

# Lack of Maintenance Culture of Public Buildings in the Capital City of Ghana- Accra

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## Abstract

Buildings in disrepair or unsanitary conditions, unauthorized building works and dilapidated signboards are potential hazards to the public, the responsibilities for maintaining and managing buildings safe and in sanitary conditions rest with owners.

Timely maintenance and proper management of buildings prevent their deterioration keep them safe and tidy, provide a pleasant and comfortable living environment and uphold their value. (Chin-man June 2002)

The maintenance of the built environments affects everyone continually, for it is on the state of our homes, offices, and factories that we depend not only for our comfort, but for our economic survival.

Maintenance starts the day the builder leaves the site. Design, materials, workmanship, function, use and their interrelationship, will determine the amount of maintenance required during the life time of the building.

Furthermore, the client's economic interest may work against the elimination of high maintenance cost in the building design.

The building fabrics have to satisfy different user needs and occupational factors. The designer should identify what performance is required from the fabrics in terms of weather tightness, noise reduction, and durability resistance to heat loss and other relevant criteria, in addition to comfort and visual requirements.

Many of the design faults which results in high maintenance expenditure could conceivably be avoided if a maintenance manager or someone with similar technical knowledge, joined the design team.

Not many architect or builders revisit their jobs after the expiry of the defects liability period and few have a continuance responsibility for maintenance.

**Keywords:** Maintenance, Design, disrepair, dilapidated, unsanitary, potential hazards deterioration, environment, performance.

## 1. Introduction

Maintenance is defined as a combination of any actions carried out to retain an item in or restore it to an acceptable condition" (BS 3811 1964).

The action referred to are those associated with initiation, organization and implementation. The former is usually referred to as preventive maintenance. There is also the concept of an acceptable standard. This may be constructed as acceptability to the person paying for the work, to the person receiving the benefit or to some outside body responsible to the public.

Clearly, there are no absolute standards which would remain acceptable to the same group of people over the period of time undertaking the work may be higher than originally provided and the work would include an element of improvement. It could be argued that this interpretation would be inconsistent with the phrase, to restore or retain, in that this would suggest that initial standards as the proper basis, however, with the passing of time buildings are modified to accommodate new users and it becomes increasingly unrealistic to think in terms of keeping or restoring the initial standards.

There is a growing awareness amongst Ghanaian about the significance of lack of maintenance culture in our public buildings or institutions in the country.

In recognizing the desirability of including reasonable elements of improvement the building maintenance committee of the UK recommends the following definition. "Work undertaken in order to keep, restore or improve every facility i.e. every part of the building, its service and surrounds to a currently accepted standard and to sustain the utility and the value of the facility" This introduces the notion of a currently accepted standard which form the general tenor and the definition, and it assumed to be higher than the initial standard. There may

of course be cases where buildings are put to a less demanding use for which lower standards would be acceptable.

There is also reference to utility and 'value' which would be important factors to take into account when fixing an acceptable standard. The key words identified in the definition are:

Keep : To prevent from growing less in size, amount or degree.

Improve: To achieve a better standard or result than before.

Utility: An important service such as water, electricity that is provided for every one that everyone pays for.

Standard: A level of quantity achievement especially a level that is thought to be acceptable.

Facility: Is something useful but essential such as additional service provided by an organization or an extra feature or a machine which you can use if you want or need to

Sustain: To maintain or keep something going for a period of time.

## 2. Nature and significance of building

It will be incomplete and unsatisfactory to work at the subject of maintenance with the regard to building without considering the various basis principles of building technology. The subject of maintenance requires a clear undertaking of how these principles interweave and overlap to produce satisfactorily sound structures for suitable living conditions.

Building can be classified in relation to age and type and range of properties. Ancient buildings are those which built before the 19<sup>th</sup> century and conformed to no building regulation standard.

(Griffiths 1973) on the other hand 19 century buildings where generally of poor technical standards. 20<sup>th</sup> century buildings are those build before 1945 to a minimum standard governed by building by-law and those built after 1945 using modern techniques and materials with the minimum standards being governed by modern building regulations. Modern buildings are now better in terms of standard with present day materials and techniques with better services.

