

UNIVERSITY OF EDUCATION-WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

**MAINTENANCE CULTURE OF PUBLIC BUILDINGS IN GHANA: A CASE
STUDY OF SELECTED INSTITUTIONS WITHIN THE SUNYANI MUNICIPALITY
OF THE BRONG-AHAFO REGION**



JANUARY, 2015

UNIVERSITY OF EDUCATION-WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

**MAINTENANCE CULTURE OF PUBLIC BUILDINGS IN GHANA: A CASE
STUDY OF SELECTED INSTITUTIONS WITHIN THE SUNYANI MUNICIPALITY
OF THE BRONG-AHAFO REGION**

BY;

KWAME FRIMPONG



**A Dissertation in the Department of CONSTRUCTION AND WOOD TECHNOLOGY
EDUCATION, Faculty of TECHNICAL EDUCATION. Submitted to the School of
Graduate Studies, University of Education, Winneba in partial fulfillment of the
requirements for the award of Master of requirements for award of Master of
Technology (Construction) degree.**

.JANUARY, 2015

DECLARATION

STUDENT'S DECLARATION

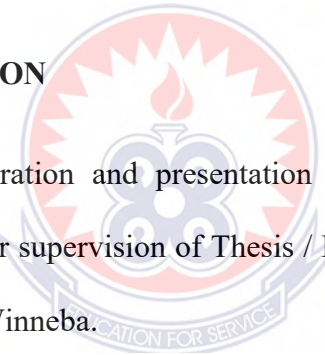
I, **Kwame Frimpong**, declare that this Thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE:.....

DATE:.....

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of Thesis / Dissertation / Project as laid down by the University of Education, Winneba.



SIGNATURE:

Prof N. Kyei- Baffour

DATE:.....

ACKNOWLEDGEMENTS

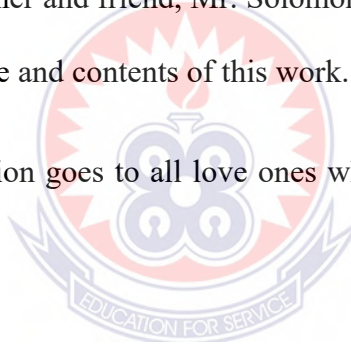
I wish to express my sincere gratitude to the Almighty God for seeing me through in the writing of this project work.

Prof N. Kyei- Baffour my supervisor deserves endless thanks for his patience in going through the entire work, his wise advice and also for his constructive suggestions.

I am also so much indebted to Gyan Comfort a trader at Sunyani Polytechnic Getfund Hostel, Mr Yeboah Sekyere Benjamin Bursar of Presby Senior High Secondary School-Berekum and Sandra Addea Kyere Tutor Yamfo Anglican Senior High School for their love and inspirations given to me to aspire to this stage.

Many thanks go to my dear brother and friend, Mr. Solomon Zaato whose invaluable insights played a pivoted role in the shape and contents of this work.

Last but not least, my appreciation goes to all love ones who supported me in diverse ways throughout my education.



DEDICATION

This thesis is dedicated first and foremost to the Almighty God, for protecting me throughout all my years of formal education and for making this Masters Programme a reality.

I also dedicate this thesis to my Son, Edward Kwasi Frimpong and Constance Serwaa Gyan and to all my relatives for their love and care that has brought me this far.



TABLE OF CONTENTS

DECLARATION	ii
ACKNOWLEDGEMENTS	iv
DEDICATION	v
TABLE OF CONTENTS	vi
LIST OF TABLES	vii
LIST OF FIGURES	ix
ABSTRACT	x
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background Of The Study	1
1.2 Statement Of The Problem.....	4
1.3 Purpose And Objectives Of The Study.....	8
1.4 Research Questions.....	8
1.5. Overview Of Research Methodology	9
1.6 Significance Of The Study.....	9
1.7 Scope Of The Study	10
1.8 The Organisation Of The Study	10
CHAPTER TWO	11
LITERATURE REVIEW	11
2.0 INTRODUCTION	11
2.1 THE CONCEPT OF BUILDING MAINTENANCE.....	11
2.2 Maintenance Culture and the State of Public Buildings in Ghana.....	29
2.3 Maintenance Rules or Codes for Public Buildings	31
2.4 MAINTENANCE POLICY FOR PUBLIC BUILDINGS	32
2.5 CHALLENGES /FACTORS AFFECTING MAINTENANCE OF PUBLIC BUILDINGS	43
CHAPTER THREE	44
Methodology	44
3.1 Introduction.....	44
3.2 Research Design.....	44
3.3 Population	45
3.4 Sampling Techniques And Sample Size	45
3.5 Data Collection Instrument	46
3.6 Data Analysis Procedure.....	47
3.7 Validity And Reliability Of The Instruments	48
3.8 Ethical Considerations	49
CHAPTER FOUR	50
ANALYSIS AND PRESENTATION OF DATA	50
4.0 Introduction.....	50
4.1 General Data of Respondents.....	50
4.2: The Maintenance Culture and Condition of Public Buildings in the Sunyani Municipality	53
4.3: Maintenance policy for public buildings within the Sunyani Municipality.....	63

4.4: The maintenance deficiencies/challenges of public institutions within the Sunyani Municipality.....	68
4.5: Maintenance Rules or Codes for Public Buildings within the Sunyani Municipality	70
CHAPTER FIVE	76
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS	76
5.0 Introduction.....	76
5.1. Summary of findings.....	76
5.2 Conclusion	79
5.3 Recommendations.....	79
5.4 Suggestions for further Studies.....	80
REFERENCES.....	81
APPENDIX I	85
APPENDIX II.....	94



LIST OF TABLES

Table 4.1 How many years have you worked in your institution	51
Table 4.2: The way maintenance is carried out in respondent's institutions	53
Table 4.4 the current state of buildings occupied by respondents in the study area.....	60
Table 4.5 Is there a maintenance department in your institution	64
Table 4.6 How maintenance policies are applicable for the operation of maintenance management of institutions	66
Table 4.7 Which of the following are the most maintenance deficiencies/challenges of public institutions.....	69
Table 4.8 Ratings of major maintenance decisions largely carried out by institutions	71
Table 4.9 There are maintenance rules of buildings by my institution.....	74



LIST OF FIGURES

Figure 4.1 Sex of respondents.....	50
Figure 4.2 How many years have you lived in this building	52
Figure 4.3 Ratings of institutions based on how they respond to maintenance of buildings...59	
Figure 4.4 There is a maintenance policy for buildings in my institution	63
Figure 4.5 the maintenance department undertake regular inspection of buildings	65
Figure 4.6 there are maintenance rules of buildings by my institution.....	70



ABSTRACT

This study assessed the role of maintenance culture of public buildings using selected institutions within the Sunyani Municipality. Simple random sampling technique was used to sample 100 staffs of the institutions that were administered with questionnaires and their top managers also interviewed. Out of the sample size of 100 respondents, 96 of them responded to the questionnaire constituting a response rate of 96%. On the maintenance culture and state of respondent's buildings, it emerged that planned maintenance was based on the life of the building, the financial implications and age of the building. Again unplanned maintenance was a common practice but preventive maintenance was not carried out at predetermined intervals due to lack of funds. As a result, the current state of the occupants building verandas, floor tiles, septic tanks and staircases were bad and needed urgent maintenance. The second objective examined whether there were maintenance policies of public buildings and it revealed that most of the institutions do not have maintenance policies, and do not undertake regular inspection and maintenance of buildings. The third objective examined the deficiencies associated with the maintenance of public buildings and shows that lack of concern shown by clients, poor design habits, insufficient resources and policies for occupants to maintain their buildings were some of the deficiencies. The fourth objective assessed the appropriate maintenance culture or codes for the maintenance departments of the institutions. The results show that there are no appropriate maintenance rules or codes. The study recommended that, there should be more education and enactment and enforcement of policies or laws for occupants of public buildings to perform certain maintenance works of their buildings, adopt appropriate maintenance culture and resource the maintenance departments of public institutions to fully discharge their duties.

CHAPTER ONE

INTRODUCTION

This chapter discusses the background and general concepts of the study, statement of the problem, purpose and objectives of the study, research questions, significance of the study, scope, delimitations and the general layout of the study.

1.1 Background Of The Study

Public sector buildings serve as a considerable source of hoards of public funds and therefore the importance of preserving them in a way that would make their benefits felt over a very long time cannot be overstated. Due to the neglect of maintenance of buildings in the country a lot of public and private sector buildings are in very deplorable conditions. It is best to avoid the need for maintenance in so far as it is practicable. Maintenance is usually seen as a nuisance and is frequently overlooked; consequently a small maintenance job becomes eventually a major item of repair. It is often expensive to carry out major maintenance works and money so spent shows no prolific returns since the deterioration of buildings hampers their ability to effectively perform their required functions and accordingly it is important to ensure proper maintenance to circumvent or curb deterioration.

In realizing the need for effective and efficient housing systems throughout the world, building researchers and experts have designed policies and programmes of certain standards and specifications which include maintenance of buildings, for the developers and clients to follow during their activities. The reason being that, deterioration in buildings and other fixed equipment is inescapable; for this reason periodic attention is required to keep them in good state so that they can continue to perform their required functions and also sustain the level of utility and value derived from them. This attention may be required at varying intervals depending on the nature of the property and includes such works as repainting, replacement of slates and tiles, cleaning of drains and rainwater disposal systems, (Bismark, et al ; 2012).

Maintenance according to Wordsworth (2002) is a combination of actions carried out to retain or restore the item to an acceptable condition. Maintenance is the act of putting back a device to its effective use after it has broken down. It can also mean the act of reconditioning or restoring a device to an acceptable standard. It is an act of taking proper care of devices so as to prolong their life span. Maintenance is the work that is done regularly to keep a machine, building or a piece of equipment in good condition. Maintenance is an action carried out by a group of persons to protect, preserve and maintain the systems, equipment and structures to ensure the assets capability to function Wordsworth (2002). Technological change has brought about the need for the construction of modern buildings for both private and public institutions. These buildings deteriorate after some time due to atmospheric and weather effects. Many of the structures both public and private are not maintained over the years and lose their aesthetic values. The structures often deteriorate to unacceptable standard. Maintenance is defined as work undertaken in order to keep or store any facility to an acceptable standard (Clinton; 1994). Afranie and Osei-Tutu (1999) viewed maintenance therefore as all the necessary work done to preserve a building with its furnishes and fittings, so that it continues to provide the same or almost the same facilities, amenities and serves as it did when it was first built. It includes the expenditure necessary to maintain the rental value of the property and involves:

- Day to day repairs such as leaking taps and electrical deffects;
- Periodic up-keep such as painting; and
- Major repair requiring heavy expenditure and the services of technical experts, for example foundation works and re-roofing.

Human beings since creation depended so much on the building environment to work, and also use it as the place of work which should therefore meet the required standard in terms of safety, comfort and economic survival. It is important that these buildings meet the functional requirements for which they were constructed.

The subject of building maintenance in Ghana has been neglected and in the Sunyani Municipality is not an exception. It is worth noting that many people fear or do not enjoy living or working in buildings showing signs of failure such as cracks, damaged or deteriorating components. The lapses that do occur in the absence of maintenance have become a major concern to society which has informed this study into the maintenance culture of public institutions in Ghana using the case of the Sunyani Municipality.

The maintenance of a building environment affects everyone continually the state of our homes, offices, schools and factories that we depend not only for our comfort but also for our economic survival as well. Wianwright and Wood (1991) stated that at the present times, it is an established economic fact that existing buildings must be maintained and repaired for where possible in preference to demolition and rebuilding. This type of work is now very common and is an important part of the workload of the building industry.

The main purposes of maintaining building as stated by Seeley (1993) are towards maintaining the value of investment, maintaining the building in a condition in which it continues to fulfil its function, presenting good appearance, minimizing difficulties encountered by the users of the building, reducing cost, maintaining job satisfaction, and to give adequate security. It is clear that without-maintenance on any building no matter its design and form, the aim of the investor will end on dead rocks, despite the heavy sums of money invested in putting up the buildings and if those buildings do not last the estimated life, then the developers cannot even retrieve the amount invested let alone gain some profit. Again no one would like to reside in a building which has deteriorated to the extent that it cannot provide the requirements of the users nor meet the functional requirements.

When such a situation arises, the building will be uninhabitable. But with maintenance work being carried out on buildings they are kept in a state whereby they provide the occupant and even the environment the necessary requirements. Without maintenance, buildings will have

to be abandoned and it will be uneconomically sound to put up new building all the time without carrying out repair works on the existing ones.

A well- maintained product/asset ensures the maximum utilization for the period of useful life especially when the product reaches the decline stage. Many writers on the economic and social significance of maintenance contend that the built environment expresses in physical form, the complex social and economic factors, which give structure and life of the community.

Therefore, the condition and quality of buildings reflect public pride or indifference, the level of prosperity in the area, social values and behaviour and all the many influences both past and present, which combine to give a country its unique characteristics.

The main challenges involved in the maintenance of public buildings could be attributed to lack of finance allocated for maintenance of public institutions, maintenance policies and plans, lack of resources and inadequate budgetary allocations to cater for maintenance.

The Sunyani Municipal Assembly and other public institutions are not adequately resourced to carry out maintenance work as early as possible which usually leads to the deterioration of public buildings making them unsuitable for human dwelling. Another issue with regards to public buildings has to do with ownership since it is a common practice among most users and occupants of public buildings to regard it as not their own property but a property of the state and as such some occupants do not take good care of them towards ensuring the efficient use and maintenance of the buildings.

1.2 Statement Of The Problem

They added that, the neglect of maintenance of public buildings in the country exposed them to varied dreadful conditions because maintenance of public buildings are usually seen as a nuisance and is frequently overlooked; and consequently a small maintenance job becomes eventually a major item of repair. This is because it is often seen as expensive to carry out major maintenance works and money so spent shows no prolific return which is plaguing the nation's

development and this situation is not different from the current condition of public buildings within the Sunyani Municipality.

Many building owners and institutions have neglected the desire and need for a comprehensive maintenance culture on their buildings. This may be through ignorance of the maintenance systems available or lack of appreciation of the need for maintenance. As a result of this, many institutions have placed a very low premium on the need to have consistent maintenance systems in place. This attitude has created a cause for concern where most public institutions buildings have lost their architectural and aesthetic appearances and are fast deteriorating, leading to high cost of renovations thus making the occupants uncomfortable.

Observations made by the researcher shows that most public buildings within the Sunyani Municipality are not regularly maintained and are in a very deplorable stage, with many of them showing signs of collapse, cracks, discoloured walls/paints and consequently deterioration. Some of the buildings either serving as residential and office accommodations in public institutions and departments within the Sunyani Municipality have never seen any significant maintenance work on them since they were constructed.

A careful look at some of the buildings of the low cost buildings, school buildings, the buildings of the police service, hospital buildings and nurses/doctors quarters, the buildings of the Sunyani Municipality premises among others depict the deplorable situations in some public institutions with their buildings showing cracks on the walls, rotten windows and door frames, leaking roofs, missing louvre blades, damaged ceilings, floors peeling-off with some having deep cracks, and faded or discoloured surface coatings or paintings. The habit of insufficient or absence of maintenance culture by the authorities and occupants of public institution buildings often leads to reduced lifespan of those buildings (Melvin, 1992).

Ghanaians lack the culture of maintenance and this is an open secret. Indeed lack of maintenance in general is really causing undesired pains to citizens of this nation (Alagidede,

2002). The main challenges towards maintenance in the study area could be attributed to lack of maintenance plans, lack of funding and inadequate budgetary allocations to cater for maintenance. The district works department is not resourced to undertake periodic and regular maintenance. Also, the issue of ownership is a big problem in public buildings in that most of its occupants regards it as not their own property but a state property and therefore not cautious in the use of public facilities.

Due to the dilapidated nature of these public residential facilities, the occupants and their properties have always been left at the mercy of the weather whenever it rains. These unfortunate situations have affected the municipality since most public sector workers at times consider their chances of easy access to accommodation before accepting or refusing postings to the municipality and the few workers there frequently ask for transfers to other places where they are aware of getting decent accommodation.

Moreover, these problems arising out of the present situation as far as the maintenance of buildings in the public sector is concerned, lowers morale of the labour force and goes a long way to reduce the efficiency of the personnel. It is therefore imperative for this study to assess the maintenance culture of public buildings in the Sunyani Municipality in order to improve upon the quality of maintenance on public infrastructure of the study area and Ghana as a whole.

