

Evaluation Of Maintenance of Building Facilities in Nnamdi Azikiwe University, Awka

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Abstract- The study Examined Evaluation of maintenance of building facilities in Nnamdi Azikiwe University Awka. The paper reviews the existing literature on building maintenance, types of maintenance, maintenance plan, building maintenance models, factors affecting building facility maintenance, other factors influencing the decision to carry out maintenance work, reason for maintenance, management organization, maintenance department, simple procedure for the maintenance organization. The methodology involved survey design, review of related literature, two sets of structural questionnaires, direct observation, walkthrough evaluation. Data Collected for this work were analyzed using descriptive statistical tool, one sample t-test and principal component analysis. The research question was answered with meanwhile the hypotheses were tested using principal component analysis and one sample t-test. The study reviewed also that maintenance is reactive rather than proactive and no evidence of maintenance plan were in use. The study recommends adequate allocation of resources to facilities maintenance in terms of funds, equipment, tools, personal and materials. The study also recommends improved maintenance culture and the need for proactive approaches to maintenance, which includes a maintenance manual and plan to be strictly adhered to by all and sundry.

I. INTRODUCTION

A building is regarded as any structure that is designed or intended for support, enclosure, shelter or protection of reason, animals or property having a permanent roof that is supported by columns or walls. Building also provides safety, human inhabitant, animals, material and equipment from effect of weather and gives internal comfort (Ogunoh, 2008). In fact, building being an essential part of human

existence, is regarded as a basic need of mankind rank second to food.

A healthy building is one that adversely affect the health of its occupant nor the large environment. According to Okoye and Ogunoh (2008), building is expected to function effectively throughout their expected life span. Building must function to accommodate the activities for which it is built and provides comfortable indoor and outdoor climate to its occupant.

Consequently, for building to meet these basic requirements, they require constant and regular maintenance of its facilities.

- **Facilities Maintenance:** - Maintenance can be seen as a systematic care of (or all works undertaken to keep) a building to a state of preservation and acceptable standard and in order to last long (Ogunoh, 2008). Facilities maintenance activities include keeping space, structure and infrastructure in a proper operating condition in a routine schedule or anticipated fashion to prevent failure and/or degeneration.

Unfortunately, building facilities maintenance has until recently been a neglected field of technology in most of our government policy formulation and execution (Akinsola and Lyagba, 2006). Every tertiary institution whether old or new requires maintenance. Tertiary institutions are considered to be key to technological development, productivity and economic growth of a nation and such have been accepted as the barometer of sustainable development. Building maintenance is seen as an unproductive exercise by Nigeria's, especially government owned properties (Okoye and Ogunoh, 2008) as government preferred using funds for new capital projects to the neglect of those already in existence. Because of this,

tertiary institutions especially federal owned universities like Nnamdi Azikiwe are being forced to investigate ways and means to reduce building maintenance cost.

1.1 AIM AND OBJECTIVES OF THE STUDY

The aim of this research is to evaluate the state of the maintenance of building facilities in Nnamdi Azikiwe University Awka, with a view to developing effective and efficient maintenance management procedures to improve building facilities maintenance in the institution. This aim will be achieved through the following objectives.

1. To determine the factors responsible for maintenance of building structures.

1.2 RESEARCH QUESTION

In the light of maintenance of building g facilities in Nnamdi Azikiwe University, Awka, the study intends to shed light on the following questions.

- i. What are the factors responsible for maintenance of building structures?

1.3 HYPOTHESIS

The following hypothesis were developed

- Hypothesis: - There are no significant factors responsible for the maintenance of building structures in Nnamdi Azikiwe University, Awka.

II. LITERATURE REVIEW

2.1 CONCEPT OF FACILITIES MANAGEMENT

The definition of facilities management is evolving and many people and organization have different views. In this section of work, we are going to present some of the most widely accepted definition of facilities management.

The SAFMA defines facilities management as an enabler of sustainable enterprise performance through the whole life management of productive work places and effective business support services.

The British Institute of facilities management (BIFM, 1999) defined facilities management as the integration of multi-disciplinary activities within the built environment and the management of their impact upon people and workplace.

The international facility management association (IFMN, 2003) gave their own definition of facilities management as the practice or coordinating the physical workplace with the people and work of the organization, integrates the principles of business administration, activities and the behavioural and Engineering Sciences.

Facilities management is very versatile field, hence the difficult being experienced in formulating or postulating an all-embracing definition that will be generally acceptable.

All human and organizational activities come under the domain of facilities management that is why it is most convenient and beneficial to look at facilities management from the explanatory point of view based on the scope/activity areas (Akin, 2003)

• SCOPE/ACTIVITY AREAS OF FACILITIES MANAGEMENT

A better picture will be painted looking at facilities management from scope/activity areas as presented by some authors.