Armstrong (1978) these building have their peculiar problems. Examples are the industrialized buildings (high rise systems) built to a height and shapes never before taught possible pose new problems because of innovation of new technologies and materials, greater loads on the structure.

Many modern buildings fail to satisfy due to inferior design and inferior materials used. Failing to meet the standards of performance that every client should be able to accept the right (Seely 1985).

By these essentials

- a. Stability
- b. Weather resistance
- c. Comfort
- d. Noise
- e. Durability
- f. Economy and
- g. Ease of Maintenance

These are some of the principle criteria of performance to be met, largely by technological design skills. If and when these fail, deterioration and defects may become apparent requiring remedial works to be carried out. Even when this is completed it will still require regular maintenance to preserve it, (Griffith 1973) and (Armstrong 1987).

## 3. Importance of building maintenance

Building maintenance is perhaps more important than building. It is costly to put a structure and leave it to deteriorate and fail. It is colossal loss of investment. However, until, (Seely 1985) indicated that recently building maintenance has been a neglected field of technology and has been regarded by many as a "Cinderella" activity. (Anderson 1967) said that the prime aim of maintenance is to preserve a building in its initial state, as far as practicable, so that it effectively serves its purpose and sees the main purpose of maintenance of building.

This will help to retain the value of investment: maintenance has been neglected for far too long and therefore gives little to no merit in the Ghanaian Construction Industry. Building maintenance is very necessary for the following reasons:

- a. Retaining value if investment
- b. Maintaining building in good condition which I will continue to serve or fulfill its functional requirements, that is, physically, economically, and up-dated functionally.
- c. Presenting good appearance in order to preserve and beautify the built up-environment.

According to (Seely 1985) the standard of maintenance achieved has an important influence on the quality of the built environment that they find themselves. There seems a little doubt that society will continue to expect higher standard in new existing buildings. (Anderson 1965) said the amount of necessary building maintenance work produce could improve by improving methods of designs specification and construction. In addition effective maintenance management embraces many skills. On the other hand, (Seely 1985) said that maintenance will remain a significant and important part of the work of construction in the industry for many years to come. (Seely, 1985) explain that building maintenance has great significance to the nation' economy not only because of the scale of expenditure involved, but also because it was important to ensure that the nation's stock of buildings both as a factor of production and of accommodation was used effectively as possible. If the value and ancient of the nation's building stock is to be kept at present levels then acceptable maintenance standards needs to be maintained throughout the economic life of the nation.

#### 4. Types of maintenance

BS 3811 defines types of maintenance as the following: Planned, Preventive and Running.

- a. **Planned maintenance:** means maintenance organized and carried out with fore thought, control and the use of records to a predetermined plan.
- b. **Preventive maintenance:** is maintenance carried out based on a predetermined plan.
- c. **Running maintenance:** is maintenance which can be carried out whilst an item is in service.

Preventive maintenance is normally planned and hence the term planned preventive maintenance. It is a concept which is probably more applicable to plant and equipment which is subjected to mechanical wear. There are certain building elements which justify this treatment. In order to introduce such a system it is first necessary to produce an inventory of every building component or area, services, etc. which has to be maintained. It is necessary to determine which items should be included in the planned preventive programmers and the frequencies at which they require attention e.g. annually.

Maintenance according to Harper categorized it in three separate components:

- a. Servicing
- b. Rectification and
- c. Replacement

##### a. Servicing

It is essentially a cleaning operation undertaken at regular intervals of varying frequency and its sometimes termed day-to-day maintenance. As more sophisticated equipment is introduce so more complicated service schedules become necessary. The frequency of cleaning varied typically frequencies being: floor swept daily and polished weekly, windows washed monthly; flues swept every three painting for decorating and protection every four years.

