

MITIGATING FACTORS IN THE MAINTENANCE OF SCHOOL BUILDINGS IN NIGERIA (A CASE STUDY OF ALIMOSHO LOCAL GOVERNMENT AREA OF LAGOS STATE)

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Abstract

Whereas it is impossible to construct a building that will be maintenance free throughout its lifetime because of the effects of age weather and human activities on it, a proper maintenance of building will prolong its life and enhance its utility. This paper aims at examining the maintenance practices as they affect public and private primary school buildings with a view to proffering solutions to issues of maintenance that would assist the government, as well as private primary schools owners. In pursuing this aim, the paper considers the existing maintenance practices on public and private primary school buildings; examining their physical condition and fitness for use. It also evaluates the users' level of satisfaction with the maintenance of such buildings and examines the determinants of maintenance standard for the school buildings. Secondary data were obtained from existing related literatures while primary data were obtained mainly through the use of questionnaire randomly administered on head teachers of the schools. Resulting data were analyzed using descriptive statistics, Spearman's rank correlation while test of hypothesis was conducted with student t-test. The findings revealed apathy in the maintenance of the school buildings, inadequacies in the building maintenance budget and significant differences in the building maintenance methods and practices in the private and public primary schools. Policy recommendations include proper budgeting for building maintenance, encouragement of maintenance personnel and adoption of efficient building maintenance method and manual in Nigerian schools.

Keywords: *Schools' Building Maintenance, Maintenance Practice, Maintenance Management Team, Primary School Buildings, Classroom Population.*

Background to the Study

Primary schools in Lagos State are divided into two broad categories. The public schools are the ones owned and operated by the Government while the private schools are owned and operated by private individuals and organizations. The maintenance of the school buildings is the focus of this paper, identifying maintenance practice, methods and problems. Shear (1993) opined that the maintenance of private and public school

buildings is one of the most tasking issues maintenance managers have been facing knowing that the inadequacy of operation and maintenance of infrastructure in developing countries has serious consequence for economic and social development.

Buildings begin to decline in utility from the moment they are completed and call for maintenance practice from the onset. In essence, there is a need for maintenance managers in every private and public school building to keep reviewing their building maintenance priorities in relation to user wants and maintenance needs (Brian, 2003). In many instances, building owners and users unnecessarily spend millions of naira each year on excessive maintenance and replacement of building components that they let deteriorate into a state from which it is very difficult and costly to recover (Adenuga, 2012). With increasing costs of new construction, the effective maintenance of the existing building stock has become even more important.

Poor maintenance will lead to unnecessary investment in rehabilitation of private and public school buildings, thus it will have negative impact on the environment. Infrastructure and or facilities, that are not maintained, will deteriorate faster, have short life span, waste scarce investment fund and preclude effective cost recovery (UNCHS, 2003). Maintenance practices on private and public school buildings is a must for every government and private school owner, in order to provide a conducive environment for the occupants such as favorable and enabling environment for learning, maximum comfort, as well as maximizing profit and revenue realizable from such buildings and above all cutting down expenses to the barest minimum. In this light, the maintenance of private and public school buildings cannot be neglected as it ensures the continuous use of the entity in question. Many of the private and public school buildings in Lagos State have been in existence for decades. The government, and a lot of private school owners have failed to realize that as an asset gets older, there is the likelihood of higher maintenance cost than at its inception.

Objectives of the Study

This paper aims at examining the maintenance practices as they affect public and private primary school buildings with a view to proffering solutions to issues of maintenance that would assist the government, as well as private primary schools owners.

Methodology

For this study, the sample frame is the total number of Public and Private primary schools in Alimosho Local Government area of Lagos State. There are 74 public primary schools and 80 private primary schools within the study area, this makes up a total of 154 primary schools. A sample unit of 50 percent of the population was considered adequate. Hence the names of the schools were arranged alphabetically and the schools that fell on odd numbers were selected. Head teachers of selected schools were served with self administered questionnaire which were analyzed to obtain the results in tables 1 to 4. Out of 37 questionnaire served on public schools 40 served on private schools, 30 were retrieved in each case

