# Assessing the Efficiency and Effectiveness of Maintenance Management Practices in Selected Private Institutions

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## ABSTRACT

The Maintenance Management sector within the public service sector in Nigeria has suffered from lack of funds and negligence for a period of time. The threat also affected the education sector, as significant sums of money are frequently spent on building facilities while upkeep is sometimes disregarded. Therefore, using private institutions in Nigeria as a case study, this paper assessed the efficiency and effectiveness of maintenance management practices.

Existing private institutions were the only ones included in the sampling survey. One hundred (100) questionnaires were sent to evaluate the physical and functional state of private institution buildings in Ogun State as determined by each department's maintenance division to evaluate the efficiency of the maintenance strategies employed in preserving their structures, identifying the most common techniques for carrying out maintenance procedures, and analyzing their effectiveness.

According to the data used, it was found that improper maintenance workload phasing can result in unprofitable maintenance management practices. Other significant factors that contribute to the inefficiency and ineffectiveness of the maintenance management processes include poor contract management, a lack of material availability, and the occurrence of inadequate projection and estimate.

(Keywords: management practices, maintenance, effectiveness, efficiency, assessment, infrastructure)

## INTRODUCTION

Looking at the deplorable state of public buildings across the country for decades, a large chunk of the country's resources have been channeled towards transportation infrastructure; government administrative buildings for ministries and parastatals; and colleges of education, universities, and primary and secondary schools. All are geared toward repositioning the underdeveloped economy. However, one remarkable action according to needed to ensure sustainability of these varieties of infrastructure has not been given the right and sufficient attention in terms of how to carry out its maintenance operations.

Adenuga and Iyagba (2005) submitted that public buildings are in very poor and deplorable conditions of structural and decorative disrepairs. Despite millions of Naira spent to erect all of these buildings, they are left, as soon as commissioned, to face premature but steady and rapid deterioration, decay, and dilapidation (Adenuga, 2012). Therefore, methods should be evolved to reduce maintenance costs. Due to the growth of housing with the lack of building Standards, more maintenance, rehabilitation, and renovation work have become necessary to ensure the serviceability and safety of the constructed houses. In addition, the existing houses need to be sustained as long as possible.

## UNDERSTANDING THE CONCEPT OF BUILDING MAINTENANCE MANAGEMENT PRACTICES

Building maintenance is an important aspect of building management that is often neglected. Maintenance assists retaining economic life of buildings. Moreover, it is an activity that requires a high level of productivity at the private and the national levels. At the private level, proper maintenance leads to lower depreciation costs (due to longer economic life) and consequently leads to higher profitability. While at the national level, proper maintenance leads to lower expenditure on replacement. Thus, allowing more expenditure on expansion into new productive

investment (Anderson, 1996, Lee, 1991). The Committee on Building Maintenance in Britain defined maintenance as: “Building Maintenance is the work undertaken in order to keep, restore or improve every facility, (i.e., every part of a building, its services and surroundings) to a currently acceptable standard, and to sustain the utility and value of the building” (Lee 1981). In addition, maintenance is defined in the British Standards (BS 3811:1974) as “A combination of any action carried out to retain an item in or restore it to an acceptable condition” (Lee, 1981, Brennan, 2000). A more functional definition is that “Maintenance is synonymous with controlling the condition of a building so that its pattern lies within specified regions”. (Fagbenle, 1988).

The Maintenance Management sector in Nigeria in the public sector has suffered from lack of funds for a period of time while the requirements for good practice in maintenance of building stock have been established over a considerable period, the achievement of good practice is by no means universal maintenance of the built environment impacts on the whole nation. The conditions of surrounding in which we live and learn, reflects the nation’s well-being ‘’Maintainability of building has been identified as one of the key areas in which the construction industry must achieve significant improvements”.

Maintaining school buildings in good condition through preventive measures makes sense for academia (Oladapo 2006). However there appears to be a lack of preventive maintenance culture in general based on the various reports on the undesirable conditions of school building (Zubairu, 1999, Fielden, 1997). Maintenance could also be categorized into plans and responsive could be used to determine the works that can involve the inspection of buildings and would be used to assess the need and priority of works that would be carried out at every stage of work. Maintenance can be done in different stages. Each stage will have different characteristics.

## METHODOLOGY

To arrive at the objectives of this research work, a sample survey was carried out by the researchers. Random sampling was used in this study. Sampling can be defined as the selection of a group from the population to make the task of surveying less expensive and more manageable. This could be achieved by selecting a small population to represent the overall population so that the research work will not become cumbersome by involving the whole population. The sampling survey was limited to the existing institution. A total of hundred (100) questionnaires were administered with the aim of achieving the following:

I. assess the operational (physical-functional condition) of public schools in Kaduna state as carried out by the maintenance management department;

II. examine the effectiveness of maintenance practices strategy used in maintaining the buildings;

III. determine the prevailing method of executing maintenance management practices and study its efficiency either by direct labor or contract; and

IV. ascertain the factors that militates against efficient and effective maintenance management practices of the schools.