### **b. Rectification**

Work usually occurs fairly early in the life of the building and arises from shortcoming in design inherent faults in our unsuitability of components, damage of goods in transit or incorrect assembly. Rectification represents a fruitful point at which to reduce the cost of maintenance because it's avoidable. All that is necessary, at any rate in theory, is to ensure that components and materials are suitable for their purpose and are correctly installed.

These seemingly requirements are not always easy to achieve. Frequently, the same component must fulfill any functions, such as weather –shield, loads bearer, thermal insulation and good appearance. A failure to perform any one of these functions satisfactory can result in maintenance work. Typically, examples are the failure of decorative floor coverings on solid concrete ground floor slabs due to damp penetration and the failure of joints between large slabs in wall cladding to exclude wind and rain. Rectification work could be reduced by the development and use of performance specification and codes of installation (Mille 1976).

### **c. Replacement**

It is inevitable because the service condition cause materials to decay at different rate. Much replacement work seems not so much from physical breakdown of the materials or elements as from deterioration of appearance. Hence, the length of acceptable life often involves a subjective judgment of aesthetic change. Furthermore, the measurement all that the promoters are interested in is how much can we make from it. Very little or no consideration is given to the possibility that the property was a whole as its component parts have definite useful life time and that provision must be made for them to be replaced.

The researcher holds the view that everything created, building, plant and equipment is organic in nature and should be treated as such. (Anderson 1967) it is first, born then matures and finally breaks down and dies.

Just like human organism, property managers must work towards their replacement (reproductively) by setting funds aside during its lifetime for replacement of components, (sinking fund). The selection would be based on the consequences of failure with regard to such factors as safety and productivity e.g. fire doors would obviously be included and the frequency on an analysis of past records. Finally job cards are prepared for the various tasks and an appropriate manual or computer bring-forward system devised. Performance should be monitored continuously to check that the work is being carried out in accordance with the benefits e.g. reduction emergency work and user request. (Reginald 1976) suggest that planned preventive maintenance is worthwhile if:

- (i) It is cost effective
- (ii) It is wanted to meet statutory or other legal requirements.
- (iii) It meets client's need from an operation point of views
- (iv) It will reduce the incidence of work for the craftsmen rather than the pure inspection. The very act of planning involving as it does an analysis of past performance in order to predict the future leads to a more enlightened approach to the management or maintenance operations.

## **5. Maintenance culture**

Maintenance culture is defined as a strategy within which decision on maintenance is taken. Alternatively it can be defined as the ground rules for the allocation of resource (labour, material and money) between the alternative types of the maintenance action that are available to management in order to make that a rationale allocation of resources. The benefits of those actions to the organization as a whole must be identified and related to the cost involved. It is necessary therefore to consider the question of culture under the following headings, benefits and culture.

## **6. Objectives**

What does maintenance have to achieve? This should be viewed in the context of the organization overall building needs. Maintenance is an important part of the technology approach which has been defined as a

combination of management, financial, engineering and other practice applied to physical assets in the pursuit of economic lifecycle costs. It requires all departments in the organization to co-operate in ensuring that the assets of the organization are planned, provided, maintained, operated and disposed off at the lowest total cost to the organization. Life cycle costing or cost-in-use is a technique which is usually thought off in terms of initial design decision but it is equally useful for appraising expenditure of maintenance, alternations and improvements during the life of a building.

## 7. Benefits

What is to be gained through maintenance? The benefits may be short term or long term and may be classified as financial, technical or human. The financial benefits brings a more effective use of the preservation of the physical characteristics of the building and its services and are reflected in fewer breakdowns with a reduction in downtime and fewer call emergency repairs, lower future maintenance cost, etc clearly some attempts should be made to express them in money terms so that all analysis can be complete as possible.

