THE IMPEDIMENTS TO THE ACCOMPLISHMENT OF BUILDING MAINTENANCE TARGETS: A SURVEY OF THE PERCEPTION OF THE MAINTENANCE EXPERTS ON STATE BUILDINGS IN THE CITY OF NAIROBI, KENYA

RAPHAEL RAUF ODIDA OCHIENG

Lecturer / University Architect, Department of Construction Management, School of Engineering and Technology,

Jaramogi Oginga Odinga University of Science and Technology, Bondo, Kenya

ABSTRACT`

State buildings provide spaces, through which services to citizens are provided. State buildings, like all other buildings consequently require prompt and effective maintenance, to remain in reasonable condition to be able to offer quality services. In Kenya, and other third world countries, building maintenance targets are often not met, due to a number of impediments, leading to prolonged and un-checked deterioration of buildings. The aim of the study was, to assess key impediments that have contributed to non-accomplishment of maintenance targets, for public office buildings in Nairobi, Kenya. Secondary data, for they were obtained from internet sources, research journals, textbooks, facts and statistics from the Kenya Government. On the other hand, a qualitative cross-sectional survey research strategy, involving self-administered questionnaires were adopted, to obtain primary data based on perceptions of maintenance experts on impediments, that have contributed to non-accomplishment of maintenance targets. Content analysis was applied to analyze secondary data, while descriptive statistics was adopted to analyze primary data. The findings indicate that, lack of building maintenance policy and/or manual, irregular maintenance, inadequate budgetary allocation and non-effective maintenance approach are major impediments, in the accomplishment of maintenance targets. The findings from the study recommended, strategies for minimization or elimination of the major impediments, in the accomplishment of maintenance targets. The identified strategies would be adopted by policy makers, for the timely accomplishment of maintenance programs.

KEYWORDS: State Office Buildings, Building Maintenance & Impediments to Maintenance Targets

INTRODUCTION

State buildings provide space from where businesses of any government are transacted, with the functionality and quality of these built up spaces, depending on how well maintained these buildings are. According to Cane *et al* (1998) and White (1979), non-accomplishment of maintenance targets, leads to defect backlog with consequences, which include eminent equipment breakdown or building element/component failure. The desire to keep these spaces in acceptable standard, demands that periodic and routine maintenance activities are carried out, as programmed.

The ageing, use and exposure of buildings to the elements of weather, leads to deterioration which culminates in reduced performance. Maintenance work is crucial to restoring or improving parts of a building, its services and surroundings to acceptable standards, with the aim of sustaining performance (Adegoke, 2003). According to Idrus *et al* (2009), maintenance also increases the service life of a building, together with its elements, components and services. The role played by maintenance in sustaining and prolonging performance of state buildings, is therefore, of utmost importance.

State buildings are key built environment assets, that require to be maintained effectively and regularly, so as to continue to provide quality spaces for shelter and delivery of public services. Al-Hammad *et al* (1995), argues that, with the ever-increasing new buildings to the maintenance inventory, it is increasingly becoming difficult to cope with the enormous maintenance work scope. This is compounded by existing public buildings, that grow older day by day, increasing scope of defects and making it difficult to achieve maintenance targets.

This research paper therefore, focuses on the assessment of factors that impede on the accomplishment of maintenance targets, with a view to formulating appropriate strategies to minimize or eliminate them altogether.

OVERVIEW OF THE IMPEDIMENTS TO THE ACHIEVEMENT OF MAINTENANCE TARGETS

The effectiveness of maintenance approaches, adopted by various building maintenance entities has a direct bearing on the successes or failures of building maintenance programs. Conventional maintenance is an approach, widely practiced in the maintenance of public buildings in Kenya, and most other third world countries. This approach is corrective in nature and therefore, not planned, but just undertaken during breakdowns or when defects have arisen (Lateef, 2010). The second approach is planned preventive maintenance, which is a more proactive approach, with benefits of preventing unexpected equipment breakdown or building component failure, and could therefore, facilitate minimization of defect backlog (Alberta Infrastructure, 2004 and Okwemba, 1981). The third approach is the predictive system, based on a life cycle model, for predicting future maintenance requirements and costs/ timing for execution and is therefore, a tool for maintenance planning and budgeting, which is key in ensuring achievement of maintenance targets (Langivine*et al*, 2006 and Teo*et al,* 2006). The fourth approach is a system, that is derived from quality, functionality and cost which, according to Idrus*et al* (2009) and Lateef (2010), ensures optimal performance of a building, throughout its life cycle and therefore, could also play a significant role in promoting achievement of maintenance targets. Other modern maintenance approaches, with more proactive qualities have emerged and have mainly been adopted, for use in the developed world and include strategic asset management, as projected by Peterson (2007), total quality management as advanced by Lekan (2007) and facilitates management, a view point of Chanter and Swallow (2007). Maintenance approaches are diverse with applicability merits, and demerits depending on circumstances and therefore, a variable that could influence the achievement of maintenance, targets for state buildings.