The increasing need for maintenance culture of public buildings in the country and Sunyani Municipality in particular agrees with what Mr. Kwesi Ahoi, the then Minister for Food and Agriculture said at the 82nd Speech and Prize-Giving Day celebration of St. Augustine's College in Cape Coast under the theme "The culture of Maintenance as an Integral part of Infrastructural Development". He said that the lack of maintenance culture of public buildings in the country was causing the nation a great deal of money which could have been channeled

into development projects and that, “Watching the infrastructure bequeathed by our forefathers to decay before looking for gargantuan funding to rehabilitate them” was unpardonable, he noted, adding that this development has devastating effects on the economy (Ghana News Agency, 2012). He said every infrastructure has an economic life span that can only be sustained through proper and regular maintenance, and that lack of strong and universal maintenance in Ghana was due to lack of ethics in effective maintenance. “Lack of commitment from leaders in all spheres of the Ghanaian society” as well as the absence of clear policies and financial resources to effect regular maintenance and the failure of managements across the country was worrying, he indicated. He blamed the Ministry of Finance which approves funds for new office structures, the acquisition of new furniture and curtains among others but fail to provide for the maintenance budget submitted by the management of the various ministries. Mr. Ahwoi said many analysts and African political leaders relate their poor economic performances to inadequate investment in infrastructure but pointed out that without significant improvement in its maintenance culture, mere addition of more public and private infrastructure cannot result in the anticipated improvement in Africa’s economic performance (Ghana News Agency, 2012). Maintenance should be a part of the usual cost of operating a building, according to experts, but it is more likely to be short-changed relative to other operating costs and there is a persistent problem of underfunding of maintenance and repair. The neglect of maintenance has a cumulative effect with rapidly increasing deterioration of the fabric and finishes of a building accompanied by harmful effects on the occupant’s and contents of the building.

Some residential and office buildings of public institutions have not seen any considerable maintenance since they were constructed and this has resulted in most of them suffering from dilapidation with others being completely abandoned.

It is against this background that this research would be done to ascertain the maintenance culture of public buildings within the Sunyani Municipality because lack of maintenance of public buildings often leads to reduced lifespan of the buildings and invariably affects the uses of these buildings.

1.3 Purpose And Objectives Of The Study

The purpose of this study is to assess the role of maintenance culture of public buildings using selected institutions within the Sunyani Municipality.

The specific objectives of the study are to:

- Investigate the maintenance culture and state of condition of buildings in selected public institutions within the Sunyani Municipality.
- Examine whether there is a maintenance policy of public buildings by the selected institutions within the Sunyani Municipality.
- Identify the deficiencies associated with the maintenance of public institution buildings within the Sunyani Municipality.
- Assess appropriate maintenance culture codes for the maintenance departments of public institutions.

1.4 Research Questions

The following questions are adopted in soliciting information concerning the research objectives.

- What is the maintenance culture and condition of public buildings in the Sunyani Municipality?
- Do public institutions have a maintenance policy in place and how is it applied within the Sunyani Municipality?

- What are the maintenance deficiencies of public institutions within the Sunyani Municipality?
- What maintenance rules /codes are available to the maintenance departments of public buildings within the Sunyani Municipality?

1.5. Overview Of Research Methodology

This report will be based on primary empirical data to be collected by the researcher through the administration of questionnaires and interviews with the occupants of public institution buildings and some departmental heads and maintenance departments of the selected public institutions using simple random sampling technique to sample the respondents.

The methodology employed in obtaining the data for the study includes physical observation and inspection of the subject properties, examination of the maintenance policy of the institution and other relevant documents on issues related to the study, interview with the maintenance departments and the financial accountants who are in charge of providing funds and maintenance of the estates of the institutions, and distribution of questionnaires to some staffs who occupy portions of their property.

The data obtained from the inspection as well as from the interviews and questionnaires will be observed for consistencies and incongruities in the analysis and discussion of the results and recommendations made.

1.6 Significance Of The Study

In the first place, the findings of this study would serve as a source from which future researchers could access information and perform further related studies on the topic. Again, this study would also provide a blueprint or guidelines for maintenance of public buildings within the study area and the nation as a whole. Furthermore, the study would outline the stakeholders responsible for both regular and routine maintenance of public buildings as well as proffer better ways of funding maintenance cost of public buildings.

Moreover, the recommendations of this study if applied would boost the morale of the occupants of public sector public workers and also become a vehicle for attracting and retaining more public sector workers to the Sunyani municipality. Finally, the findings of the study will assist Government to come out with policies pertaining to the efficient use and maintenance of public institution buildings and the protection of other property through education and other friendly ways towards enforcing maintenance culture of public buildings in Government institutions.

1.7 Scope Of The Study

This study would be limited to public residential buildings of selected public institutions within the Sunyani Municipality of Brong-Ahafo. It will examine the maintenance of residential buildings of the Ghana Police Service, the Ghana Health Service nurses/doctors quarters, teachers' bungalows and student dormitories of selected schools.

1.8 The Organisation Of The Study

Chapter One deals with the introduction. It gives the background to the study, statement of the problem, the purpose and objectives of the study and research questions. It also examined the significance of the study and the scope of the study. Chapter Two reviews the related literature, the view of the literature focuses on the following areas such as: the concept of building maintenance, definition of building, forms of maintenance, importance of maintenance, technology of maintenance, economic and social significance of maintenance, nature of maintenance, maintenance team (supervision) and managing building maintenance and finally funding of maintenance work in public buildings. Chapter Three discusses the methodology of the study. This is divided into research design, population, sampling techniques and how data gathered will be analysed. Chapter Four is a presentation of the data collected, detailed analysis and a discussion of the results and findings. Finally, Chapter Five presents the summary of findings, conclusions recommendations and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews related literature from published and unpublished books, journals, research findings and relevant information on what have been said or done about the subject. The concept of building maintenance, forms of maintenance and the importance of maintenance. Additionally the chapter attempts to look at the nature of maintenance, economic and social significance of maintenance of public buildings, the maintenance culture and state of public buildings, maintenance policy of public buildings, challenges involved in the maintenance of public buildings as well as maintenance rules or codes of public buildings. Finally this chapter also devised appropriate maintenance culture rules or code for the maintenance of public buildings as discussed.

2.1 The Concept Of Building Maintenance

2.1.1 Definition Of Building Maintenance

Buildings are structures constructed of whatsoever material and used for residential, business or other purposes. It includes foundations, plinth, walls, floors, roofs, veranda, doors, windows, ventilators, plumbing and other building services, etc. (Tsorgali 2007), and according to Seeley, (1987) all elements of buildings deteriorate at a greater or lesser rate depending on the materials and methods of construction, environmental conditions and the use of the building.

Building maintenance therefore plays an important role among other activities in building operation. Building defect and damages are part of the building maintenance bread and butter“ as their input indicated in the building inspection is very much justified, particularly as to determine the building performance. The quality and efficiency of maintenance management operation of building depends, to some extent, on the building condition information available and the expectation from the owners or the organization (Zulkarnain *et al.*, 2011). So that the

buildings can satisfy the purpose for which they existed, which is largely for the benefit of their occupants and for what goes on in the building. For instance an office building exists to facilitate administrative functions and on the other hand, a residential flat exist for people to live in, including perhaps some social interactions between residents. The building elements (floor, roofs, walls etc.) exist largely to divide the building's uses one from another and to keep at bay external elements of rain, wind, reptiles etc. Building maintenance therefore needs to be carried out to allow those functions of the building to continue to be carried out, preferably in the way and to the standard of the originally envisaged, designed and built, and at least satisfactorily.

Maintenance has been defined by the British Standard (B S3811) as a combination of all technical and administrative actions intended to retain an item in or restore it to an acceptable standard. Based on this definition, the committee of the Department of Environment in 1972 defined building maintenance as ³Building maintenance is work done in order to keep, restore or improve every facility, i.e. every part of building, its services and surrounds, to a currently accepted standard and to sustain the utility and value of the facility.

Public buildings according to Van Baren (2013) is defined as any type of building that is accessible to the public and is funded from public sources. Typically, public buildings are funded through tax money by the government, state or local governments. All types of governmental offices are considered public buildings. Public buildings generally serve the purpose of providing service to the public. Many of these services are provided free to residents. This list includes public schools, libraries, courthouses, state bungalows and post offices. In other words, public building is a building, whether for single or multitenant occupancy, and its grounds, approaches, and appurtenances, which is generally suitable for use as office or storage space or both by one or more Government agencies or mixed-ownership Government corporations.

Scarrett comments that the committee added the word improve to reflect the fact that most buildings have long life expectancies and acceptable standard of amenity and performance will rise substantially over their lifetime as result of one or more of the following:

- i. Statutory requirements. i.e. safety, public health, etc.;
- ii. Regulations of statutory undertakers;
- iii. The need to maintain public image; and
- iv. Steps taken to maintain rental values.

From this definition two key components can be identified: not only actions that relate to the physical execution of maintenance work, but also those concerned with its initiation, financing and organisation.

There is also the notion of an acceptable condition, which implies an understanding of the requirements for the effective usage of the building and its parts, which in turn compels broader consideration of building performance. The above definition comprises two key practices, retaining and restoring.

To retain entails the work done to control or curb any foreseeable failure in the property otherwise referred to as preventive maintenance and to restore on the other hand also implies that the defect or failure has already occurred and involves works done to rectify the defect or failure otherwise known as preventive maintenance.

The standard of a building will be deemed to be acceptable if it conforms to modern design and statutory principles and enables the building to perform its required functions satisfactorily.

Maintenance is also defined by the Collins English Dictionary as all actions taken to retain a material in or to restore it to a specified condition. It includes inspection, testing, servicing, repair and reclamation.

In sum maintenance encompasses all works carried out on a building or a facility with the view to rectifying a defect or failure in its functioning or performance; preventing failure in its

functioning; and/or improving the state of the facility so as to sustain its utility and value of the facility.

Seeley (1983) defines maintenance as seeking to preserve a building in its initial state so that it continues to serve its purpose. In other words, it is maintaining a building to retain the value of investment, thus to maintain the building in a condition in which it continues to satisfactorily fulfill its function and to present a good appearance to public. These definitions emphasize on preventive measures that need to be taken to prevent major defects. The word initial in the definition also seeks to find an answer to when a maintenance work should be carried out or start.

A more functional definition by White (1969) as cited in Hackman and Osei-Tutu (2008) is that, maintenance is synonymous with controlling the condition of a building so that its pattern would lay within specified region. The word control'' suggests a positive activity which is specified region'' presumably has a meaning similar to acceptable standards'' and would be determined in a similar way. An interesting aspect of this definition is that it envisages a range of acceptability with upper and lower limits between which the condition of the facility must be maintained.

Maintenance therefore is all the necessary work done to preserve a building with its finishes and fittings, so that it continues to provide the same or almost the same facilities, amenities and serves as it did when it was first built. It also includes the expenditure necessary to maintain the value of the property and involves:

- Day to day repairs such as leaking taps and electrical effects.
- Periodic up-keep such as painting and
- Major repair requiring heavy expenditure and the services of technical experts, for example foundation works and re-roofing.

2.1.2. Forms Of Maintenance And The Importance Of Maintenance

Various classifications of maintenance have been attempted by various authors. The most commonly used classification is the one by British standard BS 3811, (1984). which classifies and defines the main types of maintenance as follows;

- i. **Planned Maintenance:** This is maintenance organized and carried out with fore thought, control and the use of records to a predetermined plan. The plan should be comprehensive and systematic encompassing both short and medium term considerations. The program should be based on sound knowledge of the building with particular regards to: The life of the building, the standard to be achieved, the financial implications and the responsibility for maintenance.
- ii. **Unplanned Maintenance:** Maintenance carried out to no predetermined plan. It refers to works necessitated by unforeseen breakdowns or damages, for example repairing of a ripped off roof after a torrent rainfall.
- iii. **Preventive Maintenance:** Maintenance carried out at predetermined intervals or corresponding to prescribed criteria and intends to reduce the probability of failure in a building.
- iv. **Corrective Maintenance:** Maintenance carried out after a failure has occurred and is intended to restore the facility to a state in which it can best perform its required functions.
- v. **Emergency Maintenance:** This is maintenance which is necessary to be affected immediately to avoid serious consequences.
- vi. **Conditioned-Base Maintenance:** The preventive maintenance initiated as a result of knowledge of the condition of from routine or continuous monitoring.
- vii. **Scheduled Maintenance:** The preventive maintenance carried out to a predetermined interval of time, number of operations, seasons, etc.

- viii. **Running Maintenance:** This is Maintenance which can be carried out whilst an item is being used such as the day-to-day cleaning of the building.
- ix. **Shutdown Maintenance:** This refers to maintenance which can only be carried out after the building is evacuated or out of service.
- x. **Deferred Maintenance:** These are maintenance works which have been identified as necessary but put off due to lack of funds, BS 3811, (1984).

In BS 3811 cited in Seeley (1987) also indicated that maintenance has been subdivided into, planned and unplanned maintenance; the former being further divided into preventive“ and corrective“ maintenance.

Likewise Zulkarnain *et al.*, (2011) also established that maintenance has been categorized as “predictable” and “avoidable”. Predictable maintenance is regularly periodic work that may be necessary to retain the performance characteristic of a product, as well as that required replacing or repair the product after it has achieved a useful life span. Avoidable maintenance is the work required to rectify failures caused by poor design, incorrect installation or the use of faulty materials. The function of maintenance can be divided into three (3) groups;

1. Cleaning and servicing, 2. Rectification and repair and 3. Replacement.

Timely expenditure on the first two can postpone the need to replace materials or components, a very expensive business. Cleaning and servicing should be carried out regularly and may be combined with a system of reporting faults when become apparent, thereby avoiding the need for more expensive repairs or even replacement at a later stage. The categorization of maintenance according to BS 3811 cited in Seeley (1987) is as follows;

- a) **Unplanned Maintenance:** Maintenance carried out to no predetermined plan. It refers to works necessitated by unforeseen breakdowns or damages, for example repairing of a ripped off roof after a torrent rainfall.

- b) Preventive Maintenance:** Maintenance carried out at predetermined intervals or corresponding to prescribed criteria and intends to reduce the probability of failure in a building.
- c) Corrective Maintenance:** Maintenance carried out after a failure has occurred and is intended to restore the facility to a state in which it can best perform its required functions.
- d) Emergency Maintenance:** This is maintenance which is necessary to be affected immediately to avoid serious consequences.
- e) Conditioned-Base Maintenance:** The preventive maintenance initiated as a result of knowledge of the condition of an item from routine or continuous monitoring.
- f) Scheduled Maintenance:** The preventive maintenance carried out to a predetermined interval of time, number of operations, seasons, etc.
- g) Running Maintenance:** This is Maintenance which can be carried out whilst an item is being used such as the day-to-day cleaning of the building.
- h) Shutdown Maintenance:** This refers to maintenance which can only be carried out after the building is evacuated or out of service.
- i) Deferred Maintenance:** These are maintenance works which have been identified as necessary but put off due to lack of funds as presented in Figure 2.1.

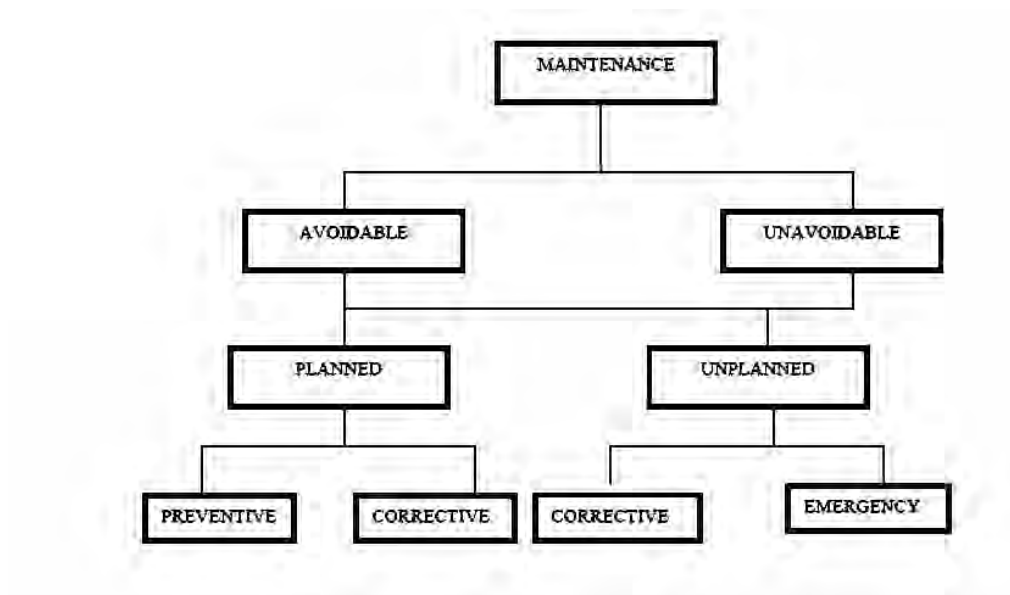


Figure 1: Forms or Types of Maintenance

Source: Seeley (1987): Types of Maintenance

The Queensland Government (2012) also developed the illustrated table below on the classification and sub-categories of maintenance. This table illustrates the elements that should be incorporated in any balanced maintenance works program as presented by Table 2.1 below.