## 8. Culture

This involves laying down operational and cost objectives for the maintenance department starting with the identification of the maintenance tasks, the standard to be achieved and the limits of cost. This will lead to a culture of corrective maintenance; how work should be programmed rather than relying on user request. The priority to be accorded to different types of work, whether the work is better carried out by direct labour or contract and where the properties are dispersed over a wide area, the extent to which task should be decentralized. These policies will determine the structure of the maintenance organization and the rules and duties of supervisory staff. Armstrong, (1987) outlined some questions which will help formulate a culture. These questionnaires are as follows:

1. What are the implications of failure?
2. Are standby facilities available?
3. What level of use is envisaged?
4. What type of maintenance organization is envisaged?
5. What level of technical expertise will be available?
6. Will spares be available on-site?
7. Can a standard be rented or purchased locally?
8. Can a standard of maintenance be provided?
9. Will all necessary documentation be provided?
10. What financial resources will be available for maintenance?

The answers to these questions are also likely to affect how subsequent maintenance decision are made, but it is likely that as more detailed stages are reached beyond the initial design brief, the types of decisions needing to be taken will not always relate directly to the policy statement. A structured approach at these stages can be beneficial by ensuring that a consistent and logical method is followed.

Maintenance can be defined as a combination of actions carried out to retain an item, in or restore it in an acceptable condition. The actions refer to are those associated with initiation, organization and implementation (Armstrong, 1987). Maintenance has been subdivided into two main categories

- (1) Planned
- (2) Unplanned

The former is sub-divided again into two, which is preventive and corrective maintenance. Planned corrective maintenance is work performed with fore thought, control and the use of records to predetermined plan to an acceptable standard.

Preventive maintenance on the other hand is work carried out at predetermined intervals or to other prescribed criteria and intended to reduce the likelihood of an item not meeting an acceptable condition (Armstrong, 1987).

Unplanned maintenance on the other hand is work resulting from unforeseen breakdowns or damage due to external causes example, a rainstorm ripping off the roof of a building: this would call for re-roofing.

Renovation is the method of given maintenance to a building which is not expensive e.g. painting etc.

Replacement is when part of the building is completely deteriorated and required to be changed.

Building construction: work that has been described as the provision for its occupants or contents as one of its main purposes is to shelter usually enclosed and designed to stand permanently.

Maintenance: combination of all technical and associates administrative action to return an iteming or restore it to a state in which it can perform its required functions.

Techniques: mechanical skill in an art means achieving one's purpose especially skillfully.

Procedures: a mode of performing a task.

## **9. Problems check maintenance**

Difficult in securing the necessary funds: only limited funds are available for maintenance in developing countries like Ghana. But it is also apparent that the funds allocated for maintenance are generally not utilized efficiently.

Lack of foreign exchange is also a problem: Lack of the foreign exchange impedes the purchase and operation of mechanical equipment. The adoption of labour – based technology is a viable solution to this problem.

The shortage of qualified and skilled staff: is a fundamental problem in most developing countries. The recognition of this situation has to do with new developing projects often incorporating training of local staff as an important component.

Deficient Institutional arrangements and management practices: is also a cause of the poor maintenance culture. Too much emphasis is often put on execution, whilst planning control and evaluation are neglected.

## **10. Planning and program maintenance works**

To prepare programmers, it is necessary to assess the general conditions of the buildings service and external works and to consider these against the criteria currently adopted.

The repair and replacement work is coasted and priorities established having regarding to any cyclic arrangements. The building and site are divided into zones for maintenance purpose. Workload is controlled through a card index system which permits leveling out work peaks, control of cost against budgets and forecasting of areas where reduction in the maintenance budgets can be accommodated in the maintenance in the short term if spending has to be curtailed. Base on experience the program adopted is a nine year reduction cycle, three year cleaning offices and eighteen monthly cleaning of walls in corridors.

Programming of cleaning work should be preceded by a survey of the various floors and wall finishes with their respective areas and uses. Uses have a bearing on cleaning frequencies as for example, window in offices, display rooms and dining areas usually washed more frequently than those in storage and factory production areas. Generally, forty to forty-five percent of all cleaning time is devoted to floor surfaces. Worksheets are compiled for daily, weekly, monthly, quarterly and annual operations and all these will provided the basis for estimating the labour requirements.