The questionnaire was organized in the form of an importance scale (i.e., 4 = ‘highly important’, 3 = ‘very important’, 2 = ‘important’, 1 = ‘not important’). Respondents were then asked to indicate by ticking a column, the relative importance of each of the impacts of construction management practices on building. A total of 100 questionnaires were distributed to respondents in the selected private institution.

In total, 83 questionnaires (83%) were retrieved from the respondents for analysis. The interviews adopted an attitudinal approach which is used to subjectively evaluate the opinion of a person or a group of people towards a particular attribute, variable, factor, or a question. Kruskal-Wallis test was also used to validate the results of Kendall's coefficient of concordance. The interview data was analyzed using conceptual content analysis which considers the appearance of a concept or the numbers of times (frequency) a particular concept appears in a text. Bordens and Abbott (2008) note that content analysis is a useful technique to help in understanding behavior adopting a purely descriptive approach.

## ANALYSIS OF DATA AND RESULTS

In this section, results of data analysis that was retrieved and sorted from the groups of respondents were presented. Analysis on the staff and student view on maintenance practices and the technicians, responding to factors that militate against the effective and efficient maintenance management practices of the institutions is shown in Table 1.

From Table 1 it was discovered that the administrative blocks was ranked 1st with the relative index of 0.82, meaning that the execution of maintenance works, has a great deal of attention from the maintenance department, followed by the academic blocks that was ranked 2nd with index of 0.81 on the staff survey, followed by the hostels which was ranked 3rd with index of 0.78, followed by the senior staff quarters that was ranked 4th index of 0.76 in the execution of maintenance management practices.

From Table 2 it was discovered that the senior staff quarters was ranked 1st with index of 0.85 execution of maintenance works, indicating that it also has a great deal of attention from the student perspectives of the maintenance department, followed by the hostel that was ranked 2nd with index of 0.81 on the student survey, followed by the academic blocks which was ranked 3rd with index of 0.72, followed by the administrative blocks that was ranked 4th with index of 0.70 in the execution of maintenance management practices.

From Table 3 it was discovered that the senior staff quarters was ranked 1st with index of 0.88 execution of maintenance works, indicating that it has a great deal of attention from the technicians response in the maintenance department, followed by the hostel that was ranked 2nd with index of 0.86 on the technicians survey, followed by the administrative blocks which was ranked 3rd with index of 0.75, followed by the academic blocks that was ranked 4th with index of 0.74 in the execution of maintenance management practices.

**Table 1:** Maintenance Management Work Execution Ranking [Staff Survey].

| *S\N* | *BUILT ASSET* | *MOST IMPORTANT* | *IMPORTANT* | *LEAST IMPORTANT* | *RELATIVE INDEX* | *RANKING* |
|---|---|---|---|---|---|---|
| 1 | HOSTEL | 7 | 13 | - | 0.78 | 3rd |
| 2 | STAFF QUARTERS | 6 | 14 | - | 0.76 | 4th |
| 3 | ADMIN. BLOCKS | 10 | 9 | 1 | 0.82 | 1st |
| 4 | ACADEMIC BLOCKS | 10 | 9 | 1 | 0.81 | 2nd |

**Table 2:** Maintenance Management Work Execution Ranking [Student Survey]

| *S\N* | *BUILT ASSET* | *MOST IMPORTANT* | *IMPORTANT* | *LEAST IMPORTANT* | *RELATIVE INDEX* | *RANKING* |
|---|---|---|---|---|---|---|
| 1 | HOSTEL | 11 | 14 | - | 0.81 | 2ND |
| 2 | STAFF QUARTERS | 15 | 9 | 1 | 0.85 | 1ST |
| 3 | ADMIN. BLOCKS | 5 | 18 | 2 | 0.70 | 4TH |
| 4 | ACADEMIC BLOCKS | 10 | 9 | 6 | 0.72 | 3RD |

**Table 3:** Maintenance Management Work Execution Ranking [Technician Survey]

| *S\N* | *BUILT ASSET* | *MOST IMPORTANT* | *IMPORTANT* | *LEAST IMPORTANT* | *RELATIVE INDEX* | *RANKING* |
|---|---|---|---|---|---|---|
| 1 | HOSTEL | 20 | 15 | - | 0.86 | 2ND |
| 2 | STAFF QUARTERS | 24 | 9 | 2 | 0.88 | 1ST |
| 3 | ADMIN. BLOCKS | 12 | 19 | 4 | 0.75 | 3RD |
| 4 | ACADEMIC BLOCKS | 14 | 16 | 5 | 0.74 | 4TH |