Table 2.1 Balanced Maintenance Works Program

Category	Sub-Category	Definition
Planned Maintenance	Preventative Service Maintenance	Prevents asset failure by systematic inspection and monitoring to detect and avoid deterioration or failure. It also entails testing to confirm correct operation.
	Condition-Based Maintenance	Programmed maintenance work, based on condition assessment or other priorities, that returns an asset to an acceptable standard.
	Statutory Maintenance	Compulsory maintenance to meet requirements mandated in Acts, Regulations and other statutory instruments. This includes standards and codes referred to in an Act, Regulation or statutory instrument.
Unplanned Maintenance	Corrective and Breakdown Maintenance	Restores an asset to operational condition following an unforeseen failure.
	Incident Maintenance	Brings an asset back to an operational or safe condition following damage caused by natural disasters, storms, fire, forced entry or vandals.

Source: Queensland Gov. (2012)

Another approach to maintenance classification has been adopted by Speight (1982). It divides maintenance into three broad categories:

- i. ***Routine or day-to-day maintenance***: This is largely of the preventive type, such as daily sweeping, scrubbing, etc.
- ii. ***Periodic maintenance*** carried out at specific times such as painting every Christmas or fumigating a school every academic year.
- iii. ***Major repair or Restoration***: such as re-roofing or rebuilding defective walls and often incorporating an element of improvement, Speight (1982).

2.1.3 Planned Maintenance

Maintenance organized and carried out with fore thought, control and the use of records to a predetermined plan. The plan should be comprehensive and systematic encompassing both short and medium term considerations. The program should be based on sound knowledge of the building with particular regards to: The life of the building, the standard to be achieved, the financial implications and the responsibility for maintenance (Aha et al n.d). Furtherance to this, Zulkarnain *et al.*, (2011) also identified planned maintenance as a maintenance that is organized and carried out with forethought, control and the use of records to a predetermined plan. Queensland Gov. (2012) similarly in defining planned maintenance referred to it as planned work executed at predetermined intervals to meet statutory, health and safety, technical or reliability considerations, and to preserve the asset and prolong its economic life. Planned maintenance consists of preventative, statutory, and condition-based maintenance.

University of Calgary (2013) explained further that to prevent emergencies and equipment breakdown, Facilities Management conducts ongoing maintenance on building systems and components. Preventive measures include inspections, testing, lubrications, and cleaning, filter and belt changes. Work is performed according to the manufacturer's recommended

maintenance procedures and typically does not require a customer request. If a customer wants to have Operations & Maintenance on any special equipment outside the scope of the department's basic responsibilities, such services are chargeable. Planned Maintenance responsibilities include those mandated by government regulations, insurance requirements and building codes. Many of these, such as fire alarm testing, are designed to ensure the safety of building occupants. RICS, (2009) in other words explained planned maintenance as the process of periodically undertaking routine tasks necessary to maintain plant (lifts, boilers, etc.) in a safe and efficient operating condition.

2.1.4 Preventive/Predictive

In their study, the Queensland Gov. (2012) stated that preventative maintenance may be applied to building structures, building fabric, services and site improvements but is predominantly used for maintenance of building services. When preparing their maintenance strategy, departments should be aware of the benefits of preventative maintenance practices which minimize the likelihood of building asset failures, health and safety issues and disruptions to service delivery. Preventive maintenance by RICS (2009) is generally identified by a condition assessment and is planned to take place to suit the pattern of deterioration of a building and the availability of funds for the purpose. University of Calgary (2013) similarly revealed that a planned and controlled program of periodic inspection, adjustment, lubrication and replacement of components as well as performance testing and analysis, sometimes referred to as a preventive maintenance program.

As cited by Francis Naab Zana (2011), other maintenance-related concepts and definitions are;

- 1. Prevention:** it entails protecting housing by controlling its environment, thus preventing agents of decay and damage from becoming active. It involves clearing schedules, good housekeeping and proper housing management.

2. **Consolidation:** is the physical addition or application of adhesive or supportive materials unto the actual fabric of housing in order to ensure its continued durability or structural integrity.
3. **Rehabilitation:** It involves the modernization of aged buildings with or without adaptive alterations for use. It means the introduction of modern services into the housing without changing its original use.
4. **Repair:** is to revive housing to the original state so that it works as it was first put up or built. It involves reactive responses to housing deterioration and it is essentially ad hoc in nature.
5. **Renovation:** It consists of work done to restore a structure, services and equipment by a major overhaul to the original design and specification or to improve on the original design. This may include substantial additions and extensions to the original structure and in the extreme re- building. Renovation constitutes the interface with improvement and refurbishment.
6. **Refurbishment:** means in architectural sense, as involving replacement of missing parts or introduction of new decorative elements into a structure. In addition, it involves working on a housing to make it bright, clean and fresh again.
7. **Extension:** With respect to housing, it involves addition of parts to make housing wider or larger in response to what is required of it. In sum, housing improvement is equivalent to the broad concept of housing conservation, which is primarily a process, which leads to the prolongation of life of a property. In other words, it is the action taken to prevent decay and to prolong the service life of housing for now and future (Richards: 1970) and can be likened to the process of maintenance management.

2.1.5 The Nature of Maintenance of Buildings

Harper cited in Seeley (1985) believes that maintenance comprises three separate components namely; Servicing, Rectification and Replacement

- a) **Servicing:** This is essentially a cleaning operation undertaken at regular interval of varying frequency and is sometimes termed day-to-day maintenance.
- b) **Rectification:** This work usually occurs fairly early in the life of the building and arises from shortcomings in design, inherent faults in or unsuitability of components, damage of good in transit installation and incorrect assembly. Rectification represents a fruitful point at which to reduce the cost of maintenance, because it is avoidable.
- c) **Replacement:** Replacement problems involve items that degenerate with use or with the passage of time and those that fail after a certain amount of use or time. Items that deteriorate are likely to be large and costly (e.g., machine tools, trucks, ships, and home appliances). Non deteriorating items tend to be small and relatively inexpensive (e.g., light bulbs, vacuum tubes, ink cartridges). The longer a deteriorating item is operated the more maintenance it requires to maintain efficiency. Furthermore, the longer such an item is kept the less is its resale value and the more likely it is to be made obsolete by new equipment. If the item is replaced frequently, however, investment costs increase. Thus the problem is to determine when to replace such items and how much maintenance (particularly preventive) to perform so that the sum of the operating, maintenance, and investment costs is minimized, Encyclopedia Britannica (2013).

2.1.6 The Importance of the Maintenance of Public Buildings

The maintenance of a building environment affects everyone continually for it on the state of our homes, offices, schools and factories that we depend not only for our comfort but our economic survival as well. Wianwright and Wood (1991) states that at the present times, it is an established economic fact that existing building must be maintained and repaired for

where possible in preference to demolition and rebuilding. This type of work is now very common and is an important part of the workload of the building industry.

The main purposes of maintaining buildings stated by Seeley (1993) are as follows:

- ❖ Maintaining value of investment
- ❖ Maintain the building in a condition in which it continues to fulfill its function
- ❖ Presenting good appearance

Other purposes of effective building maintenance are to:

- Minimize difficulties encountered by the users of the building
- Reduce cost
- Reduce down time
- Maintain job satisfaction
- Give adequate security



From the discussion, it could be seen that without – maintenance, the aim of the investor will end on dead rocks, for quite a heavy sum of money is invested in building and if those buildings do not last the estimated life, then the developers cannot even retrieve the amount invested let alone gain some profit. Again no one would like to reside in a building which has deteriorated to extent that it cannot provide the requirements of the users nor meet the functional requirements.

When such a situation arises, the building will be uninhabitable. But with maintenance work being carried out on buildings they are kept in a state whereby they provide the investor, the occupant and even the environment the necessary requirements. Without maintenance building will have to be abandoned and it will be uneconomically sound to put new building all the time without carrying out repair works on the existing ones.

According to Hall (1986) cited in Hackmn and Osei-Tutu (2008), the maintenance of the physical structures of a property ensures that the investments made May not only yield the highest possible net returns over the life of the property but also fulfills another ultimate obligation of providing the required human comfort and satisfaction.

The main objective maintenance is to preserve a building, so as to continue to serve the purpose for which it was put up. Hall (1986) cited in Hackmn and Osei-Tutu (2008) identified the following purposes for which maintenance are undertaken:

1. **To maintain the value of a building-** normally a better maintained building has greater value. Owusu (1991) observed an increase in the attractive value of selected houses as a result maintenance. However, increase value may be marginal as location and size of site all play an important role in the determination of value.
2. **To ensure optimum usage of buildings-** good maintenance should allow buildings to be used to their full potential;
3. **To create or maintain suitable appearance-** can make a positive contribution to external environment and social conditions. Dilapidated buildings can contribute to social deprivation and badly maintained services and facilities , waste energy and resources and can affect the environment;
4. **To maximize the life main components and materials** – maintenance can reduce cost of subsequent maintenance by extending periods between repairs and replacement;
5. **To ensure that buildings do not detract from surroundings.** In sum, no one would want to live in a house, which has deteriorated to the extent that it cannot meet the functional requirements of its users. But the objectives

2.1.7 The Economic and Social Importance of Maintenance of Public Buildings

When the resources to carry out maintenance work effectively are in short supply in that, a scale of preference always needs to be followed. As a result of this the more functionally pressing needs are met and the less essential one forgone.

Frequent maintenance of the built facility brings such benefits as comfort and satisfaction to its inhabitants. Maintaining the physical structures of a property ensures that investments made does not only yield the highest possible returns over the life of the property but also fulfills the ultimate responsibility of providing the needed human satisfaction and comfort.

Stone (1975 p62) reported that it should be borne in mind that the inter-dependency and interrelationship of initial and running cost are of great importance when planning maintenance expenditure. In considering the cost of building therefore, the initial cost must be considered relative to the level of maintenance that is required with the choice of materials and types of constructional methods that will bring about a balance between limited expenditure and future maintenance expenditure. The life of the building generally also determine how the balance between initial and maintenance cost is to be made.

Seeley (1995 p13) emphasized that, generally, there is an inverse proportion between initial cost and maintenance cost that is the higher the initial cost, the lower the maintenance cost. In combining the life of building with the initial cost or future maintenance emphasis should be laid on a choice of material to last the life of the building.

Afrane S. and Osei-Tutu, E. (1999) contend that a house is regarded as an economic asset, which must be maintained to ensure that it appreciates in value and results in a return either socially or economically to the owner. In effect the primary aim of maintaining a building is to preserve it in its original state to as practicable as possible so that it effectively serves that

purpose. As a role the capital asset of a building is so valuable and is often appreciating so that in practice, maintenance should frequently be directed to prolong effective life.

Therefore the purpose of for maintaining a building are: Retaining the value of investment, maintaining the building in a condition in which it continues to fulfill its function and presenting good appearance.

No wonder many writers on the economic and social significance of maintenance contend that the built environment expresses in physical form, the complex social and economic factors, which gave structure and life of the community.

As a result, the condition and quality of buildings reflect public pride or indifference, the level of prosperity in the area, social values and behavior and all the many influences both past and present, which combine to give a country its unique characteristics.

Rea (1950) is also of the view that buildings with low maintenance assist in reducing the high demands for the already scare building resource. He said an increased user and environmental benefit will therefore be achieved when viewed against, the usual cost to society of deteriorating buildings.

Architects, Surveyor site engineers, maintenance engineers and other parties involved in the construction industry need for that matter to identify the more frequent and high expenditure items and constantly be questioning the suitability of not only materials but also the method to assemble them.

The nature of development as emphasized by Seeley also has an influence to a large extent on the level of either initial or maintenance cost speculative development with the view of sale will undoubtedly show regard to economizing initial cost although cost-in-use may be very

high. In the light of the above building maintenance cannot be left out of the economics in the wake of the current depression in economy.

2.1.8 The Effects of Lack of Maintenance of Public Buildings

Alagidede (2000) states that “Ghanaian lacks the culture of maintenance and is an open secret”. He added that it is rather unfortunate that valuable assets like buildings are allowed to deteriorate openly before an attempt is made to rectify the situation, which attracts a huge amount of resources which has political, social and economic effect on the nation and cannot be ignored.

The government of the day becomes unpopular and can even lose power, its members MPs, Ministers and other heads of institutions lose their seats and others are demonstrated against due to the deteriorating nature of the state owned properties of which they are responsible for. Investors come into the country and are scared to invest due to unfavorable environment.

Moreover people are exposed to danger of weather hazards and some even become homeless due to the extent at which their places are deteriorating. The users of public buildings are always disturbed due to the state of the buildings they occupy. The most worrying aspect is the lost of precious souls which often occur when building collapse due to its deteriorating state or when electric system of a building becomes faulty causing fire outbreak. The family of those lost souls becomes a burden to the society and the nation as well losses quality human resources who have probably help in it development.

Finally lack of maintenance also leads to high commitment of funds or resources when a building is to be renovated after deteriorating. These scarce resources could have been used to develop other sectors of the economy if preventive or periodic maintenance is adopted earlier on to savage the situation, nevertheless it is wasted due to sheer negligence.

One thing that baffles the writers mind is that if even the individuals are ignorance or do not see the need to maintain their buildings what about the government who supposed to know better. Should Ghana as a HIPC nation continue to seek donors help or contract loans to put up structures only to neglect them to deteriorate? If this continues, then when do we as a nation really come out of the highly indebted poor country (HIPC)?

2.1.9 Funding for Maintenance of Public Buildings

Funding is the means of providing money for an activity. In this case it is the means of mobilizing money to carry out maintenance work. Seeley (1996) states that building maintenance work uses extensible resources of labour and materials and this therefore suggests that a lot of resources are needed for the maintenance work and as such the means of funding can also not be over looked because it is the perception of most people that, the funding of building maintenance is one of the causes of lack of maintenance work in Saboba District and Ghana as a whole.

In government organization, the funding has been the responsibility of the Government, although sometimes she seeks donor support. In private sectors, the private investors are the sources of funding for the maintenance work in their establishment.

In some organizations the beneficiaries, for instance, students of the tertiary institutions contribute through the paying of the academic user fees. Some non-governmental organizations (NGOs) also help in the funding maintenance work.

In public sector such as schools and community based facilities, churches, parent teacher association (PTA), old students association and philanthropist also help in the funding of maintenance work. Ghana education trust fund (GET Fund) is also other sources from which funds are sought to maintain schools in the country.

2.2 Maintenance Culture and the State of Public Buildings in Ghana

Buildings are expected to exist for a long time, regardless of whether or not they have actually been designed and constructed properly to do so. The building industry is responsible for maintaining, improving and adopting the existing stock of buildings in addition to the production of new buildings.

It appears that in Ghana the neglect of maintenance of our housing stock has resulted in much public concern as in some cases defects/failures have occurred in relatively new buildings. Some of the problem is lack of concern shown by clients and users as well as poor design habits and execution. There is evidence that a substantial part of our building stock, roads and other physical facilities are in danger of deteriorating below the point of economic repair.

This is particularly true of government buildings, roads and other facilities scattered all over the country where no efforts have been consciously made to budget against their maintenance, Iwuanyanwu, (1987).

The policy of maintenance which should enforce for building to be maintained is neglected in Ghana. Ghanaians lack the culture of maintenance and it is an open secret. Undoubtedly every institution in Ghana is guilty of this menace. Indeed lack of maintenance in general is really causing undesired pains to the citizens of this nation Alagidede (2000).

Maintenance which could bring back the beautiful building environment is not done, so most buildings within the country including Sunyani Municipality continue to deteriorate with time and have become imperative to assess the maintenance culture in public buildings in order to improve upon maintenance practice by individuals and the stakeholders in charge of the maintenance of public buildings.

2.2.1 General Concept of Maintenance of Buildings in Ghana

In Ghana the neglect of our housing work has resulted in much public concern that, defect/failures have occurred in relatively new buildings. In most cases, the lack of maintenance is blamed on the lack of concern shown by the clients/users as well as poor design habits by the architects. It is especially so with properties where property owners do not include running cost in their expenditure when in fact they should factor their maintenance expenditure.

Experience shows that property owners do not show the same concern that they give to their automobile in respect of maintenance.

- A telling comparison is that of the amount of time spent by the average motorist on cleaning his car with the average time spent on cleaning the external paint work of the house.

2.2.2 Aims of Maintenance of Buildings

The primary aim of maintaining a building is to ensure that the building continue to serve the purpose for which it was put up. The purposes for which maintenance are undertaken include:

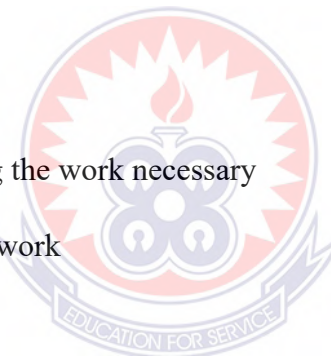
- To maintain the value of a building:- a better maintained building normally has greater value, however, increased value may be marginal as location and size of site all play an important role in the determination of value (Afranie S. and Osei-Tutu E.)
- To ensure optimum use of buildings:- good maintenance should allow building to be used to their full potential.
- To create or maintain suitable appearance:- can make a positive contribution to external environment and social conditions. Dilapidated buildings can contribute to social deprivation and badly resources and can affect the environment.