Literature Review

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". A more functional definition is that "Maintenance is synonymous with controlling the condition of a building so that its pattern lies within specified regions". (Shear, 1983). Maintenance management issues play a major role in the performance of constructed facilities (Shohet et al, 2003). Maintenance management is defined as "the selection of the goals, planning, procurement, organization, co-ordination and the control of the necessary resources for their achievement. Maintenance management is an orderly and systematic approach to planning, organizing, monitoring and evaluating maintenance activities and their cost. (Horner and Munns, 1997). Management is concerned with the dynamics of circumstances and activities, and is general motivated by the need to economize in the use

of resources and time in achieving predetermined objectives. Historically, maintenance was seen as the preservation of a building so that it can serve its intended purpose. Maintenance assists in retaining economic life of buildings. Moreover, it is a productive activity both at the private and the national (public) 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 (public) level, proper maintenance leads to lower expenditures on replacement. Thus, allowing more expenditure on expansion into new productive investment (Ikhwan, 1996).

According to Adenuga (2012), maintenance management refers to systems of managing facilities embracing functions expected of professionals that are charged with such responsibilities. Olateju (1994) defines maintenance policy as the strategy within which decisions on maintenance are taken, that is, the ground rules for the allocation of resources, men, money, materials and machinery. According to him the allocation of resources involves the establishment of priorities for the resource allocation. An effective maintenance program and management system is characterized as the product of prudence, of the sentiment that 'a stitch in time saves nine' (Rapp & George (1998) and Buys & Nkado (2000).

In maintaining private and public school buildings, there are usually several strategic options available to management, and many alternative decisions to be considered. There is, for example, the possibility of reducing the demand for maintenance by addressing the actual cause of failure and identifying its consequences. For instance, it may be necessary to decide whether to repair or to replace an item, and whether to carry out periodic maintenance at fixed intervals or simply to respond to the requests of the users. (Horner et al, 1997) highlighted seven building maintenance strategies: Corrective Maintenance; Preventive or Time Based Maintenance; Predictive or Condition-based Maintenance; Routine Maintenance; Deferred Maintenance; Detective Maintenance and Emergency Maintenance. Corrective maintenance is the simplest type of maintenance strategy, where an element in a building is used until it breaks down or defects. It covers all activities, including replacement or repair of an element that has failed to a point at which it cannot perform its required function. Corrective maintenance is sometimes referred to as failure-based or unplanned maintenance. It tasks often take place in an ad hoc manner in response to breakdown or user request. Thus, corrective maintenance can be extremely expensive for two reasons:

Preventive or Time-Based Maintenance involves doing everything possible to prevent breakdown (Priel, 1992). Preventive maintenance was introduced to overcome the disadvantages of corrective maintenance, by reducing the probability of occurrence of failure and avoiding sudden failure. This strategy is referred to as time-based maintenance, planned maintenance or cyclic maintenance. Preventive maintenance tasks are performed in accordance with a predetermined plan at regular, fixed intervals, which may be based for example on operating time. Such a strategy is frequently applied to external or internal paint work. Aim of preventive maintenance is to catch small problems before they become big problems. Preventive maintenance keeps a building operating at peak efficiency through regular inspection and repairs (Arditi & Nawakorawit, 1999).

Predictive or Condition-based Maintenance is defined as: "Maintenance carried out in response to a significant deterioration in a unit as indicated by a change in monitored parameter of the unit condition or performance" (Kelly and Harris, 1978). The condition-based maintenance concept recognizes that a change in condition and/or performance of an item is the principal reason for carrying out maintenance. Thus, the optimal time to perform maintenance is determined from a condition survey used to determine the actual state of each constituent item in a building. In this strategy, maintenance tasks are determined and planned by efficiently monitoring the building's elements such as walls, floors, roof and service equipment such as boilers, pumps, and heating system, to identify which element or piece of equipment requires maintenance before a major failure occurs.

To gain the full advantage of applying condition-based maintenance, the condition of an item must be monitored to identify whether there is any evidence of change from a normal to an abnormal condition. This can be done by selecting the parameter which best describes the condition of the item and monitoring changes using suitable condition monitoring tools. Condition assessments can vary from simple visual inspections to more advanced inspections using a variety of condition monitoring tools and techniques.