**Table 4:** Showing the Method of Executing Maintenance Practices.

| *S/N* | *POSITION* | *FREQUENCY* | *PERCENTAGE* |
|---|---|---|---|
| 1 | Direct Labor | 27 | 37.5 |
| 2 | In-house Labor | 27 | 37.5 |
| 3 | Contract | 22 | 28.9 |

**Table 5:** Factors influencing Quality in Maintenance Work.

| S/N | Factors | Strongly Agree | Agree | Strongly Disagree | Disagree | Relative Index | Ranking |
|---|---|---|---|---|---|---|---|
| 1 | Poor contract management | 23 | 32 | 5 | - | 0.86 | 2nd |
| 2 | Financing and payment of completed work | 23 | 46 | 5 | 2 | 0.92 | 1st |
| 3 | Changes in site condition | 29 | 35 | 11 | 1 | 0.80 | 5th |
| 4 | Shortage of material | 16 | 48 | 12 | - | 0.76 | 7th |
| 5 | Design changes | 30 | 37 | 7 | 2 | 0.81 | 4th |
| 6 | Subcontractors | 17 | 42 | 14 | 3 | 0.74 | 9th |
| 7 | Weather | 29 | 39 | 8 | 1 | 0.85 | 3rd |
| 8 | Labor and management relation | 22 | 41 | 8 | 5 | 0.76 | 7th |
| 9 | Inspecting and testing of completed portion of the work | 25 | 34 | 13 | 4 | 0.76 | 7th |
| 10 | Mistake during construction | 26 | 38 | 8 | 4 | 0.78 | 6th |
| 11 | Construction method | 19 | 40 | 14 | 3 | 0.75 | 8th |
| 12 | Price fluctuation | 22 | 36 | 16 | 2 | 0.76 | 7th |
| 13 | Additional work | 21 | 33 | 18 | 4 | 0.73 | 11th |
| 14 | Inaccurate Estimate | 22 | 40 | 10 | 4 | 0.76 | 7th |
| 15 | Delays | 18 | 44 | 11 | 3 | 0.75 | 8th |
| 16 | Fraudulent practices | 25 | 30 | 15 | 6 | 0.74 | 10th |

## Approaches in Maintenance Execution

The methods of executing maintenance practice are presented in Table 4. It was discovered that 37.5% responded to direct labor, 37.5% also responded to In-house labor, where 28.9% responded to the idea of contract works. It could be deduced that direct labor and In-house labor was used in maintenance management project execution in the selected institutions while few projects are executed by contract.

## Factors Influencing Quality Management in Maintenance Work

Table 5 shows the general factors that are responsible for quality management of maintenance work. Relative index and ranking of every factor are presented above.

Results of analysis of factors influencing quality in building maintenance management were presented in this section. Financing and payment of completed works with index of 0.92 was ranked the best (1st) poor contract management with relative index of 0.86 was ranked second (2nd), weather with relative index of 0.85 was ranked third (3rd) while changes in design with 0.81 index was ranked fourth (4th). Financing and payment of completed works was the most subscribed factor, poor contract management was also suggested. The issue of financing is very important if fund is not allocated to the task, the work lingers, and this could lead to further deterioration.

## CONCLUSION

Accessing the effectiveness and efficiency of maintenance management practices in public institution is of paramount importance in building design, construction, and management in our i Nigeria. As a result of creating awareness in the mind of people, an easier and effective means of maintenance policies has been introduced to the community. It was discovered that lack of proper phasing of maintenance workload can give rise to poor maintenance management practice, also, some major variables led to the inefficiency and ineffectiveness of the maintenance projects includes: the occurrence of poor contract management, lack of availability of materials and

the incidence of in accurate estimate. As a result of creating awareness in the mind of people an easier and effective means of maintenance policies have been introduced to the community. It was observed that lack of proper phasing of maintenance workload can give rise to bad and uneconomical maintenance management practice.

## RECOMMENDATIONS

The following recommendations were discovered based on the results of this study.

1. Adequate funds should be provided for effective maintenance practices to be achieved. The policy maker should be interested in maintenance, which should not be neglected.

2. Maintenance practicing personnel should acquire proper training in order to effectively execute the responsibilities required of them.

3. The maintenance department of the schools should ensure that all the money allocated to the department, no matter how small, it should be used judiciously for maintenance jobs.

4. The need for comprehensive economic analysis and workable financial plans should be prepared before contracts are awarded.

5. The maintenance department should ensure that there is/are a precaution to be taken to guaranty quality of materials when they are purchased for maintenance work.

6. The maintenance department is advised to carry out regular inspections of the existing buildings and not to wait until the structure needs repairs.

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