- To minimize the life of main components maintained services and facilities, waste energy and materials:- maintenance can reduce cost of subsequent maintenance by extending periods between repairs and replacement.
- To ensure that buildings do not detract from surroundings and also maintain a suitable appearance.

2.3 Maintenance Rules or Codes for Public Buildings

The function in this area is mainly of a technical nature and concerned with the planning and control of construction resources to ensure that necessary repairs and renewals are carried out with maximum efficiency and economy. The major decision relate to the following as spelt out in BS 3811 cited in Seeley (1985);

- Determining Standard
- Planning Inspections
- Identifying and Specifying the work necessary
- Estimating the cost of the work
- Planning the work
- Organizing the executive of the work



2.3.1 Determining Standards

For this, it is necessary to have information on the overall objectives of the organization and of statutory and other external requirement so that compatible standards can be fixed. The expression of these standards in qualitative and quantitative terms demands knowledge of the effects of varying degree of disrepair on user activities and levels of visual acceptance.

2.3.2 Planning Inspections

Fixing the periodicity of inspections requires knowledge of the rates of deterioration of the building elements so that defects are revealed before they reach critical stage. The minimum

period will be determined by the inspection cost which should clearly not exceed the cost consequence of failure, Seeley (1985).

2.3.3 Identifying and Specifying the Work Necessary

This is achieved by compiling the information received on the condition of the building from inspectors and other sources with the standards laid down. It demands knowledge of the causes of defects and of the remedial measures which would be appropriate for the circumstance.

2.3.4 Estimating the Cost of the Work

As far as possible the estimates should be based on historic cost data obtained from within the organization for previous similar jobs, but in the absence of such data, cost from external sources and experienced budget have to be used.

2.3.5 Planning the Work

This is mainly in respect of fixing appropriate start and finish times for the individual jobs. It also requires information on the effect of the timing of the work on user activities, its agency, the availability of resources and the labour time required for each operation.

2.3.6 Organizing the executive of work

The major decision here is whether to employ labour directly for the purpose or to engage an outside contractor; for this, information will be required on the relative merits of these alternatives from the point of view of both cost and convenience, Seeley (1985).

2.4 Maintenance Policy For Public Buildings

BS 3811 cited in Seeley (1985) defines maintenance policies as a strategy within which decisions on maintenance are taken. Alternatively, it may be defined as the rules for the allocation of resources (men, materials and money) between the alternative types of maintenance actions that are available to management. In order to make a rational allocation of resources the benefits of those actions to the organization as a whole must be identified and

related to the costs involved. Issues under consideration in a maintenance policy of includes; objectives, benefits and policies.

According to Lee (1987), the maintenance policies of most public buildings falls under three components. The three main separate components-

- **Servicing** – is essentially a clearing operation undertaken at regular intervals of varying frequency and is sometimes termed day-to-day maintenance. Daily sweeping of floors, monthly washing and cleaning of windows and regular painting for decoration and protection every four years are some examples of servicing. However as more sophisticated equipment are introduced so more complicated service schedules become necessary. Servicing becomes necessary as a result of constant use of facilities, the effect of the weather and atmospheric conditions on the components of the building.
- **Rectification;** Usually occurs fairly early in the life of a building, but it can also occur sometime within the life span of the building. It arises from shortcomings in design, inherent faults in or unsuitability of components, damage of goods in transit or installation and in correct assembly. Rectification represents a fruitful point at which to reduce the costs of maintenance, because it is avoidable. All that is necessary at any given rate in theory is to ensure that components and materials are suitably for their purpose and are correctly installed. Rectification work could be reduced by the development and use of performance specification and codes of installation (Lee, 1987).

According to Stapleton (1994), rectification is the response to inherent defects in design, construction or installation stages of the building process. This provides an opportunity to ‘trade off current capital expenditure against future maintenance costs.

- **Replacement;** Occur at all costs in building. This is because the extent of exposure of materials to the vagaries of the weather varies, and the weather in specific locations

also varies while the capacity of elements of buildings in withstanding changes and different intensities of the weather also vary. This therefore becomes necessary as a result of material decay due to these differential rates of weather conditions. Physical breakdown of materials or elements as well as deterioration appearance may necessitate replacements.

However, this brings the problem of distinguishing between maintenance and improvement, which has not been resolved satisfactorily by many definitions. It is however, generally conceded that maintenance should include reasonable elements of improvement, for example the replacement of worn out components with up-to-date versions. Where the intention of work done is to increase efficiency in the use of the building by adding facilities, which were not previously present, the work should be classified as improvement. However, it is logical therefore to extend the meaning of maintenance to cover some localized improvement, Stapleton (1994).

Francis Naab Zana (2011) indicated that whatever the scenario exists, in considering the operation of maintenance management there are a number of common areas requiring a policy statement. These include:

i. Resource Allocation

The proportion of resources that will be allocated to building maintenance will have to be determined in a competitive environment. These resources may be in terms of finance, staffing (both managerial and operative) and time. Generally, maintenance tends to compete on rather unfavourable terms for all of these, and for finance in particular. Following the allocation of maintenance resources as a block is the need to decide precisely how these resources are to be distributed. Given the inevitable pressures, this may be carried out in a variety of ways, some of which may have little to do with building performance considerations and be beyond the influence of the maintenance technical staff.

The process may be the result of a clearly defined policy or of some mysterious internal process dictated by other characteristics of the organisation. Here too we need to recognise that the resource allocation may be part of an outsourced operation that will have contractual implications to be considered and may be heavily influenced by a bidding process subjected to a range of market pressures.

ii. Performance requirements

If a logical approach to building performance has been taken from inception, then a detailed performance model may exist. This relates of course not only to technical standards, but also to operational and financial ones, such as response times and budgets.

An external bidding process preparatory to entering into an outsourced arrangement will need to address all of these questions, and the importance of properly defined service level agreements cannot be emphasised strongly enough.

iii. Execution of the work

A policy will need to be formulated to indicate how maintenance work is to be executed.

- a. This will involve consideration of such factors as:
- b. Who executes the work?
- c. When is it executed?
- d. How is it executed?
- e. How is it supervised and controlled?
- f. What is its relationship with other activities in the organisation?

iv. Administrative activities

Consideration of work execution requires an assessment of the procedures necessary to administer maintenance operations, and this strikes at the heart of maintenance management.

The type of maintenance department may or may not be a result of a carefully formulated policy, but will certainly be a reflection of the parent organization's attitude to the

maintenance of buildings. The increasing tendency towards a partnering and/or out sourced approach increases the demands on these administrative activities but more importantly changes their nature away from the operational towards one of monitoring and control, Francis Naab Zana (2011).

2.4.1 Factors Influencing Maintenance Of Public Buildings

Francis Naab Zana (2011) stated that the factors influencing maintenance means how often, what degree, how much should be spent on maintenance. These factors include;

- 1. Purpose of the owner/developer:** The reason for which the property has been developed will influence how often, to what degree should maintenance be carried out, and how much should be spent on maintenance. For instance if the property was developed with the aim disposing off then, the owner has to ensure that it is constantly kept in a state to command a price and attract suitable tenants.
- 2. Quality of design:** The kind of design also influences how maintenance is to be carried out. The design of a particular structure may involve a lot of sophisticated materials which may be very difficult to obtain. Besides, the design may also be one that does not fit into a particular geography and hence frequent maintenance. It is therefore important that the issue of maintenance is considered at the design stage
- 3. Standard of workmanship:** This refers to the work being carried out on site. The standards of workmanship will automatically dictate the frequency of maintenance to be carried out. If the standard of workmanship on site is very high, the cost as well as the frequency of maintenance would be low and the vice versa.
- 4. Use of the structure:** The use of a particular structure would also determine to a great extent how maintenance is carried out. A frequently used structure would call for frequent maintenance as compared to a structure that is seldom used. Also, the users of the structure would also influence maintenance. A place being used by high profile

officials would be well maintained as against one used by common workers, Francis Naab Zana (2011).

5. **Statutory requirement:** There are laws which guide the operations of every public organization. Sometimes, some of these laws affect a maintenance activity which requires a certain degree of maintenance to be carried out periodically. Statutory regulations sometimes influence maintenance activities to be carried out on particular facilities. For instance, in the operations of an airport, daily checks as well as maintenance must be carried before flight operations can take place.
6. **Environmental factors:** The environment places a major role when it comes to maintenance. Areas with unstable environmental conditions undergo frequent maintenance work and the vice versa. For instance, in the temperate and tropic zones of the world, different maintenance activities are carried out as a result of different climatic conditions.
7. **Materials used:** Materials used change every day and hence may trigger of maintenance on a particular structure. Poor quality materials used in construction would be changed if new and more durable materials come to the market. Maintenance is also done with cost implication in mind. It would therefore be prudent to use more durable materials on the market in order to offset recurrent maintenance on poor quality materials used. There are many other factors influencing maintenance. Notable among them include the following, technology, neighborhood character, socio cultural beliefs, image among many others, Francis Naab Zana (2011).

Alagidede (2000) in commenting on the procedure for carrying out maintenance on public buildings stated that; in order to carry out maintenance work effectively the following procedures normally must be followed;

- Identify the problem: this can be done, through examination of the building, critical observation and inspection.
- Study the problem and analyze it to identify possible cause; this will help find the solution.
- Plan the cause of action and list the various tasks that will be required in renovating the building (operational sequence)
- Estimate the cost of the maintenance work if it is an organization then write officially to the authorities for the maintenance work, which should include the problem and the cost of the maintenance work.
- Carry out maintenance work using appropriate skills and after the request have been approved and the necessary materials and funds provided.
- Test or evaluate the project
- Write a report, Alagidede (2000).

2.4.2 The Role Of Maintenance Or Estate Manager Of Public Institutions

According to Francis Naab Zana (2011), every building requires maintenance. This is because buildings and machines deteriorate over time. The Estate Manager should therefore find means to keep the properties he manages in an acceptable standard in order to achieve the purpose for putting up such properties. In carrying out maintenance activities some of the roles perform by the estate manager include; the rate at which maintenance works are carried out on buildings is largely influence by the quality of the design, components, finishes and the materials of the structure. The maintenance manager should contribute to the design of the structure and also during the construction of the structure.

Again he has to contribute to the space needs depending on the use of the building. He should at least have a fair idea of the cost to be incurred on the structure as maintenance within the life span of it. The estate manager considers the physical state of the properties to determine

whether it is facilitating the achievement of the overall objective of the organization. Maintenance though facilitates the work of the organization; the estate manager has to consider the type of the maintenance activities that can help the organization to achieve its overall goal. It is the duty of the estate manager to ensure that the buildings remain in a good condition. He arranges skilled people like plumbers and technicians for solving issues like leaking faucets and electrical problems respectively. They also look into the regular maintenance work like the cleaning of the common areas of the buildings and regular upkeep of the externals like the gardens and parks. Other annual or bi-annual works like painting of the buildings are also handled by the estate manager, Francis Naab Zana (2011).

The estate manager also needs to maintain the properties to an acceptable standard at reasonable cost and with minimum inconvenience. He needs to consider at the preparation of lease whether it should be full repairing and insuring or not. He also needs to consider whether the type of maintenance activities fall within the regulations of the area the country, Francis Naab Zana (2011).

2.4.3. The Maintenance Department

Francis Naab Zana (2011) indicated that in its broadest sense, the term maintenance department is used to describe the person or persons responsible for the planning, control and execution of maintenance operations. This may be wholly in house or, as is now much more likely, may include independent bodies, such as consultants and contractors.

In considering the maintenance management systems to be used, the relationships with these bodies and the rest of the business organisation must therefore be carefully taken into account. The nature of these interfaces will influence operational methods and management systems profoundly. The organisation set up to deal with maintenance needs must address two major concerns, Francis Naab Zana (2011).

Firstly, it must ensure that an appropriate service is provided within the guidelines established by proper consideration of corporate objectives, and secondly, it must be capable of judging its own effectiveness (or that of an external provider) by monitoring and controlling its performance.

The need to satisfy these two interlinked issues underlines the importance of the interface of maintenance with the rest of the organization, Francis Naab Zana (2011).

2.4.4 The Role Of Maintenance Department With In The Organisation

The position of the maintenance department within the organisation, and its relationships with other departments and functions, may be the single biggest indicator of the degree of importance attached to maintenance by senior management.

A carefully integrated maintenance department probably indicates a positive policy stance, where building maintenance has been considered as an important part of the organisational objectives.

This is obviously related to overall corporate objectives.

However, in too many instances the reverse is the case, which reflects the low priority given to property maintenance by many organisations. Clearly, where an organisation has outsourced its maintenance, whether part of a comprehensive FM package or not, the positioning of the responsibility for monitoring and control needs to be rethought and it may well be that there is no option other than to locate it close to strategic management levels, Francis Naab Zana (2011).

2.4.5 Functions Of The Maintenance Department

The maintenance department performs among other things the following basic functions.

- i.** Advisory function: this involves liaison with occupants and users and consultation with upper management on such matters as;

- a. The standards to be maintained and the effect on user activities of deviations from these standards.
- b. The relative merits of alternative maintenance policies and the extent to which it would be advantageous to employ operatives directly for executing the work.
- c. Clarification of any constraints in relation to limits of expenditure, desirable cash flow patterns, acceptable delay times or restrictions on time and method of carrying out work.
- d. Estimates of maintenance expenditure both long and short term, including, where appropriate, the cost of initially bringing up to the required standard and the possibility of fazing any such backlog over a period of years.
- e. Provision of cost and other data to assist upper management in deciding whether to repair or renew.
- f. Technical requirements for minor works involving alterations or small additions to the building; although not strictly maintenance, it is usual for the maintenance organization to assume full responsibility for this type of work.
- g. Advice on the maintenance implications of designs for proposed new buildings.

- ii. **Organizational function:** this may be in relation to the central administrative and supervisory system or to the execution system whether by direct labour or contract.

This must be considered with respect to internal functions, and also with points of interface, both within and externally, so that each of the following may be relevant;

- a. The formation of a basic internal administrative system that clearly defines: roles and responsibilities, organisational interrelationships, communication channels, chains of command and patterns of accountability and standard procedures.
- b. The defining of proper protocols for dealing with external organisations, and other departments within the organisation.

Within this function careful consideration will need to be given to the procedures for communicating information, whether written or oral.

Increasingly, information technology is of critical importance when considering administrative and organisational systems.

- iii. **Control functions:** the control functions are dependent on the timely receipt of accurate information relating to the state of the system.

The control functions operate in the following areas:

- a. **Work input.** Identifying the extent of work necessary to achieve the required standards within the constraints laid down. The processes involved would include planned inspections, appraisal of user requests and assignment of priorities.
 - b. **Time of execution.** Programming the workload so that the carrying out of the work is timed in accordance with the needs of the user and the available labour force.
 - c. **Quality.** Supervision of work during execution and by subsequent control inspections to detect latent defects.
 - d. **Cost.** Budgetary control system including estimating resource requirements in cost and performance terms for later comparison with actual cost and performance achieved.
 - e. **Feedback.** This is an inherent feature of all the control functions and involves keeping such records as are necessary for the proper control of the operations.
-
- iv. **Miscellaneous functions:** the maintenance organization may have responsibility for other matters such as: Safety and security, principally in relation to compliance with statutory fire precautions and the maintenance of firefighting equipment, refuse disposal, cleaning, grounds etc.

2.5 Challenges /Factors Affecting Maintenance Of Public Buildings

Francis Naab Zana (2011), in his study outlined a number of factors that militate against the maintenance of public buildings as;

- i. **Availability or non-availability** of resources whether physical or economic greatly affect the decision to carry out maintenance works especially major renovation work which require huge funds.
- ii. **Urgency of the work:** investors consider whether delayed work in the short run will require more expensive work at a later stage.

This usually takes into consideration the safety of users and any possible damage to structural as well as finishing and furnishing in the building.

- iii. **The use of a building:** the use to which a building is put also affects the decision to carry out maintenance.

A building such as those of schools and hospitals require more attention than a mere residential unit due to the amount of pressure and use of it.

- iv. **The age of the building:** capital expenditure on buildings is in anticipation of returns.

It is therefore prudent to consider the age of the building to avoid spending on a building which has outlived its usefulness or will not yield returns proportionate to the amount expended on it,

Francis Naab Zana (2011).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter examines possible methods with the aim of finding the best methodology to answer the research questions. According to Collis & Hussey (2003), research methodology is the overall approach to the design process from the hypothetical foundations to the collection of data and analysis adapted for a study. Methodology is then a way by which knowledge is gained about the world, by trying to discover how one can go about the task of finding out what is believe to be true (Christou *et al.*, 2008), and for that matter, this chapter presents the research methodology of the study, research design, population, sampling techniques, sample size and data collection methods or techniques.

3.2 Research Design

Research design according to Adams & Schvaneveldt (1985) and Ogoe (1993), is a collection of guides or rules or data collection pacts with the structure for data collection and analysis; the structure that influences the technique for collection and analysis of data and provides the connection between empirical data as well as its conclusions in a logical sequence to the initial research question of the study (Yin, 2003; Bryman, 2004; Baiden 2006).