Routine Maintenance includes general maintenance necessary to keep the building in good condition (Arditi & Nawakorawit, 1999). These items are not tenant requested, but necessary to keep the building in good condition. Deferred maintenance to include physical defects that occurred because of physical deterioration and cost of upgrading buildings to meet standards, including modern heating, ventilation, and air conditioning standards, energy standards, fire and life safety standards, and accessibility standards. According to (Arditi & Nawakorawit, 1999) the necessary maintenance is put off until later date. Contributing to the delay might be budget limitations, owner preference, the availability of parts, or inclement weather. Detective Maintenance is applicable to the types of devices that only need to work when required and do not tell us when they are in failed state e.g. fire alarm, smoke detector, this require a periodic functional check to ascertain their working condition. Emergency Maintenance occurs when and where there is an unexpected breakdown of assets or equipment. These are unpredictable or reactive type of maintenance that is more difficult to schedule

The Study Area

Lagos is the most populous conurbation in Nigeria with more than 8 million people. It is the most populous in Africa, and currently estimated to be the second fastest growing city in Africa immediately following Bamako. Lagos is one of the largest urban agglomerations, currently counting 9.5 million inhabitants. Since the late 70ies Lagos experiences an enormous population explosion and has a growth rate of 5,7 percent per year. This means, Lagos is growing 2000 inhabitants per day. As the city's growth rate and the slum growth rate are mostly the same, the city development is not able to connect and to build at that speed. Lacking infrastructure and the emergence of informal settlements and at first glance chaotic conditions are resulting effects (LURG 2014). Formerly the capital of Nigeria, Lagos is a huge metropolis which originated on islands separated by creeks, such as Lagos Island, that fringe the southwest mouth of Lagos Lagoon, protected from the Atlantic Ocean by long sand spits such as Bar Beach which stretch up to 100 km east and west of the mouth. From the beginning, Lagos has spread on the mainland west of the lagoon and the conurbation, including Ikeja and Agege, now reaches more than 40 km north-west of Lagos Island. The city is the economic and financial capital of Nigeria. Lagos is one of the 36 states of Nigeria and it is divided into 20 Local Government areas, one of which is Alimosho Local Government area (shown in figure 1).

The study area is Alimosho Local Government Area of Lagos State, which is predominantly a residential district. It is a Local Government in the Ikeja Division of Lagos State, and the largest local government in Lagos with 1,288,714 inhabitants according to the official 2006 Census. It has been subdivided into six local council development areas including Agbako Oke-Odo, Alimosho, Egbe-Idimu, Ikotun-Igando, Ayobo-Ipaja and Mosan-Okunola to make grass root governance more meaningful.



Figure 1: Alimosho Local Government Area (Source Wikipedia)

Evaluation Criteria

The building maintenance practice in the private and public primary schools of the case study is compared using the following three main criteria:

- I. Management of maintenance group - Maintenance management is an effective tool for achieving a high standard of maintenance work. Maintenance management's responsibility needs to formulate long term strategic plans to meet those needs are required (Mahmoud, 1994). The composition of the group is essential for its success. In absence of professionals, it will lead to a cumbersome, time consuming, and most likely fail maintenance work.
- II. The maintenance programme should comprise of three basic components: Organisation, inspection and maintenance plan. The effective performance of these functions lies with the maintenance departments that are available in the schools. Inadequacy of maintenance departments is a bane.
- III. Wrong Behaviors of Occupants - Private and public school buildings occupants often pay little attention to keeping the buildings in good working order and are surprised when they fail to give the service they expected. The misuse of building services will result in their damage and the need for repair, which will be costly. also, the abnormal occupier activities like classroom congestion can cause therapid deterioration of school building.

Members of Maintenance Department

The availability of professionals in the maintenance department improves the effectiveness and quality of maintenance activities of the department. There is little a maintenance department without a professional(s) who is trained and vast in building maintenance can achieve compared to a maintenance department to with seasoned professionals. This does not seem to be the case in public schools as reflected on table 1 where 26.7percent of members of maintenance department are professionals as against the private schools where 66.7 percent of the members of maintenance department are professionals.