Cleaning equipment and products must be carefully selected to ensure the best results at an advantageous price. The choice is influenced by such factors as standard of appearance, amount of wear, degree of soiling and type of equipment available and the quality of staff. It is good culture to minimize the number of types of products in use, and the cheapest is not necessarily the most economical, supervision and inspection of cleaning works is virtually important, and equipment must be properly maintained.

(Mile 1976) said that the objective of planning programming is simple. It is to answer these basic questions:

What is to be maintained?



How is to be maintained?

When should it be maintained?

The answer to the first question is usually all the buildings are used by the organization, but the answer to the second will depend on the use, class and the physical nature of the building itself. It can only be answered satisfactorily after careful examination of each building, leading preferably to a job specification which will describe fully the task to be carried out at each maintenance inspection interval. Lee, (1976) also expressed his views that the object of planning is to ensure work considered necessary is carried out to the maximum economy, that is, the work is to ensure work considered necessary is carried out the maximum economy that is, and the work done satisfies the criteria for effectiveness and efficiency. The essential features of a planned maintenance system are that failures are anticipated and appropriate procedures devised for their prevention rectification. It involves having a planned course of action for dealing with the inevitable consequences of deterioration. The plan should be all embracing and lay down measures for dealing with even remote possible, example damage caused by severe weather conditions. Effects of delay on whether or not spares are held in store for rectification of such defects will depend upon the degree of risk involved and the likely the user activities. The maintenance manager can then decide on a suitable cycle of maintenance for the building for which he is responsible, he can prepare a master maintenance plan which will show the mark to be carried out in each successive year.

When preparing this master plan, the maintenance manager will take care to ensure that the work to be due is reasonably balanced between one year and another. This leads to a steady work load, and allows him to recruit a full-time permanent maintenance crew as well as ensuring that his budget should not fluctuate from year to year (apart from provision for usage and price increased). Considering the characteristics of maintenance, Lee expatiated further that, rendering the accuracy of comprehensive long-term programming of operations, it seems impracticable. He continues that, it is not to say that such programs do not serve a useful purpose, but that the uncertainties inherent in large proportions of the work should be recognized and sufficient and could provide an effective means of control where deadlines have to be met. An effective method of producing a network to remedy problems in programming is the “activity –on-the-node” system or, as it is sometimes called, ‘precedence’ diagram. In this system the ability is represented at the node which is the equivalent of the event in the critical path method. It is generally thought to be easier to understand than the conventional arrow diagram auditor’s frequently used as a preliminary of the analysis.

### **11. Inculcating a maintenance culture**

The attitude of the Ghanaians to publicly owned property, whether i.e. building, road or plant is generally negative and such a character leads to the common understanding that is either “no body’s property.

### **12. Record keeping**

Record is an important aspect of maintenance, management people tend to get work done and move on to the next task forgetting record keeping. For that matter maintenance log book must be issued to take care of maintenance activities.

### **13. Maintenance log book**

Reasons why maintenance log book must be provided are:

1. It records and keeps records which can be for future reference.
2. Can be used for future price determination
3. It shows the location and part of the building which has been repaired already.
4. It helps the maintenance Officers to know the cost of maintenance done of past years.

## 14. Findings and analyses of results

Table 1

Building components	Number of premises	Neat	Dirty	Disgusting
Walls	32	20%	60%	20%
Floors	32	20%	70%	10%
Roofs	32	60%	30%	10%
Front view	32	30%	60%	10%
Back view	32	10%	20%	70%
Air conditioners	32	16%	20%	64%
Rain Gutters	32	12%	40%	48%
Doors	32	30%	60%	10%
Windows	32	25%	55%	20%

## 15. Building components

### Walls

The total number of Government or Public premises visited in this research was 32, the number one building component on the table above is walls, 20% shows that the walls are neat and 60% shows that the walls are dirty and 20% shows that the walls are disgusting.

### Floors

The second building component on the table above is floors which 20% shows that the floors are neat and 70% shows that the floors are dirty and 10% shows that they are disgusting.