The researcher adopted a questionnaire survey in the quest to evaluate the maintenance culture of public buildings from occupants and those in-charge of maintaining those buildings. The need for generalization in the findings across the public buildings influenced the choice of questionnaire survey and interview. The questionnaire and interview survey enhances consistency of observations and improves replication due to its inherent standardized measurement and sampling techniques (Oppenheim, 2003).

3.3 Population

A research population can be defined as the totality of a well-defined collection of individuals or objects that have a common, binding characteristics or traits (Polit and Hungler, 1993). Burns *et al.* (1993) added that population in research work is defined as all elements (individuals, objects and events) that meet the sample criteria for inclusion in a study. This research covers a population of one hundred (100) occupants of public buildings and 20 selected staff of the Municipal Assembly, Schools and Ghana Highway Authority responsible for maintenance works within the Sunyani Municipality. The main reason for using this category of people is that their activities directly or indirectly have a bearing on maintenance management practices of the public buildings within the study area. The target population for the study included the occupants of Sunyani Municipal Assembly bungalows, Nurses and Doctors bungalows and selected staff and students of Sunyani Senior High School and Polytechnic.

3.4 Sampling Techniques And Sample Size

In research, the term “sample” means a part of a whole (population) drawn to reflect the remaining (Naoum, 1998). Thus, sampling refers to the process of selecting a quota of the population to characterise the entire population. A sample, then, consists of a subject of the units that constitute the population (Polit & Hungler, 1999). However, research studies use simply a small fraction of the population, referred to as a sample. This is because using a sample is more practical and less costly than collecting data from the entire population. Polit & Hungler (1999) asserted that, the major risk of using a selected sample is that it might not adequately reflect the behaviours, traits, or beliefs of the population. For the purposes of this study, purposive sampling was used in attaining the sample size because of the difficulties encountered in assessing the population size of the population under study. Purposive sampling refers to strategies in which the researcher exercises his or her judgment about who will provide

the best perspective on the phenomenon of interest, and then intentionally invites those specific perspectives into the study which (Bernard, 2002; Lewis & Sheppard, 2006; Tongco, 2007) indicated that purposive sampling technique simply put, is where the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience.

This helped the researcher to determine how maintenance is carried out at the different levels and within the different housing or building types in the three public institutions. Purposive sampling technique was then used to select the sample size of 100 occupants and users of public buildings within the study area.

3.5 Data Collection Instrument

The instrument to be used in collecting the quantitative data from respondents will be a questionnaire. A questionnaire is a "structured technique for data collection" which consists of a series of questions (Malhotra, 1993). Collis and Hussey (2003) further explains the definition of a questionnaire by stating that a questionnaire consists of a list of structured questions selected and developed with the aim to draw out reliable responses from the chosen sample.

The questionnaires would be structured using closed-ended questions to give respondents a limited number of categories to select as responses and to also proffer their views. The questionnaire would, however include all possible categories. The close-ended questions would be used because they yield quantitative data and make it easy for the researcher to understand once the questionnaires are returned (Marlow, 2000).

The survey questionnaire was divided into various sections in accordance with the objectives, each corresponding to the focus of the separate models used in the analysis. Thus the socio-demographic data of respondents, the maintenance culture and condition of public buildings in the Sunyani Municipality, maintenance policy of public institutions, the maintenance deficiencies of

public institutions within the Sunyani Municipality, and the maintenance rules /codes available to the maintenance departments of public buildings were sought.

The researcher will also interview the staffs who have relation with maintenance of the public buildings within the Sunyani Municipality. An interview is a set of questions for obtaining statistically useful or personal information from individuals (Encyclopaedia Britannica, 2007). Kvale (1996) also states that, an interview allows the interviewee to describe the world as they experience it. An interview serves as an extension of ordinary conversation and allows for interaction “to achieve richness and depth of knowledge of understanding” as viewed by Rubin and Rubin (1995).

Interview as an instrument used in this study therefore is supposed to further illicit information from the various stakeholders in the Sunyani Municipality who are involved in the maintenance of public buildings in areas on the maintenance culture and condition of public buildings in the Sunyani Municipality, maintenance policy of public institutions, the maintenance deficiencies of public institutions within the Sunyani Municipality, and the maintenance rules /codes available to the maintenance departments of public buildings to enable the researcher make linkages with the results gathered from the occupants and existing literature..

3.6 Data Analysis Procedure

After sorting out the questionnaires, the data were inputted and analyzed using descriptive statistical methods via use of the Statistical Package for Social Sciences (SPSS) version 16.0 and Microsoft Spreadsheet to present the data in figures and charts for easy understanding and interpretation. The Descriptive Analysis Unit of the SPSS was also used to summarize the data, create appropriate tables, graphs and examine the relationships among the variables. This will facilitate interpretation of results and provide answers to the various research questions. Both statistical and descriptive techniques were employed in the data analysis and as such the data collected were analyzed both qualitatively and quantitatively.

Due to insufficient time and other constraints, 100 questionnaires were designed and self-administered by the researcher to selected occupants of public buildings and semi-structured interview conducted with the staffs of selected public institutions within the study area and the results analysed as presented in Chapter Four.

3.7 Validity And Reliability Of The Instruments

The validity of a research is the degree to which definitions and explanations of the phenomena under study match accurately with the realities of the environments in which they exist (McMillan & Schumacher, 1993:391). Content and face validity where content validity refers not to what the test actually measures, but to what it superficially appears to measure whilst face validity assesses whether the test "looks valid" to the examinees who take it, the administrative personnel who decide on its use and other technically untrained observers. In order to check the face validity of the instrument for this thesis, it was given to the supervisor of the researcher and other colleagues for their comments before administering the instrument.

Reliability on the other hand, is a quantitative research study that refers to the researcher's ability to be transparent, consistent and dependable upon his/her research activities so that research bias is minimized. Best and Kahn (1993:208), contend that reliability is the degree of consistency purported by the research instruments and procedures. Here consistency means the ability to provide replicable data when similar data collection methods were utilized by different researchers at different research settings ensuring that the research instruments used to collect the data can be relied upon. McMillan and Schumacher (1997:385) maintain that reliable data collection instruments collect these data with accuracy so that, the researcher does not risk a condition in order to collect different information initially not intended for.

3.8 Ethical Considerations

Ethical considerations are very vital in any research work which should never be overlooked when considering a research work. Organizations and individuals should be contacted before one gathers data, analyses of data and reports of information gathered. Hence, a research work should involve an express moral approval. In other words, a research should be subjected to disapproval or conforming to accepted standards of conduct.

In this research work therefore, respondents willingly took part in the study though they also had the right to withdraw from the research. Protection of confidential data given by identifiable respondents and their anonymity and reactions of respondents was also observed.



CHAPTER FOUR

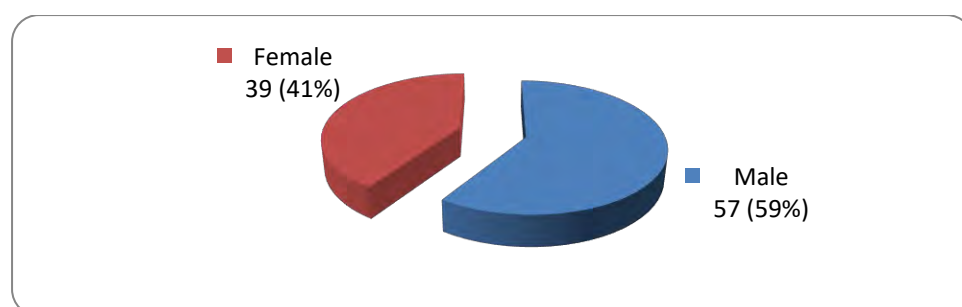
ANALYSIS AND PRESENTATION OF DATA

4.0 Introduction

This chapter presents the analysis and discussion of the empirical aspects of the study. Twumasi (2001) stated that analysis entails the critical examination of materials in order to understand its part and relationship and to discover its trends in relation with the objective of any study. The research questions were designed in accordance with the research objectives and questions in order to collect the primary data for the study. The presentation of results is in descriptive statistics in the form of frequency distribution, figures and bar graphs.

4.1 General Data of Respondents

Under this section the researcher presents the findings of the field research with respect to the socio-demographic information of respondents of the survey. Areas of particular interest to the researcher under this section were; the sex of respondents, how many years respondents have work in their institution, and the number of years respondents have live in their buildings as discussed below.



Source: Field Survey, 2015

Figure 4.1 Sex of respondents

Figure 4.1 displays the sex of respondents which shows that out of the 96 respondents who responded to the questionnaire, 57 respondents representing 59.4% were male, and the remaining 39 respondents made of 40.6% are female.

The results shows that out of the total number of people who responded to the questionnaire over half of them thus 57 respondents representing 59.4% were male, more than their female counterparts.

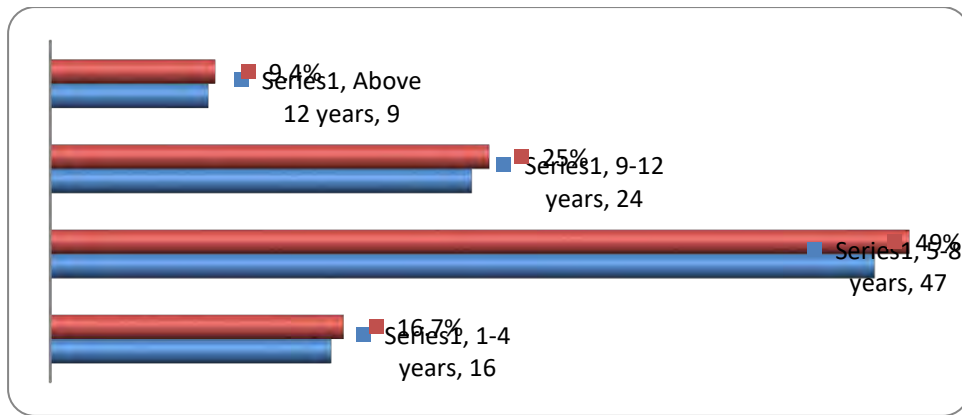
Table 4.1 How many years have you worked in your institution

Options	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1-4 years	6	6.2	6.2	6.2
5-8 years	47	49.0	49.0	55.2
9-12 years	27	28.1	28.1	83.3
Above 12 years	16	16.7	16.7	100.0
Total	96	100.0	100.0	

Source: Field Survey, 2015

Table 4.1 answers the question on how many years respondents have worked in their your institution and the result shows that, 47 respondents made of 49.0% stated between 5-8 years, 27 respondents made of 28.1% indicated 9-12 years, 16 respondents representing 16.7% stated above 12 years, and 6 respondents made of 6.2% stated between 1-4 years.

This meant that 47 respondents made of 49.0% have worked between 5-8 years followed by 27 respondents made of 28.1% who indicated that they have worked with their respective institutions from 9-12 years.



Source: Field Survey, 2015

Figure 4.2 How many years have you lived in this building

From Figure 4.2 which display the result on how many years respondents have lived in their buildings, it revealed that 47 respondents made of 49.0% indicated from 5-8 years, 24 of them representing 25.0% stated between 9-12 years, while 16 respondents constituting 16.7% stated 1-4 years and 9 respondents made of 9.4% indicated above 12 years.

The study revealed that about 49.0% of them indicated they have lived in their buildings from 5-8 years, 24 of them representing 25.0% have lived in their buildings between 9-12 years, followed by about 17% of the respondents who stated that they have lived in their buildings between 1-4 years.

4.2: The Maintenance Culture and Condition of Public Buildings in the Sunyani Municipality

Table 4.2: The way maintenance is carried out in respondent's institutions

Question Items	Strongly Disagree or Disagree	Neutral	Strongly Agree or Agree	Mean
Planned Maintenance based on the life of the building, the standard to be achieved, the financial implications and the responsibility for maintenance.	20(20.8%)	19(19.8%)	57(59.3%)	4.00
Unplanned Maintenance or maintenance works necessitated by unforeseen breakdowns or damages such as repair of a ripped off or leaking roof	31(32.29%)	12(12.5%)	53(55.21%)	4.00
Preventive Maintenance carried out at predetermined intervals or corresponding to prescribed criteria	27(28.1%)	36(37.5%)	33(34.3%)	3.13
Corrective Maintenance	53(55.2%)	14(14.6%)	29(30.2%)	2.50
Emergency Maintenance	13(13.5%)	12(12.5%)	71(74.0%)	4.00
Conditioned-base maintenance based on routine or continuous monitoring.	76(79.2%)	4(4.2%)	16(16.6%)	1.94

Scheduled Maintenance at predetermined intervals of time, seasons or years of the building,	49(51.0%)	11(11.5%)	38(39.6%)	1.77
Running Maintenance carried out whilst an item is being used as the day-to-day cleaning of the building.	13(13.5%)	11(11.5%)	72(75.0)	4.00
Shutdown Maintenance which can only be carried out after the building is evacuated or out of service.	33(34.4%)	11(11.5%)	42(54.1%)	3.23
Deferred Maintenance on works which have been identified as necessary but put off due to lack of funds	26(27.2%)	9(9.4%)	61(63.5%)	4.00

Source: Field Survey, 2015

Table 4.2 shows the way maintenance is carried out in respondent's institution, using the scoring key: 1=Strongly Disagree, 2=Disagree, 4=Agree and 5=Strongly Agree.

The above Table 4.2 shows the way maintenance is carried out in respondent's institution. On whether planned maintenance based on the life of the building, the standard to be achieved, the financial implications and the responsibility for maintenance, it recorded a mean value of 4.00; where 20 (20.8%) strongly disagree or disagree, 19 (19.8%) neutral and 57 respondents made of 59.3% which constituted over half of the total number of respondents either strongly agree or agree with the statement.

This shows that over half of the total number of respondents either strongly agree or agree that planned maintenance based on the life of the building, the standard to be achieved, the financial implications and the responsibility for maintenance.

Unplanned maintenance or maintenance works necessitated by unforeseen breakdowns or damages such as repair of a ripped off or leaking roof recorded a mean value of 4.00 where 31 respondents made of 32.29% either strongly disagree or disagree with the point, 12 respondents representing 12.5% were neutral, and over half of the total number of respondents 53 of them representing 55.21% indicated that they either strongly agree or agree.

The findings revealed that over half of the respondents 55.21% indicated that they either Strongly Agree or Agree that Unplanned Maintenance or maintenance works necessitated by unforeseen breakdowns or damages such as repair of a ripped off or leaking roof.

Preventive maintenance carried out at predetermined intervals or corresponding to prescribed criteria it had a mean value of 3.13, where 27 respondents representing 28.1% strongly disagree or disagree, 36 of the respondents representing 37.5% stated neutral, and 33 respondents representing 34.3% either strongly agree or agree.

It is clear from this result that over half of the respondents either strongly disagree or disagree or were neutral to the point that preventive maintenance carried out at predetermined intervals or corresponding to prescribed criteria in their institutions.

On whether corrective maintenance is carried out at respondents institutions, it generated a mean value of 2.50 where 53 respondents made of 55.2% indicated that they either strongly disagree or disagree, 14 respondents constituting 14.6% stated neutral, and only 29 respondents representing 30.2% stated that they either strongly agree or agree that corrective maintenance is carried out at respondents institutions.

The results show that it was only 29 respondents representing 30.2% who stated that they either strongly agree or agree that corrective maintenance is carried out at their institutions.

On the issue of emergency maintenance it recorded a mean value of 4.00, 13 respondents made of 13.5% stated that they either strongly disagree or disagree with the point, 12 respondents made of 12.5% indicated that they were neutral and over half of the total number of respondents 71 of them representing 74.0% either strongly agree or agree that emergency maintenance was carried out by their institution.

The finding here shows that over half of the total number of respondents 71 of them representing 74.0% either strongly agree or agree that emergency maintenance was carried out by their institution.

As to whether conditioned-base maintenance based on routine or continuous monitoring it recorded a mean value of 1.94 where 76 respondents representing 79.2% indicated that they either strongly disagree or disagree with the point, 4 of them representing 4.2% were neutral, and only 16 respondents made of 16.6% either strongly agree or agree that conditioned-base maintenance based on routine or continuous monitoring.

The results shows that almost all the respondents which is about 76 representing 79.2% indicated that they either strongly disagree or disagree with the point that conditioned-base maintenance based on routine or continuous monitoring was carried out by their institutions.

On whether scheduled maintenance at predetermined intervals of time, seasons or years of the building it recorded a mean value of 1.77 where 49 respondents representing 51.0% indicated that they either strongly disagree or disagree with the point, 11 respondents made of 11.5% were neutral and 38 respondents representing 39.6% either strongly agree or agree with the point.

It was revealed by the results that about 51.0% indicated that they either strongly disagree or disagree with the point that scheduled maintenance at predetermined intervals of time, seasons or years of the building.