According to Uchekukwu (2012), the scope of facilities management can be examined from three respective viz;

- a. By user sector component
- b. By function
- c. By core competences

2.2 FACILITIES MAINTENANCE

Maintenance has different definition by different scholars. According to the building maintenance committee (1972), gave the following definition of maintenance as “work undertaken in order to keep, restore or improve every facility i.e every part of a building, its services and surrounds, to a current accepted standard and to sustain the utility and value of facility.

2.3 TYPES OF MAINTENANCE

Maintenance can be classified into planned, programmed or scheduled, and unplanned contingency system). We have the preventive type of maintenance and corrective type. Preventive maintenance is broken down into warrants, routine,

operational, infrequency, cyclic and predictive maintenance system.

1. Planned or Programmed or Schedules Maintenance

a. Preventive Maintenance: - This may be described as work which is carried out before an element has failed with the intention of preventing or considerably reducing the chance of failure. It is work carried out at pre-determined intervals to minimize the possibility of elements and components falling below require standard.

ai. Cyclic Maintenance: - According to Ajator (2012) cyclic maintenance also includes periodic maintenance and Holmes (1994) opined that cyclic maintenance is of two types namely; condition independent cyclic maintenance and condition dependent cyclic maintenance.

a.ii. Routine Maintenance: - It is the maintenance required at the end of a piece of equipment's useful life. It is aimed at taking advantage of the residual usefulness or life of equipment because of its purpose, this type of maintenance is done very frequently.

a.iii. Operational Maintenance: - It is concerned with the work of custodians ground workers, and general maintenance crew who do the daily work of cleaning and routine maintenance. Operational maintenance includes responding to calls for emergency repairs, replacing light bulbs, patching holes and repairing of furniture and fixtures.

a.iv. Predictive Maintenance: - It is the cutting edge or modern facilities management. It is based on the principles of forecasting equipment or component breakdown. This maintenance uses sophisticated computer software to forecast the failure of equipment based on age, user demands and performance measures.

1b. Corrective Maintenance: - Corrective maintenance is the work carried out after an element has failed and where possible, restore the element to its original state or to a state which is acceptable, taking into account the current or proposed use of

the building. Corrective maintenance is typically carried out in these steps.

Diagnosis of the Problem: - The maintenance technician must take time to locate the failed parts or otherwise satisfactorily access the cause of the system failure.

Repair and /Or Replacement Faculty Component: - Once the cause of the system failure has been determined, action must be taken to address the cause, usually by replacing or repairing the components that caused the system to fail.

Verification of the Repair Action: - Once the component in quest have been repaired or replaced, the maintenance technician must verify that the system is again successfully.

2. Unplanned or Contingency System of Maintenance

a. Response or Emergency Maintenance: - It is the type of maintenance that responds or attends immediately to sporadic request from users of buildings and other facilities.

b. Breakdown maintenance: - It is the type of maintenance work carried out to bring an item back to a state of functioning after total collapse.

III. RESEARCH DESIGN

By virtue of the nature of the research, survey research method was adopted for this research. Survey research method according to Nworgu (1991) is one in which group of people or items are studied by collecting and analyzing data from only a few people or items considered being representative of the entire group. The use of survey research method makes the data gathered directly from respondent to be more distinct and infinite.

3.1 PRIMARY DATA

Primary data is the information gathered directly by the researcher. For this research primary data was collected through questionnaires, oral interviews, direct observation and walk-through evaluation.

3.2 SAMPLE SIZE AND TECHNIQUE

The population of the study is made up of non-academic staff in the University who are involved in facilities maintenance management service. Using the Taro Yamene’s formular because base on the research condition, the population is finite, hence a corrected sample size will be determined by applying the formula as stated below.

$$n = \frac{N}{1 + N(e)^2}$$

A total no of 81 questionnaires was administered: 55 to staff of works department and 26 to staff of physical planning units.

3.3 METHOD OF DATA COLLECTION

The study adopted the use of self-administered questionnaire backed up with interview guide. A well-structured questionnaire was administered to the targeted population.

Two types (I, II) of questionnaires were used. The first was administered to staff of works department and the second staff of physical planning unit.

3.4 METHOD OF DATA PRESENTATION AND ANALYSIS

Data collected from this work was presented using descriptive statistical tools as this would ensure a more meaningful and simpler way of interpreting data collected; such tools include frequency and percentage and results were presented in tables. The research hypothesis I was tested using principal component analysis (PCA) as it is a method used to reduce the number of variables in one’s data by extracting important ones from a large pool while research hypothesis II was tested using the one sample t-test which is used to determine if there is a significant difference between the means of two groups which may be related in certain features.