### Roofs

The third component is roofs, 60% shows that the roofs are ok, 30% shows that the roofs are not in good condition and 10% shows that the roofs are disgusting.

### Front views

The fourth component on the table above is the front view of the premises of which 30% shows that the front views are neat, 60% shows that the front views are dirty and 10% shows that the front views are disgusting.

### Back views

The fifth component is the back view of the premises and 10% shows that the back views are neat, 20% shows that the back views are dirty and 70% shows that the back views are totally disgusting.

### Air conditioners

The sixth component is the air conditioners of which 16% shows that they are neat, 20% shows that they are dirty and 64% shows that they are disgusting.

### Rain gutters

The seventh component is the rain gutters and 12% shows that they are neat, 40% shows that they are dirty and 48% shows that they are disgusting.



## **Doors**

The eighth component on the table above is doors and 30% shows that the doors are neat, 60% shows that the doors are dirty and 10% shows that the doors are disgusting.

## **Windows**

The ninth component on the table is windows, 25% shows that the windows are neat and 55% shows that the windows are dirty and 20% shows that the windows are disgusting.

## **16. Conclusion**

The researchers have made an effort to look for possible reasons why most Ghanaian are not maintenance conscious over the things that are government owned, be it house, motor cars office premises or what so ever.

- The mentality of people seriously needs to be addressed relentlessly in order to inject a maintenance culture through mass education and public campaigns. The government together with all the recognizable institutions social establishments has a great deal to offer in this respect. Rules and regulations should be made to achieve the desire results. In terms of development the attitude of Ghanaian in appreciating maintenance needs.
- The success of failure of any maintenance afford will depend on the system, and caliber of persons involved in carrying it out. Programmed maintenance –widely practiced in the more developed countries has to be given a chance here since the existing direct labour and make shift contractual system have failed abysmally to produce any good results.
- From analysis of survey, it was revealed that the government have maintenance policy, but it implementation is what has been the cause of ineffectiveness with regards to maintenance.
- The government prefers building new structures to maintaining the existing ones whose components were in bad state. It was also revealed that inability of maintenance surveyors to visit the government premises was a contributing factor.
- From analysis of survey poor materials use and workmanship results in some form of deterioration.
- Maintenance work can be sustained and continued in public buildings if we change our attitude as good patriots of Ghana.

## **17. Recommendation**

Upon carrying out this study the researcher has come up with some issues which when addressed will in the long term help tremendously in the proper execution of maintenance works in the public sector.

- There is the urgent need for the management of public sector maintenance surveyors to critically examine this current stock of public buildings and embark on a massive rehabilitation exercise to salvage buildings that could be put into effective use, other than continually erecting new ones.
- The public works department must as a precautionary measure adhere strictly to maintenance programmers' so as to avoid early or rapid deterioration of public buildings.
- The idea of maintenance manual should be encouraged, developed and implemented, so that occupants of any property will have firsthand knowledge of its requirements and plan effectively. The manual will also afford executioners of maintenance activities to have a detailed follow-up for inspection of these facilities.

- An effective inspection/monitoring mechanism must be put in place, other than waiting for occupants to reports.
- There is also the need to employ the right caliber of supervisory staff to take responsibility for conducting, reviewing and appraising maintenance needs.
- The public work department must also put all necessary measures in place to review electrical installations, in order to prevent fire outbreak.
- Records keepings should be highly encouraged to meet the growing needs of the Construction industry, and this should be maintained at all cost. This will help make maintenance organization more responsive to the current needs and be cost conscious. In this regard maintenance operatives must be employed to oversee the following in our public buildings:
  - Keep accurate data on every building to reflect the life cycle needs.
  - Check data regularly to reflect budgeting for future works based on accurate survey.
  - To check if regularly maintenance routine is in place.
  - It is therefore the responsibility of executioners of maintenance activities to establish and follow up on a checkup inspection to help forestall a disciplinary more or the proper use these facilities while also at the same time having in-depth knowledge concerning this area of industry.

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