More so, on whether running maintenance carried out whilst an item is being used as the day-to-day cleaning of the building it recorded a mean value of 4.00, with 13 respondents representing 13.5% either strongly disagree or disagree, 11 respondents made of 11.5% were neutral and 72 respondents representing 75.0% either strongly agree or agree with the point that running maintenance carried out whilst an item is being used as the day-to-day cleaning of the building.

It can be deduced from the results that about 75.0% of the respondents either strongly agree or agree with the point that running maintenance carried out whilst an item is being used as the day-to-day cleaning of the building.

Again, on shutdown maintenance which can only be carried out after the building is evacuated or out of service it recorded a mean of 3.23 where 33 respondents representing 34.4%, 11 respondents representing 11.5% were neutral and 42 respondents made of 54.1% either strongly agree or agree with shutdown maintenance which can only be carried out after the building is evacuated or out of service.

The result indicated that about 54.1% of the respondents either strongly agree or agree with shutdown maintenance which can only be carried out after the building is evacuated or out of service.

Finally, as to whether deferred maintenance on works which have been identified as necessary but put off due to lack of funds it recorded a mean value of 4.00 indicated that 26 respondents representing 27.2% stated that they either strongly disagree or disagree with the point, 9

respondents representing 9.4% indicated neutral, and 61 respondents representing 63.5% either strongly agree or agree.

It can be concluded from the result that over half of the total number of respondents which is 63.5% either strongly agree or agree that deferred maintenance on works which have been identified as necessary but put off due to lack of funds.

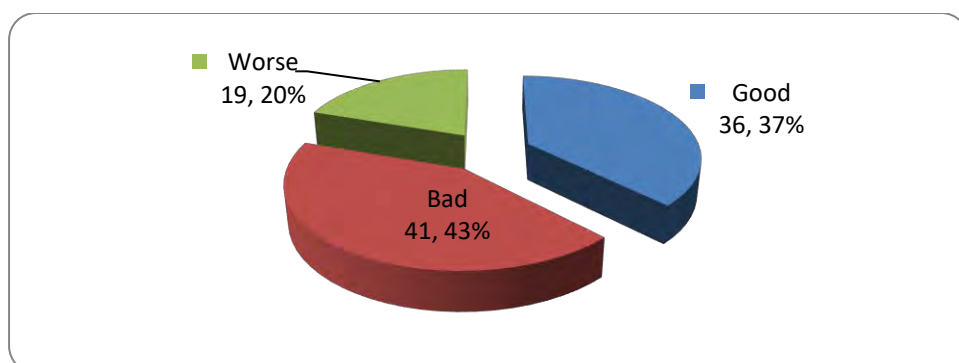
On which other ways maintenance of buildings is being carried out, most of the respondents stated that;

- There is nothing like maintenance of buildings as far as their institution was concern and some added that no maintenance has been carried out for close to twenty years.
- It was also added by some of the respondents that maintenance is only carried out in their institution only when a senior officer is given a new bungalow or posted to a bungalow for the first time.
- Other respondents indicated that preventive and planned maintenance is done when it becomes necessary but not a routine in their institutions.

The above finding is in consonance with Alagidede (2000) who stated that the policy or culture of maintenance which should enforce for building to be maintained is neglected in Ghana. Ghanaians lack the culture of maintenance and it is an open secret. Undoubtedly every institution in Ghana is guilty of this menace. Indeed lack of maintenance in general is really causing undesired pains to the citizens of this nation.

The above findings further confirmed Queensland Gov. (2012) who stated that preventative maintenance which should be applied to building structures, building fabric, services and site improvements but is predominantly used for maintenance of building services. When preparing their maintenance strategy, departments should be aware of the benefits of preventative

maintenance practices which minimize the likelihood of building asset failures, health and safety issues and disruptions to service delivery.



Source: Field Survey, 2015

Figure 4.3 Ratings of institutions based on how they respond to maintenance of buildings

Figure 4.3 presents the views of respondents on the ratings of their institutions based on how they respond to maintenance of buildings. Out of the 96 respondents 36 of them representing 37.5% indicated that the way their institution response to maintenance of buildings was good, 41 respondents made of 42.7% stated that their institutions response to maintenance of buildings was bad, and 19 respondents constituting 19.8% stated that their institutions response to maintenance of buildings was worse.

This result shows that 41 respondents made of 42.7% stated that their institutions response to maintenance of buildings was bad, followed by 19 respondents constituting 19.8% who stated that their institutions response to maintenance of buildings was worse.

This finding contradicts Hackmn and Osei-Tutu (2008), who stated that the maintenance of the physical structures or properties of an institution ensures that the investments made may not only yield the highest possible net returns over the life of the property but also fulfills another ultimate obligation of providing the required human comfort and satisfaction.

Table 4.4 the current state of buildings occupied by respondents in the study area

Question items (Facilities of buildings)	Responses			
	Good	Better	Bad	Worst
Lighting/Electrical fittings state	68(70.8%)	8(8.3%)	20(20.8%)	-----
Roof, floor and ceiling state	49(51.0%)	18(18.8%)	29(30.2%)	-----
Foundation/wall state	58(60.4%)	18(18.8%)	20(20.8%)	-----
Window and door fans/frames state	50(52.08%)	7(7.29%)	39(40.63%)	-----
Interior Painting state	48(50.0%)	13(13.54%)	35(36.45%)	-----
Exterior Painting state	35(36.45%)	8(8.3%)	42(43.75%)	11(11.5%)
Plumbing works (i.e. Pipe water & Toilet)	43(44.78%)	7(7.29%)	32(33.33%)	13(13.54%)

Source: Field Survey, 2015

Table 4.4 presents the current state of buildings occupied by respondents in the study area. With regards to the state of the lighting / electrical fittings, 68 respondents constituting 70.8% indicated good, 8 of them made of 8.3% indicated better, and 20 respondents representing 20.8% stated that lighting / electrical fittings of their buildings were bad.

It is clear from this point that 68 respondents constituting 70.8% indicated the current state of the buildings lighting / electrical fittings was good, followed by 28 respondents made of 29.1% who stated that the lighting / electrical fittings of their buildings were bad.

On the state of the building roof, floor and ceiling, 49 respondents representing 51.0% stated that the state of their building roof, floor and ceiling was good, 18 respondents made of 18.8%

said it was better, and 29 of them constituting 30.2% indicated that their building roof, floor and ceiling was bad. From this result it was revealed that only 49 respondents representing 51.0% stated that the state of their building roof, floor and ceiling was good.

Considering the state of the foundation/walls of respondents buildings, it was realized that 58 respondents made of 60.4% stated that their buildings foundation/walls was good, 18 respondents made of 18.8% indicated better, and 20 of them representing 20.8% said their buildings foundation/walls was bad. It was clear from this finding that it was only 60.4% of the respondents who stated that their buildings foundation/walls were good and the rest were not good.

Again, looking at the windows and door fans/frames state respondents buildings, 50 of them representing 52.08% stated that their buildings windows and door fans / frames were good, 7 respondents made of (7.29%) said their buildings windows and door fans / frames were better and 39 respondents representing 40.63% indicated that their buildings windows and door fans/frames were bad. It can be concluded from this result that about 52% of the respondents stated that their buildings windows and door fans / frames were good and the rest were bad.

On the issue of respondents interior painting state, it was only 48 respondents representing 50.0% stated that their buildings interior painting state was good, 13 respondents made of 13.54% stated that their buildings interior painting state was better, while about 35 respondents constituting 36.45% indicated that their buildings interior painting state was worse. The results shows that with regards to the respondents interior painting state, it was only 48 respondents representing 50.0% stated that their buildings interior painting state was good and the rest was not good.

With regards to the exterior painting state of respondents buildings, 35 respondents made of 36.45% stated that their buildings exterior painting state was good, 8 respondents made of 8.3%

stated that it was better, and almost half of the total number of 96 respondents of about 42 respondents constituting 43.75% stated that their buildings exterior painting state was bad and 11 of about 11.5% indicated that their buildings exterior painting state was worse.

The findings show that out of the total number of 96 respondents, about 42 respondents constituting 43.75% stated that their buildings exterior painting state was bad and only 35 respondents made of 36.45% stated that their buildings exterior painting state was good.

Commenting on the plumbing works (i.e. pipe water & toilet) state of the respondents, it was only 43 respondents made of 44.78% who indicated their buildings plumbing works (i.e. pipe water & toilet) state was good, 7 of them representing 7.29% indicated better, 32 respondents representing 33.33% indicated that their buildings plumbing works (i.e. pipe water & toilet) state was bad and 13 respondents constituting 13.54% indicated that their buildings plumbing works (i.e. pipe water & toilet) state was worse.

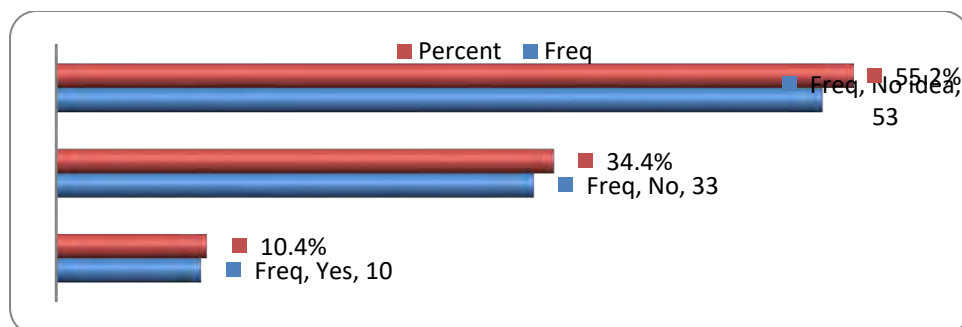
The result shows that it was only 43 respondents representing 44.78% who indicated their buildings plumbing works (i.e. pipe water & toilet) state was good while the rest were not good.

In commenting on the question of the other areas of their buildings that need maintenance attention not stated among the above outlined points. The results of the respondents and those interviewed further added that every area or part of their buildings needs maintenance, others stated that their verandas, water closets, floor tiles, septic tanks and stair ways or staircases of some of the buildings which needed urgent maintenance have never been attended to.

The above results agree with Alagidede (2000) who stated that “Ghanaian lacks the culture of maintenance and is an open secret”. He added that it is rather unfortunate that valuable assets like buildings are allowed to deteriorate openly before an attempt is made to rectify the

situation, which attracts a huge amount of resources which has political, social and economic effect on the nation and cannot be ignored.

4.3: Maintenance policy for public buildings within the Sunyani Municipality



Source: Field Survey, 2015

Figure 4.4 There is a maintenance policy for buildings in my institution

From Figure 4.4 where respondents were asked whether there is a maintenance policy for buildings in their institutions, only 10 respondents made of 10.4% indicated Yes to the question, 33 respondents representing 34.4% said No and over half of the total number of respondents 53 respondents made of 55.2% indicated that they had No idea on whether there is a maintenance policy for buildings in their institutions.

The finding shows that only 10 respondents made of 10.4% indicated Yes to the question followed by 34.4% who said No and over half of the total number of respondents 53 respondents made of 55.2% indicated that they had No idea on whether there is a maintenance policy for buildings in their institutions.

This finding agrees with Francis Naab Zana (2011) who stated that the type of maintenance department may or may not be a result of a carefully formulated policy, but will certainly be a reflection of the parent organization's attitude to the maintenance of buildings. The increasing tendency towards a partnering and / or out sourced approach increases the demands on these

administrative activities but more importantly changes their nature away from the operational towards one of monitoring and control.

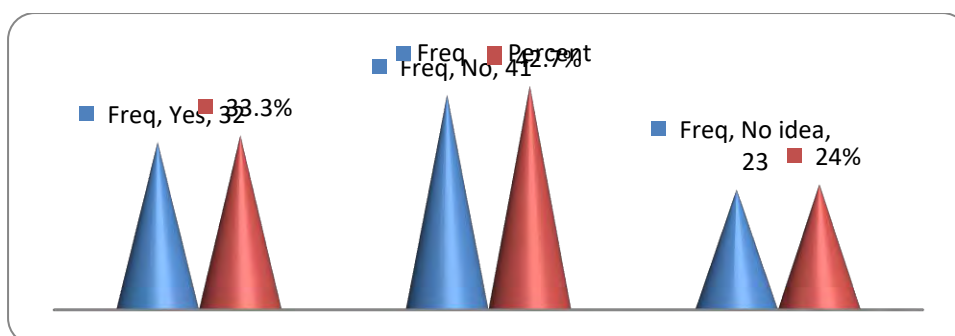
Table 4.5 Is there a maintenance department in your institution

Options	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	49	51.0	51.0	51.0
No	47	49.0	49.0	100.0
Total	96	100.0	100.0	

Source: Field Survey, 2015

In answering the question on whether there was a maintenance department in respondents institutions, it was only 49 respondents constituting 51.0% who indicated Yes to the question that there was a maintenance department in respondents institutions, and 47 respondents representing 49.0% stated No to the question that there was a maintenance department in respondents institutions.

The results concluded that 49 respondents constituting 51.0% indicated Yes to the question that there was a maintenance department in their institutions, followed by 47 respondents representing 49.0% who stated No to the question that there was a maintenance department in respondents institutions.



Source: Field Survey, 2015

Figure 4.5 the maintenance department undertake regular inspection of buildings

Figure 4.5 presents the views of respondents on whether their institutions maintenance departments undertake regular inspection of buildings. Out of the total number of 96 respondents, 32 respondents representing 33.3% indicated yes to the question, 41 respondents made of 42.7% stated No their institutions maintenance departments do not undertake regular inspection of buildings, and 23 respondents representing 24.0% indicated that they had No idea as to whether their institutions maintenance departments undertake regular inspection of buildings.

The finding shows that 41 respondents made of 42.7% stated that their institutions maintenance departments do not undertake regular inspection of buildings followed by 33.3% indicated yes to the question.

On how request for maintenance is carried by occupants on their buildings handled by respondents maintenance department; the views of those who responded to the questionnaire and those who were interviewed stated that, it is usually the officer who occupies the building who had to put in request by filling a requisition form so as to generate an estimate for the repairs and some added that selective maintenance is usually carried out based on the availability of funds.

This finding is in consonance with Francis Naab Zana (2011) who stated that the type of maintenance department may or may not be a result of a carefully formulated policy, but will certainly be a reflection of the parent organization's attitude to the maintenance of buildings. The increasing tendency towards a partnering and/or out sourced approach increases the demands on these administrative activities but more importantly changes their nature away from the operational towards one of monitoring and control.

Table 4.6 How maintenance policies are applicable for the operation of maintenance management of institutions

Question Items	Strongly Disagree / Disagree	Neutral	Strongly Disagree / Agree	Mean
Resource allocation based on finance, staffing (both managerial and operative) and time.	39(40.6%)	13(13.5%)	44(45.83%)	3.15
Performance requirements not only to technical standards	25(26.0%)	14(14.6%)	57(59.38%)	3.43
Execution of the work; by formulation of policy to indicate how maintenance work is to be executed stating who and how to do it	39(40.6%)	26(27.1%)	31(32.3%)	3.01
Administrative activities based on the assessment of procedures necessary to administer maintenance operations by maintenance management.	25(26.04%)	27(28.1%)	44(45.83%)	3.16

Source: Field Survey, 2015

With regards to the resource allocation based on finance, staffing (both managerial and operative) and time, 39 respondents made of 40.6% either strongly disagree / disagree with the point, 13 respondents representing 13.5% indicated neutral and 44 respondents made of 45.83% indicated that they either strongly disagree / agree with a mean value of 3.15.

On whether performance requirements were not only to technical standards, 25 respondents representing 26.0% indicated that they either strongly disagree/ disagree with the point, 14

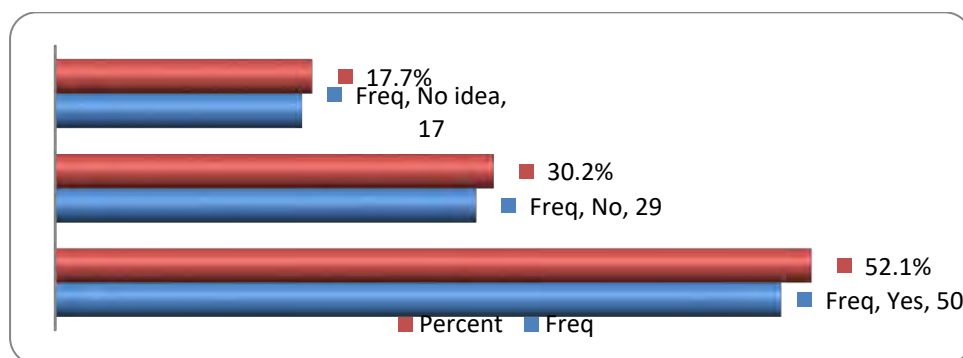
respondents representing 14.6% were neutral, and 57 respondents made of 59.38% stated strongly disagree / agree having a mean value of 3.43.

