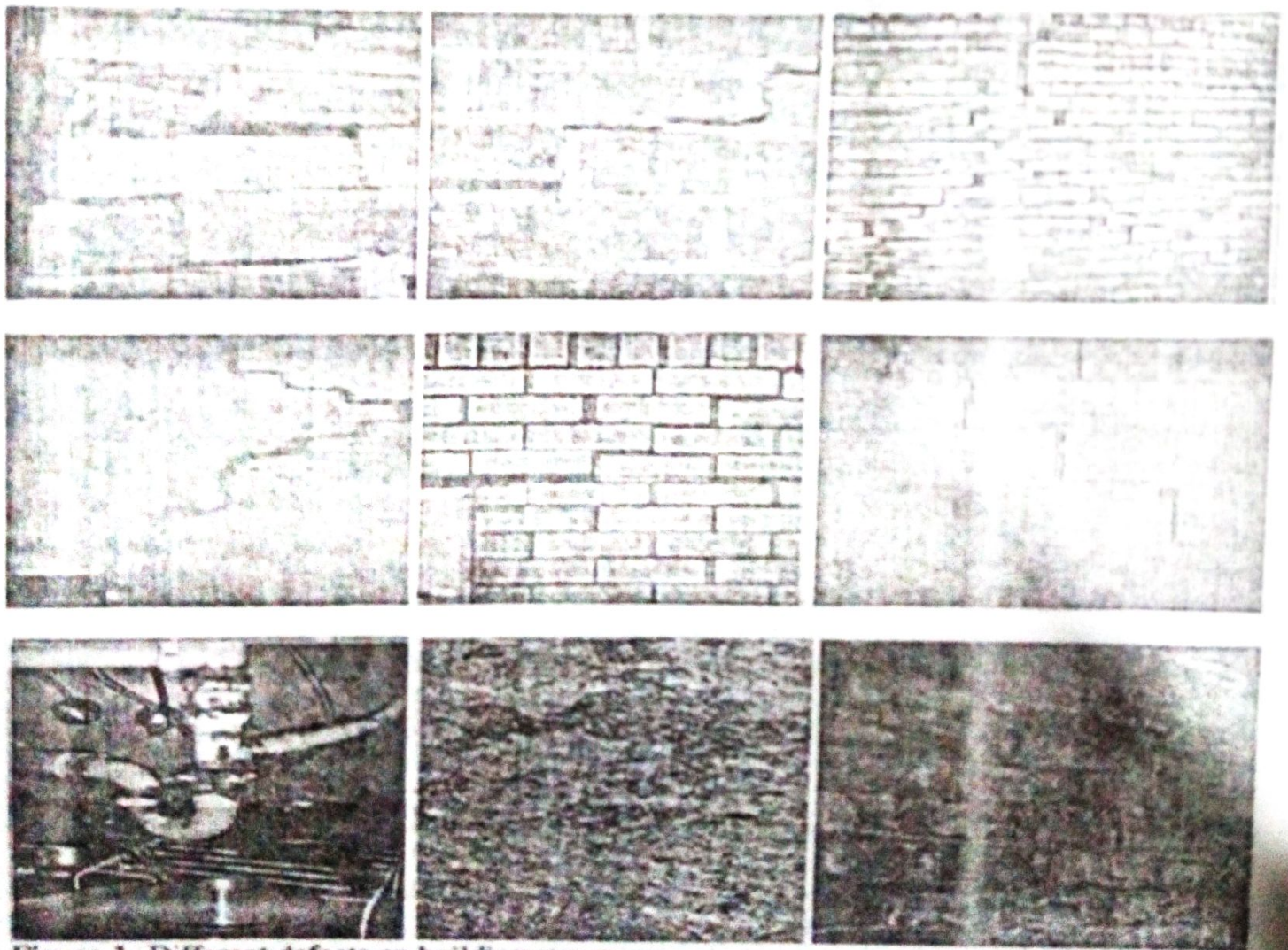


Figure 1: Different defects on building structures

Table 1: Effects of defects on building structures

| S/N | Effect | Severity Index(SI) | Rank |
|-----|---|--------------------|------|
| 1 | Total collapse of the building | 92 | 1 |
| 2 | Permanent deformity of building element | 84 | 2 |
| 3 | The building loses its of prestige | 82 | 3 |
| 4 | Failure in some part of the building | 80 | 4 |
| 5 | Destruction of property | 77 | 5 |
| 6 | Structural Defect | 77 | 5 |
| 7 | Inadequate Security | 58 | 6 |

A construction defect is considered a deficiency in the architectural design, planning and supervision or construction of a new home or building. Construction defects usually include any deficiency in the performing or furnishing of the design, planning, Supervision, Inspection, Construction, or Observation of construction to a new building. Gryna (1988) identified causes as a proven reason for the existence of a defect. Often there are several causes of the same erroneous action. There may be either combined causes or a chain of causes. For this reason, the term root causes is sometimes used to describe the most basic reason for undesirable condition. If the root causes is eliminated or corrected, it will prevent the recurrence of the defect. Oyedele (2010) also identified the causes of construction defects as the act/s of omission or commission or the combination of the two which may lead to defects occurring in construction. Construction defects are caused mostly by lack of skillful manpower, oversights of the contractors or sub-contractors, inadequate or inexplicit job descriptions, inadequate fund or cash-flow problem, usage of poor (substandard) or defective materials, lack of time leading to poor project planning and scheduling and inexperience of contractors or sub-contractors. Construction defects can also be caused by poor design by the project designers and inefficiency of the project manager and the project consultant. In building, the main cause of defects is brought about by human input, making use of inexperienced and unqualified inspectors, Avoiding and ignoring inspection completely, Non implementation of corrective actions during the construction process, Inaccurate measurement, Lack of communication, Non-compliance with specifications, Inability to read and understand/interpret drawings, Insufficient site supervision, Lack of communication between the owner, architect/engineer, project manager, Employing unqualified supervisors, Unqualified labor force (Assaf, Al-Hammad, Al-Shihah, 1995). Roddis (1993) distinguished between defect and failure in buildings. While defect is deflection in a building causing certain amount of cracking or distortion, excessive deflection that results in serious damage to elements in a building is referred to as building failure. Hall (1984) ascribed faulty design, faulty execution of work, and use of faulty materials as major causes of structural failures. A distressed building exhibits defects in its components, noticeable as weakened foundation, cracks in floors, walls, and roofs. These more often signify overall defects in the structural stability of buildings which, if not checked, result in progressive collapse.

Conclusion: This paper concluded that the main causes of Construction Defects in Buildings could be attributed to: Improper Soil Analysis and Preparations; Site Selection and Planning; Civil and Structural Engineering; Defective Building Materials; Negligent Construction; Design Deficiencies; and Construction Deficiencies amongst others. Total collapse of building was found to be the major consequence of defective building, followed by deformity and loss of prestige. Building collapse, though a common phenomenon all over the world is more rampant and devastating in the developing countries.

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