Table 1: Members of maintenance department

Ownership of School	Members of maintenance department				Total
	Professionals	Teachers	Artisans	None	
Private	20(66.7%)	7(23.7%)	3(10%)	0	30
Public	8(26.7%)	10(33.3%)	4(13.3%)	8(16.7%)	30

Number of Students per class

One of the root causes of maintenance problem is the overuse of classroom facilities in public schools. This is as a result of the continuous rise in student enrolment in public schools which are patronized mainly by the dominant poor people of the society. The classroom congestion has consequently led to overuse of facilities and deplorable state of the school buildings. This finding is backed up with Table 2 where 90 percent of public primary schools have population of more than 30 students in a class. This overpopulation can be greatly attributed to the free education policy on Universal Basic Education by the government which compels all parents to send their children or wards to schools.

Table2: Number of students per class

Ownership of School	Number of students per class				Total
	10-20	21-30	31-40	41-50	
Private	3(10%)	22(73.3%)	5(16.7%)	0	30
Public	0	3(10%)	24(80%)	3(10%)	30

Type of Maintenance Practiced

There are three types of maintenance practices found in the study area: Preventive, Corrective, Repair/Emergency. Preventive method which is planned is practised by 76.7 percent of private schools and 23.3 percent of public schools as witnessed on table 3

Table 3: Type of maintenance practiced

Ownership of School	Type of maintenance practiced				Total
	Preventive	Corrective	Repair/Emergency	None	
Private	23(76.7%)	6(20%)	1(3.3%)	0	30
Public	7(23.3%)	4(13.3%)	19(63.3%)	0	30

Test of Hypotheses

Independent samples T test of hypotheses conducted on the data from tables 1-3 at 5% significant level revealed significant differences in the responses of the two categories of schools in three aspects as indicated on Table4:

- With respect to average number of students per classroom,
 H_0 = There is no statistically significant difference in the average number of students per classroom
 H_1 = There is a statistically significant difference in the average number of students per classroom
 $T(58) = -7.373$: $p = 0.000$. Reject H_0

2. With respect to the type of maintenance practice in the school
 Ho = There is no statistically significant difference in the type of maintenance practice in the school
 H₁ = There is a statistically significant difference in the type of maintenance practice in the school
 T(58) = -4.335: p = 0.000 Reject Ho
3. With respect to the composition of members of maintenance department,
 Ho = There is no statistically significant difference in the composition of members of maintenance department.
 H₁ = There is a statistically significant difference in the composition of members of maintenance department.
 T(58) = -3.933: p = 0.000. Reject Ho

Table 4: Independent Samples Test

		t	df	Sig. (2- taile d)	Mean Differenc e	Std. Error Differenc e	95% Confidence Interval of the Difference	
							Lower	Upper
Number of Students per Classroom	Equal variances assumed	7.393	58	.000	-.93333	.12625	-1.18605	.68062
	Equal variances not assumed	7.393	56.968	.000	-.93333	.12625	-1.18614	.68052
Type of Maintenance Practice	Equal variances assumed	4.335	58	.000	-.63333	.14609	-.92576	.34091
	Equal variances not assumed	4.335	56.680	.000	-.63333	.14609	-.92590	.34077
Members of Maintenance Team	Equal variances assumed	3.933	58	.000	-.96667	.24581	-1.45870	.47463
	Equal variances not assumed	3.933	46.717	.000	-.96667	.24581	-1.46125	.47209

Conclusion and Recommendation

Maintenance departments with relevant maintenance crew are lacking in the primary schools, especially the public ones. The situation of two tiers educational setup of private and public schools promotes social apathy based on financial status of parents or sponsors. While the private schools are more alive to environmental image, public schools care less erroneously believing that what belongs to the public belongs to nobody. The situation whereby teachers are maintenance officers is undesirable and the absence of maintenance departments is worse.

Financing schools' maintenance programme remains a desideratum in Nigeria as an invaluable venture that guarantees the right environment for learning. Hence, funding of schools maintenance activities should be the responsibility of all the stake holders whereby the school administration includes fund-raising activities as part of it maintenance programmes. Employment, remuneration and continuous training of

maintenance managers are essentials to be considered for salubrious learning environment in secondary schools. Building maintenance must be coordinated, continuous and adequately funded. It recommended the removal of educational apathy from the secondary school system in the interest of the nation's image.

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