Furthermore, on whether the execution of the work by formulation of policy to indicate how maintenance work is to be executed stating who and how to do it, having a mean value of 3.01 it was revealed that 39 respondents made of 40.6% stated strongly disagree / disagree, 26 respondents representing 27.1% indicated neutral, and only 31 respondents made of 32.3% stated that they either strongly agree / agree with the point that the execution of the work by formulation of policy to indicate how maintenance work is to be executed stating who and how to do it.

Again, on whether administrative activities based on the assessment of procedures necessary to administer maintenance operations by maintenance management, it recorded a mean value of 3.16 where 25 respondents representing 26.04% indicated strongly disagree/ disagree, 27 respondents made of 28.1% were neutral, and about 44 respondents constituting 45.83% either strongly agree / agree with the point that the administrative activities based on the assessment of procedures necessary to administer maintenance operations by maintenance management.

It is clear that the above findings confirmed Francis Naab Zana (2011), that every building requires maintenance because buildings and machines deteriorate over time. As such the Estate Manager should therefore find means to keep the properties he/she manages in an acceptable standard in order to achieve the purpose for putting up such properties. In carrying out maintenance activities some of the roles perform by the estate manager include; the rate at which maintenance works are carried out on buildings is largely influence by the quality of the design, components, finishes and the materials of the structure.

4.4: The maintenance deficiencies/challenges of public institutions within the Sunyani Municipality



Source: Field Survey, 2015

Figure 4.6 Lack of concern by clients and users and poor design habits and execution are major challenges of most public buildings

Figure 4.6 presents the views of respondents on whether lack of concern shown by clients and users as well as poor design habits and execution are major challenges of most public buildings. It was revealed that out of the 96 respondents, 50 of them constituting 52.1% indicated Yes to the question, 29 respondents made of 30.2% stated no to the question that it was lack of concern shown by clients and users as well as poor design habits and execution are the major challenges of most public buildings, and 17 respondents made of 17.7% stated that they had no idea whether it was lack of concern shown by clients and users as well as poor design habits and execution are major challenges of most public buildings.

This result shows that 50 of the respondents constituting 52.1% indicated Yes to the question that lack of concern shown by clients and users as well as poor design habits and execution are major challenges of most public buildings.

Table 4.7 Which of the following are the most maintenance deficiencies/challenges of public institutions

Options	Frequency	Percent	Valid Percent
Availability or non-availability of resources	49	51.0	51.0
Urgency of the work	5	5.2	5.2
The use of a building	10	10.4	10.4
The age of the building	24	25.0	25.0
Non-functioning maintenance staff	8	8.3	8.3
Total	96	100.0	100.0

Source: Field Survey, 2015

Table 4.7 presents the views of respondents on which of the following are the most maintenance deficiencies/challenges of public institutions; it was realized that out of the 96 respondents 49 of them made of 51.0% indicated that the availability or non-availability of resources, and 24 respondents made of 25.0% stated that the age of the building where the most maintenance deficiencies/challenges of public institutions, 10 respondents made of 10.4% stated the use of a building, and 8 respondents also made of 8.3% stated that the non-functioning maintenance staff was the most maintenance deficiencies/challenges of public institutions, while 5 respondents made of 5.2% indicated that it was the urgency of the work was the most maintenance deficiencies/challenges of public institutions.

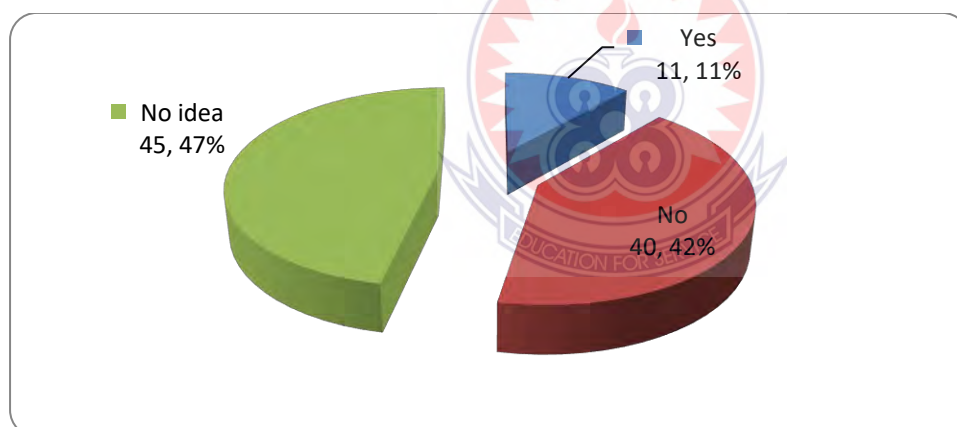
The results revealed that about 51.0% of the respondents indicated that the availability or non-availability of resources was the most maintenance deficiencies or challenges of public

institutions, followed by 25.0% of them who stated that the age of the building was the most maintenance deficiencies / challenges of public institutions.

On the other maintenance deficiencies/challenges of public institutions, the respondents who answered the questionnaire and those who were interviewed indicated that most of the occupants of government buildings have over the years been paying rent (deducted at source) to the government of Ghana yet not a pesewa was released for the maintenance of those public buildings.

Again, it was well noted that due to lack of education and the fact that there was no policy on the need for occupants of public buildings to perform maintenance of their buildings and lack of funds to execute maintenance of their buildings.

4.5: Maintenance Rules or Codes for Public Buildings within the Sunyani Municipality



Source: Field Survey, 2015

Figure 4.7 there are maintenance rules of buildings by my institution

From Figure 4.7 respondents were asked whether there are maintenance rules of buildings by their institution. Out of the 96 respondents, 11 of them representing 11.5% indicated Yes to the question that there are maintenance rules of buildings by their institution, 40 respondents representing 41.7% indicated No to the question and 45 respondents made of 46.9% indicated that they had No idea whether there are maintenance rules of buildings by their institution.

It was clear from the results that 40 respondents representing 41.7% indicated No to the question there are maintenance rules of buildings by their institution and 45 respondents made of 46.9% indicated that they had No idea whether there are maintenance rules of buildings by their institution.

Table 4.8 Ratings of major maintenance decisions largely carried out by institutions

Question Items	SD/D	N	SA/A	M
Determining Standard in qualitative and quantitative terms	36(37.5%)	27(28.13%)	33(34.38%)	3.08
Identifying and specifying the work necessary by compiling the information received on the condition of the building from inspectors and users with the standards laid down	31(32.3%)	32(33.3%)	33(34.4%)	2.91
Estimating the cost of the work based on historic cost data obtained from within the organization	43(44.8%)	23(24.0%)	30(31.2%)	2.72
Planning inspections based on the rates of deterioration of the building elements	41(42.71%)	20(20.8%)	35(36.46%)	2.97
Planning the work in respect of fixing appropriate start and finish times for the individual jobs	33(34.38%)	11(11.5%)	42(43.75%)	2.89
Organizing the executive of work on whether to employ labour directly for the purpose or to engage an outside contractor	11(11.5%)	29(30.2%)	56(58.33%)	3.56

Source: Field Survey, 2015

Table 4.8 above shows the ratings of major maintenance decisions largely carried out by institutions, where SD/D=Strongly Disagree/ Disagree, N=Neutral, SA/A= Strongly Disagree / Agree and M=Mean.

On whether respondents institutions determining standard in qualitative and quantitative terms which recorded a mean of 3.08; 36 (37.5%) respondents either disagree or strongly disagree with the statement, 27 (28.13%) of them where Neutral, and only 33 (34.38%) respondents agree or strongly agree with the point that their institutions determine standard in qualitative and quantitative terms.

This shows that 37.5% respondents either disagree or strongly disagree that their institutions determine standard in qualitative and quantitative terms with 34.38% respondents who either agree or strongly agree with the point and the remaining 27 (28.13%) respondents where Neutral.

As to whether respondents institutions identify and specify the work necessary by compiling the information received on the condition of the building from inspectors and users with the standards laid down with a mean value of 2.91; it shows that 31 (32.3%) respondents disagree or strongly disagree that point, 32 (33.3%) respondents were Neutral to the point and 33 (34.4%) of them either agree or strongly agree that their institutions identify and specify the work necessary by compiling the information received on the condition of the building from inspectors and users with the standards laid down.

The finding shows that about 65.6% of the respondents either disagree or strongly disagree with the point or were Neutral that their institutions identify and specify the work necessary by compiling the information received on the condition of the building from inspectors and users with the standards laid down.

On whether respondents institutions estimate the cost of the work based on historic cost data obtained from within the organization, 43 (44.8%) respondents stated that they either disagree or strongly with the point, while 23 (24.0%) respondents indicated Neutral, and only 30(31.2%) out of the total number of 96 respondents either agree or strongly agree that their institutions estimate the cost of the work based on historic cost data obtained from within the organization having a mean value of 2.72.

It was clear from the results that almost half of the total number of respondents (44.8%) either disagree or strongly disagree with the statement that their institutions estimate the cost of the work based on historic cost data obtained from within the organization.

On whether planning inspections are based on the rates of deterioration of the building elements it generated a mean value of 2.97; with 41 respondents made of 42.71% Disagree with the point, 20 of them representing 20.8% were Neutral and only 35 out of the total number of 96 respondents representing 36.46% either Agree or Strongly agree that planning inspections based on the rates of deterioration of the building elements was done by their institutions.

The result shows that 42.71% of the respondents either disagree or strongly disagree with the point that planning inspections was based on the rates of deterioration of the building elements their institutions.

With regards to planning the work in respect of fixing appropriate start and finish times for the individual jobs a mean value of 2.89 was generated; where 42 respondents representing 43.75% respondents either disagree or strongly disagree to the point that planning the work in respect of fixing appropriate start and finish times for the individual jobs, with 33 respondents representing 34.38% who either agree or strongly agree to the statement, and 11 respondents made of 11.5% were Neutral.

The finding shows that 42 of the respondents representing 43.75% either disagree or strongly disagree to the point that planning the work in respect of fixing appropriate start and finish times for the individual jobs.

Concerning organizing the executive of work on whether to employ labour directly for the purpose or to engage an outside contractor it recorded a mean value of about 3.56; where 11 out of the total number of respondents made of 11.5% Disagree or Strongly disagree that organizing the executive of work on whether to employ labour directly for the purpose or to engage an outside contractor was carried out at their institution, 29 of the respondents representing 30.2% were Neutral, and about 56 respondents which form majority of the respondents made of 58.33% either Agree or Strongly agree that organizing the executive of work on whether to employ labour directly for the purpose or to engage an outside contractor was carried out by their institutions.

The findings concluded that when it comes to organizing the executive of work on whether to employ labour directly for the purpose or to engage an outside contractor was carried out by their institutions 58.33% of the respondents either Agree or Strongly agree to the point.

Table 4.9 There are maintenance rules of buildings by my institution

Options		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	11.5	11.5	11.5
	No	40	41.7	41.7	53.1
	No idea	45	46.9	46.9	100.0
	Total	96	100.0	100.0	

Source: Field Survey, 2015

Table 4.9 shows the views of respondents on whether there are maintenance rules of buildings by their institution; out of the total number of 96 respondents 11 of them representing 11.5% stated Yes to the point, 40 respondents made of 41.7% indicated No and about 45 respondents representing 46.9% indicated that they had No idea as whether There are maintenance rules of buildings by their institution.

The results shows that 40 respondents made of 41.7% indicated No to the question that there are maintenance rules of buildings by their institution and 45 respondents representing 46.9% indicated that they had No idea as whether there are maintenance rules of buildings by their institution.

The findings is contrary to Alagidede (2000) in commenting on the procedure for carrying out maintenance on public buildings stated that; in order to carry out maintenance work effectively the following procedures normally must be followed;

- Identify the problem: this can be done, through examination of the building, critical observation and inspection.
- Study the problem and analyze it to identify possible cause; this will help find the solution.
- Plan the cause of action and list the various tasks that will be required in renovating the building (operational sequence)
- Estimate the cost of the maintenance work if it is an organization then write officially to the authorities for the maintenance work, which should include the problem and the cost of the maintenance work.
- Carry out maintenance work using appropriate skills and after the request have been approved and the necessary materials and funds provided.
- Test or evaluate the project and then write a report, Alagidede (2000).

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents a summary of the main findings of the study, conclusion and recommendations and areas that call for further research or study.

5.1. Summary of findings

On the gender or sex of the respondents, the results shows that out of the total number of people who responded to the questionnaire over half of them thus 57 respondents representing 59.4% were male, more than their female counterparts, and 47 of them made of 49.0% have worked in their institutions between 5-8 years followed by 28.1% of them who indicated that they have worked with their respective institutions from 9-12 years.

The study revealed that about 49.0% of the respondents have lived in their buildings from 5-8 years, 25.0% have lived in their buildings between 9-12 years, followed by about 17% of the respondents who stated that they have lived in their buildings between 1-4 years.

The objectives of the study were to; investigate the maintenance culture and state of condition of buildings in selected public institutions within the Sunyani Municipality, examine whether there is a maintenance policy of public buildings by the selected institutions, identify the deficiencies or challenges associated with the maintenance of public institution buildings, and to assess appropriate maintenance culture or codes for the maintenance departments of public institutions.

To achieve this, the first research question sought to investigate the maintenance culture and state of condition of buildings in selected public institutions within the Sunyani Municipality.

It emerged that planned maintenance was based on the life of the building, the standard to be

achieved, the financial implications and the responsibility for maintenance to be carried out in their institutions.

Again about 55% of the respondents indicated that unplanned maintenance or maintenance works necessitated by unforeseen breakdowns or damages such as repair of a ripped off or leaking roof was a common maintenance practice, preventive maintenance were not carried out at predetermined intervals or corresponding to prescribed criteria in their institutions rather it was emergency maintenance that was carried out by their institution, no scheduled maintenance at predetermined intervals of time, seasons or years of the building was a practice, and deferred maintenance on works which have been identified as necessary are usually put off due to lack of funds and maintenance are mostly done when a senior officer is given a new bungalow or posted to occupy a bungalow for the first time.

With regards to the current state of occupant's buildings; it was revealed that some of the lighting / electrical fittings, windows and door fans/frames, interior & exterior paintings buildings plumbing works (i.e. pipe water & toilet), some of their building verandas, water closets, floor tiles, septic tanks and stair ways or staircases were bad and needed urgent maintenance.

The second research question sought to examine whether there is a maintenance policy of public buildings by the selected institutions and it came out of the data that only 11% of the respondents indicated that they had maintenance policy for their buildings and the rest of them indicated that they had no idea or were not aware of maintenance policies by the maintenance departments of their institutions. Where they had maintenance policies even, 67% of them indicated that the maintenance departments do not undertake regular inspection and maintenance of buildings it was rather request of senior officers that are always used to generate estimates for repairs or maintenance based on the availability of funds and the officer involved.

The third objective of the study was to examine the deficiencies or challenges associated with the maintenance of public institution buildings within the study area. The results as presented in chapter four shows that 52.1% of the respondents indicated that lack of concern shown by clients and users as well as poor design habits and execution are major challenges of most public buildings.

The findings also revealed that about 51.0% of the respondents indicated that the non-availability of resources was the most maintenance deficiencies or challenge of public institutions, followed by the age of the building.

The findings further indicated that due to lack of education and no policy for occupants of public buildings to perform maintenance were some of the maintenance deficiencies / challenges.

Finally, the fourth research question sought to assess the appropriate maintenance culture or codes for the maintenance departments of public institutions. The results shows that; about 41.7% of the respondents indicated that there are no maintenance rules or codes by their institution and 46.9% of them had no idea whether there are maintenance rules of buildings by their institution.

Again, the results show that the selected institutions do not determine standards in qualitative and quantitative terms. They do not identify and specify the work necessary by compiling the information received on the condition of the building from inspectors and users with the standards laid down.

Respondents added that their institutions do not also estimate the cost of the work based on historic cost data obtained from within the organization, and that planning of inspections was not based on the rates of deterioration of the building elements by their institutions.

Concerning organizing and execution of work on whether to employ labour directly for the purpose or to engage an outside contractor about 58% of the respondents either strongly agree or agree to the point.

5.2 Conclusion

The following conclusions could be drawn from the study: there is no really appropriate maintenance culture or codes for the maintenance of public institution buildings, unplanned maintenance or maintenance works necessitated by unforeseen breakdowns or damages such as repair of a ripped off or leaking roof was a common maintenance practice due to lack of funds and maintenance are mostly done when a senior officer is given a new bungalow or posted to occupy a bungalow for the first time; the maintenance departments do not undertake regular inspection and maintenance of buildings, lack of concern shown by clients and users as well as poor design habits and execution are major challenges of most public buildings and due to lack of education and no policy for occupants of public buildings to perform maintenance were some of the maintenance deficiencies / challenges and finally there should be appropriate maintenance culture or codes for the maintenance departments of public institutions.

5.3 Recommendations

From the above findings and conclusions, the following recommendations have been made. The study recommended that preventive maintenance should be carried out at predetermined intervals or corresponding to prescribed criteria in their institutions rather than emergency maintenance or unplanned maintenance or maintenance works necessitated by unforeseen breakdowns such as repair of a ripped off or leaking roof.