IV. DATA PRESENTATION AND ANALYSIS

The preliminary information of the respondents, such as Age, Sex, Marital Status, Educational Qualification, and Area of Specialization of respondent are presented and Explained in this section.

Table 4.1: Sex distribution of Respondents

Sex	Frequency	Percent
Male	54	77.1
Female	16	22.9
Total	70	100.00

Table 4.1 contains the sex distribution of the respondents; it shows that 77.1 percent of the respondents are male while 21.9 percent are female. This shows that the respondents are more of males than females.

Table 4.2: Age range of Respondents

Age range	Frequency	Percent
18-25 years	7	10.0
26-40 years	49	70.0
41-64 years	14	20.0
Total	70	100.00

Age ranges of the respondents are contained in table 4.2, the table has it that 10.0 percent of the respondents are aged 18 to 25 years, 70.0 percent are within the ages of 26 to 40 years while 20.0 percent are aged 41 years to 64 years. This obviously shows that those who are aged 26 to 40 years are more in number than other respondents.

Table 4.3: Marital status of Respondents

Marital status	Frequency	Percent
Single	28	40.0
Married	39	55.7
Divorced	3	4.3
Total	70	100.00

Table 4.3 contains the marital status of the respondents, from the table, it can be seen that 40.0 percent of the respondents are single, 55.7 percent are married while 4.3 percent are divorced; showing that the respondents are more of the married.

Table 4.4: Educational level of the respondents

Marital status	Frequency	Percent
O'Level	1	1.4
OND/HND/BSc	34	48.6
Postgraduate level	35	50.0
Total	70	100.00

Table 4.4 has the educational qualifications of the respondents. It can be seen from the table that 1.4 percent of the respondents are O'Level holders, 48.6 percent are OND/HND/BSc holders while 50 percent are those who have studied to postgraduate level. This shows that majority of the respondents are graduates and as such are enlightened enough to supply the necessary information.

Table 4.5: Areas of specialization of Respondents

Area of specialization	Frequency	Percent
Architecture	17	24.3
Estate Surveying and Valuation	7	10.0
Quantity Surveying	7	10.0
Land Surveying	4	5.7
Engineering	25	35.7
Urban and Regional Planning	6	8.6
Building	2	2.9
Town planning	2	2.9
Total	70	100.00

The areas of specialization of the respondents are contained in table 4.5; from the table, it can be seen that 24.3 percent of the respondents are Architects, 10.0 percent are Estate Surveyors and Valuers, Quantity Surveyors make up 10.0 percent while Land Surveyors make up 5.7percent. The remaining are Engineers, who make up 35.7 percent of the respondents, 8.6 percent are Urban and Regional Planners, 2.9 percent are Builders while 2.9 percent are Town planners.

4.1 OBJECTIVES

To determine factors responsible for maintenance of building structures.

To meet this objectives, one sample t-test was done with the responses of the respondents on the maintenance of building facilities in Nnamdi Azikiwe University, Awka. The result of the one sample t-test is presented in table 6 and 7.

- Statistical Tool Used: One-sample T-Test
- Reason for choice of Tool: One set of observations was compared with a standard.
- Degrees of Freedom: 10.
- Decision Rule: Accept the null hypothesis if the p-value is greater than or equal to 0.05.
- Test Proper: The result (output) of test is presented in tables 14a and 14b as shown.

Table 4.6: One-Sample Statistics for Factors Responsible for Maintenance of Building Structures

	N	Mean	Std. Deviation	Std. Error Mean
Factors Responsible for Deterioration of Building Structures	11	3.86494	.339178	.102266

From table 6, it can be seen that the mean of the responses of the respondents on the factors responsible for the deterioration of building structures is 3.864945, the mean is greater than 3.0 which is the mean cutoff point.

Table 4.7: One-Sample Test for Factors Responsible For Maintenance Of Building Structures

	Test Value = 3.0				
	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
				Lower	Upper
Factors Responsible for Deterioration of Building Structures	8.458	10	.000	.637082	1.092809

Table 7 contains the T-Test of the factors responsible for maintenance of building structures; the test compared the mean of the respondents with the mean cutoff point. From the table, it can be seen that the mean difference is 0.8649455, and the p-value is 0.000. The implication of the above is that the factors responsible for maintenance of building structures are significant; that is, there are significant factors responsible for maintenance of building structures in NAU, leading to the rejection of the null hypothesis and acceptance of the alternative. Furthermore, this implies that the factors which have been identified by the respondents are significant.