Again it was recommended that the institutions should have maintenance policies for their buildings and the maintenance departments should undertake regular inspection and maintenance of buildings.

Furthermore, the study recommended that, there should be more education and enactment and enforcement of policies or laws for occupants of public buildings to perform certain maintenance works on some parts of their buildings and payment of rent by occupants should be used judiciously to maintain the buildings that public workers live in.

Finally there should be appropriate maintenance culture or codes for the maintenance departments of public institutions and that proper planning of inspections should be done based on the rates of deterioration of the building elements by the maintenance departments of the various institutions.

5.4 Suggestions for further Studies

The research recommends the following for future researchers who may wish to do further research on the topic under study;

In the researchers view, for future studies, the scope of the study should be broaden to capture more data thus by broadening the number of occupants of the public institutions within the study area.

The sample size of the study should also be increased to cover many occupants of public buildings in the study area and if possible to cover all occupants of public buildings in the Brong-Ahafo Region.

REFERENCES

- Adams, G.R. and Schaneveldt J.D (1985) *Understanding Research Methods*, New York: Longman Publishers
- Afranie, S. and Osei-Tutu, E. (1999a, 1999b). *Building Maintenance in Ghana*, Analyzing of Problems, Practices and policy. KNUST, Kumasi.
- Aha Bismark, Nyomah Nelson-Mandela, Dei Sekyi Benard and Asiedu Barbara Susuhwe (2012). *Maintenance Practices in Ghanaian Public institutions- The Case of Ghana Cocobod*, Kumasi, Department of Land Economy, KNUST, Kumasi, Ghana;
www.academia.edu/.../Maintenance_Practices_in_Ghanaian_Public_Instit...
- Alagidede, P. (2002). *Ghanaian and Maintenance Cultures*. Adansi Press. Accra.
- Alagidede, P. (2000). *Ghanaian and Maintenance Cultures*. Accra: Adansi Press.
- Baiden, B. K. (2006) *Framework for the Integration of the Project Delivery Team*. Unpublished Thesis (PhD), Loughborough University, United Kingdom
- Bernard, H.R. (2002) *Research Methods in Anthropology: Qualitative and Quantitative Methods*. 3rd ed. California: Alta Mira Press, Walnut Creek.
- Bryman, A. (2004b) *Qualitative Research on Leadership: A critical but Appreciative Review*, *Leadership Quarterly*, 15. pp. 729 -769
- British Standards Institution, BS 3811: (1984), *Glossary of General Terms used in Maintenance organization*. London.
- Burns, T., Beadsmore, A., Bhat, A., *et al* (1993) *A controlled trial of home-based acute psychiatric services. I. Clinical and social outcome*. *British Journal of Psychiatry*, 163, 49 -54.
- Clinton, R. (1994). *Principles of Planned Maintenance*. London: Edward Arnold: Publisher.
- Collis, J. and Hussey, R. (2003) *Business Research: A Practical Guide for*

Undergraduate and Postgraduate Students, 2nded, New York: Palgrave Macmillan.

Christou, E., Valachis, I. and Anastasiadou, C. (2008) *Research Methodology in Hospitality Industry: The role of the Inquiry Paradigm*. Available at: <http://www.ul.edu.lb/fthm/papers/3rd%20Axis/Methodology%20greece.doc> [Assessed on [04/04/2013]

Encyclopedia Britannica, (2013), *Replacement and Maintenance* Available at: <http://www.britannica.com/EBchecked/topic/682073/operations-research/68191> [Accessed on 11th September. 2013]

Hackman, J. and Osei-Tutu, E. (2008). *Building Maintenance*. KNUST, Kumasi. PP. 4-17

Iwuanyanwu, E. C. (1987), *Landed Assets Management and Maintenance Culture for Nigeria*. Paper presented at the 17th Annual Conference of Nigeria Institute of Estate Surveyors and Values.

Kvale, S. (1996). *Interviews. An introduction to qualitative research interviewing*.

Thousand Oaks: Sage.

Lee, R. (1987), *Building Maintenance Management Oxford U.K or Building Maintenance*, 3rd edition, Macmillan Press Ltd. Nottingham.

Lewis, J.L. & Sheppard, S.R.J. (2006) *Culture and Communication: Can Landscape Visualization Improve Forest Management Consultation With Indigenous Communities? Landscape and Urban Planning*, 77.pp.291–313

Melvin Eric. (1992) *Plan, Predict, Prevent. How to Reinvest in Public Buildings*.

Naoum, S.G. (1998) *Dissertation Research and Writing for Construction Students*.

Oxford: Bultermouth-Heinemom

Ogoe, E.K (1993) Decentralisation and Local Government Reforms in Ghana:

GNDC's Decentralisation Policies: the Case of Ahanta West District Assembly.

Available at <http://books.google.com.gh/books?id=xoFoMwEACAAJ> [Accessed 15th July, 2013]

Oppenheim, A. N. (2003) Questionnaire Design, Interviewing and Attitude

Measurement. New ed. London: Continuum International Publishing Group.

Owusu, A. (1991), 1986 Housing Statistics study Report, Building and Road research

Institute (BRRI) Kumasi.

Polit, D.F and Hungler, B.P (1999) Nursing Research: Principles and Methods. 6th Ed.

(Revised), London: Lippincott Williams & Wilkins

Polit, D. F. and Hungler, B. P. (1993) Essentials of Nursing Research: Methods,

Appraisals and Utilisation, 3rd ed. Philadelphia, Lippincott-Raven Publisher

Queensland Government, (2012) Maintenance Management Framework, Policy for the

Maintenance of Queensland Government buildings, Available at: www.hpw.qld.gov.au

[Accessed on 5th September. 2013]

Rea (1950), Urban Development in Britain, Cambridge University Press, London. P. 56.

RICS Practice Standards, (2009) Building Maintenance: Strategy, Planning and

Procurement, Guidance Note. 2nd edition, UK

Seeley, I. H. (1987). *Building Maintenance*, (3rd ed.). Nottingham: Macmillan Press Ltd..

Seeley, I. H. (1996). *Building Management*. Hong Kong: Macmillan Education Ltd.

Seelely, I. H. (1993), *Building Maintenance*. London, UK: The Macmillan Press.. p.11

Seeley, I, H. (1985). *Building Maintenance*, (2nd ed), London: Macmillan Press Ltd.

Stone, P. A. (1975). *Building Design Evaluation*. London: Cambridge Education Press,. P.56.

Tongoco, D.C. (2007) Purposive Sampling as a Tool for Informant Selection,

Enthobotany Research & Applications, 5,pp.147-158. Available at [http://hdl.](http://hdl.handle.net/10125/227)

[handle.net/10125/227](http://hdl.handle.net/10125/227)[Accessed on [04/04/2013]

Twumasi, P. A. (2001). *Social Research in Rural Communities*. 2nd ed Accra. Ghana

University Press

Wianwright and Wood (1991), Cost Estimate, Macmillan Education Press, London. P. 72, 73.

Wordsworth P. (2002), Lee's Building Maintenance Management. Black science.

Yin, R. K. (2003). Case Study Research: Design and Methods (3rd Ed.). Thousand

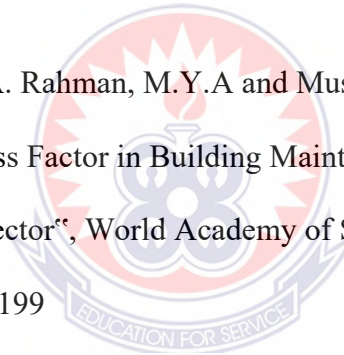
Oaks, CA: Sage Publication.

Zulkarnain, S.H, Zawawi, E.M.A. Rahman, M.Y.A and Mustafa, N.K.F. (2011) A

Review of Critical Success Factor in Building Maintenance Management

Practice for University Sector", World Academy of Science, Engineering and

Technology, 53, pp. 195-199



APPENDIX I

QUESTIONNAIRES FOR THE STAFF OF PUBLIC BUILDINGS

The researcher is a student at the University of Education, Kumasi campus who is seeking your views on the maintenance culture of public buildings in Ghana, using selected institutions within the Sunyani Municipality of Brong-Ahafo Region as a case study. Information provided will be treated with the utmost confidentiality.

Please tick [] the appropriate response(s) or give your views to the questions below:

Section A: General Data of Respondents

1. Sex of respondents

A. Male { } B. Female { }

2. How many years have you worked in your institution?

A. 1-4 years { } B. 5-8 years { } C. 9-12 years { } D. Above 12 years { }

3. How many years have you lived in this building?

A. 1-4 years { } B. 5-8 years { } C. 9-12 years { } D. Above 12 years { }

Section B: The Maintenance Culture and Condition of Public Buildings in the Sunyani Municipality

4. How important are the following on the way maintenance is carried out in your institution, using the scoring key: 1=Strongly Disagree, 2=Disagree, 3=Neutral 4=Agree and 5=Strongly Agree

Question Items	1	2	3	4	5
a) Planned Maintenance based on the life of the building, the standard to be achieved, the financial implications and the responsibility for maintenance.					
b) Unplanned Maintenance or maintenance works necessitated by unforeseen breakdowns or damages such as repair of a ripped off , leaking roof, or crack on the wall/foundation					
c) Preventive Maintenance carried out at predetermined intervals or corresponding to prescribed criteria					
d) Corrective Maintenance					
e) Emergency Maintenance					
f) Condition-based maintenance on routine or continuous monitoring.					
g) Scheduled Maintenance at predetermined intervals of time, number of operations, seasons or years of the building.					

h) Running Maintenance: which can be carried out whilst an item is being used such as the day-to-day cleaning of the building.					
i) Shutdown Maintenance: which can only be carried out after the building is evacuated or out of service.					
j) Deferred Maintenance: works which have been identified as necessary but put off due to lack of funds					

5. Which other way(s) is the maintenance of buildings carried out by your institution? (please specify).....

.....

.....

6. How would you rate the performance of your institution on how they respond to maintenance of buildings?



{ } Very good { } Good { } Bad { } Worse

7. Please indicate the state of the building that you currently occupy by choosing the appropriate option below:

Question items (Facilities of buildings)	Responses			
	Good	Better	Bad	Worst
1. Lighting/Electrical fittings state				
2. Roof, floor and ceiling state				
3. Foundation/wall state				
4. Window and door fans/frames state				
5. Interior Painting state				
6. Exterior Painting state				
7. Plumbing works (i.e. Piping for water & Toilet)				

8. Other areas of your building that needs maintenance attention not already stated? (Please specify)

.....

Section C: Maintenance policy for public buildings within the Sunyani Municipality

9. There is a maintenance policy for buildings in my institution? Yes No Not sure

10. Is there a maintenance department in your institution? Yes No

11. Does the maintenance department in your institution undertake regular inspection of buildings? Yes No Not sure

12. How is request for maintenance by occupants on their building handled by your maintenance department?

.....

13. Indicate the level of agreement with maintenance management in the following areas:

Question Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a) Resource allocation based on finance, staffing (both managerial and operative) and time.					
b) Performance requirements to technical standards					
c) Execution of the work between formulation of policy to indicate how maintenance work is to be executed stating who and how to do it					

d) Administrative activities- assessment of procedures necessary to administer maintenance operations by maintenance management.					
--	--	--	--	--	--



Section E: Maintenance Rules or Codes for Public Buildings within the Sunyani Municipality

17, There are maintenance rules of buildings by my institution

{ } Yes { } No { } Not sure

18. Choose the major maintenance decisions largely carried out by your institution. Read each statement and tick (✓) the appropriate response to the question using. 1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=strongly agree

Question Items	1	2	3	4	5
1) Determining Standard in qualitative and quantitative terms					
2) Identifying and specifying the work necessary by compiling the information received on the condition of the building from inspectors and users with the standards laid down					
3) Estimating the cost of the work based on historic cost data obtained from within the organization					
4) Planning inspections based on the rates of deterioration of the building elements					
5) Planning the work in respect of fixing appropriate start and finish times for the individual jobs					
6) Organizing the execution of the work on whether to employ labour directly for the purpose or to engage an outside contractor					

19. Other maintenance Rules or Codes for Public Buildings (please specify)

.....

.....



APPENDIX II

STRUCTURED INTERVIEW FOR MANAGEMENT OF PUBLIC BUILDINGS

The researcher is a student at the University of Education, Kumasi campus who is seeking your views on the role of maintenance culture of public buildings in Ghana. Using selected institutions within the Sunyani Municipality of Brong-Ahafo Region as a case study. Your confidentiality is guaranteed.

Please tick [] the appropriate response(s) or give your views to the questions below.

Section A: General Data of Respondents

1. Sex of respondents

A. Male { } B. Female { }

2. How many years have you worked in your institution?

A. 1-4 years { } B. 5-8 years { } C. 9-12 years { } D. above 12 years { }

3. What is your current position?

.....

4. How many years have you remained in your current position?

A. 1-4 years { } B. 5-8 years { } C. 9-12 years { } D. Above 12 years { }

Section B: The Maintenance Culture and Condition of Public Buildings in the Sunyani Municipality

5. How appropriate are the following on the way maintenance is carried out in your institution, using the scoring key: 1=Strongly Disagree, 2=Disagree, 3= Neutral 4=Agree and 5=Strongly Agree

Question Items	1	2	3	4	5
a) Planned Maintenance based on the life of the building, the standard to be achieved, the financial implications and the responsibility for maintenance.					
b) Unplanned Maintenance or maintenance works necessitated by unforeseen breakdowns or damages such as repair of a ripped off, leaking roof, or crack on the wall/foundation.					
c) Preventive Maintenance carried out at predetermined intervals or corresponding to prescribed criteria					
d) Corrective Maintenance					
e) Emergency Maintenance					
f) Condition-based maintenance on routine or continuous monitoring.					
g) Scheduled Maintenance at predetermined intervals of time, number of operations, seasons or years of the building,					

h) Running Maintenance: which can be carried out whilst an item is being used such as the day-to-day cleaning of the building.					
i) Shutdown Maintenance: which can only be carried out after the building is evacuated or out of service.					
j) Deferred Maintenance: works which have been identified as necessary but put off due to lack of funds					

6. Which other way(s) is/are the maintenance of buildings carried out by your institution?

(please specify).....

.....

.....



7. How would you rate the performance of your institution on how they respond to maintenance of buildings?

Very Good Good Bad Worse

8. Please indicate the state of the building that you currently occupy by choosing the appropriate option below:

Question items (Facilities of buildings)	Responses			
	Good	Better	Bad	Worst
1) Lighting/Electrical fittings state				
2) Roof, floor and ceiling state				
3) Foundation/wall state				
4) Window and door fans/frames state				
5) Interior Painting state				
6) Exterior Painting state				
7) Plumbing works (i.e. Piping for water & Toilet)				

9. Other areas of your building that needs maintenance attention not already stated? (Please specify)

.....

Section C: Maintenance policy for public buildings within the Sunyani Municipality

10. There is a maintenance policy for buildings in my institution? { } Yes { } No { } Not sure

11. Is there a maintenance department in your institution? { } Yes { } No

12. Does the maintenance department in your institution undertake regular inspection of buildings? { } Yes { } No { } Not sure

13. How is request for maintenance by occupants on their building handled by your maintenance department?

.....

14. Indicate the level of agreement with maintenance management in the following or all the areas:

Question Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
e) Resource allocation based on finance, staffing (both managerial and operative) and time.					
f) Performance requirements to technical standards					
g) Execution of the work; between formulation of policy to indicate how maintenance work is to be executed stating who and how to do it					

h) Administrative activities- assessment of procedures necessary to administer maintenance operations by maintenance management.					
--	--	--	--	--	--



Section D: The maintenance deficiencies/challenges of public institutions within the Sunyani Municipality

15. Lack of concern shown by clients and users as well as poor design habits and execution are major challenges of most public buildings?

Yes No Not sure

16. Which of the following are maintenance deficiencies/challenges of public institutions?

- Availability or non-availability of resources Urgency of the work
 The use of a building The age of the building
 Non-functioning maintenance staff

17. Other maintenance deficiencies/challenges of public institutions (please specify)?

.....
.....



Section E: Maintenance Rules or Codes for Public Buildings within the Sunyani Municipality

18, There are maintenance rules for buildings by my institution

{ } Yes { } No { } Not sure

19. Choose the major maintenance decisions largely carried out by your institution. Please Read each statement and tick (✓) the appropriate response to the question using; 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree

Question Items	1	2	3	4	5
7) Determining Standard in qualitative and quantitative terms					
8) Identifying and specifying the work necessary by compiling the information received on the condition of the building from inspectors and users with the standards laid down					
9) Estimating the cost of the work based on historic cost data obtained from within the organization					
10) Planning inspections based on the rates of deterioration of the building elements					
11) Planning the work in respect of fixing appropriate start and finish times for the individual jobs					

12) Organizing the execution of the work on whether to employ labour directly for the purpose or to engage an outside contractor					
--	--	--	--	--	--

20. Other maintenance Rules or Codes for Public Buildings (please specify)

.....

.....