Budget is a tool for planning and successful implementation of maintenance programs, for state buildings and is one of the variables that could determine the extent of achievement of maintenance targets. Various budget projection methods have been adopted, in the maintenance of buildings, the choice for which it has a critical bearing on the achievement of maintenance targets (Clifton, 1993). Each of the prediction methods has merits and demerits, depending on the circumstances at hand, calling for the need to assess applicability, before employing any one of the methods. A critical review of past studies by Shohet et al (2002), Roy et al (1996), Masters and Brandt (1987), Purvis et al (1992), Chiang' (1984) and Sayward (1984) indicate that, different methods of budget predictions have advantages and disadvantages, that could positively or negatively influence the achievement of maintenance targets. The choice of the prediction method will determine the accuracy of the budget forecasts and therefore, influence accomplishment or non-accomplishment of maintenance targets.

Inadequate funding allocation to finance, maintenance budgets as a variable is a common feature, in the public

sector and has prompted deferment of maintenance programs.

In the United Kingdom, one of the developed countries, Chanter and Swallow (2007), decrease the high proportion of costs of maintenance requirements, relative to the available budgetary allocation, while in Malaysia and Singapore, Lateef (2010), argues that, it is rare for budgetary allocations to match maintenance needs. Adenuga *et al* (2007), points out that, the low budgetary allocations for maintenance of state buildings in Nigeria, is a major factor for non-accomplishment of maintenance programs, a scenario that is also replicated in Kenya (Republic of Kenya, 2011). It therefore, follows that, inadequate and inaccurate maintenance budgets are recipes for non-accomplishment of maintenance targets.

Building maintenance policy and manual are tools, that facilitate efficiency/ effectiveness of any maintenance framework and ranks high as another variable, that could contribute to the achievement or non-achievement of maintenance targets. The Draft Maintenance Policy (Republic of Kenya, 2011), Bastidas (1998) and Okwemba (1981) indicate that, the two maintenance tools provide guidelines, standards, policies and actions, for systematic maintenance of state buildings. According to Lee and Scott (2009), the guidelines, standards and policies are meant to facilitate planning, budgeting, inspections and management structure, for effective delivery of maintenance services. The building maintenance policy and manual can therefore, provide a platform for successful management of maintenance programs.

The style of management adopted by any organization can either facilitate success or failure, of building maintenance programs. Management takes several forms, depending on the vision and mission of an organization (Sharma, 2000 and Robbins, 1998). The different management styles have advantages and disadvantages. The advantages could facilitate the effectiveness and efficiency, while the disadvantages could encourage ineffectiveness and inefficiency. For instance, Adenuga*et al* (2007), viewed state structure as bureaucratic and is therefore, riddled with un-desirable inflexibility and inefficiencies. Maintenance culture has been recognized as an important management aspect, which influence work performance. Lack of commitment from both the maintenance managers and staff, has contributed low quality of maintenance tasks undertaken, in addition to extensive delays in implementing maintenance programs (Sani SI *et al,* 2011; Republic of Kenya, 2011 and Adenuge*et al,* 2007). Lack of implementation of positive maintenance culture, is another management factor, that could immensely promote in-effectiveness and in-efficiency. Agencies that carry out maintenance, operate through defined organizational structures, which may enhance on stall effectiveness/ efficiency of maintenance strategies (Rijn, 2004). Effectiveness and efficiency means, doing the right thing first time (Svikis IL, 2003). It is therefore, logical to state that, the choice of management style, as a variable would influence the effectiveness and efficiency of the maintenance framework.

Globally, the public procurement systems have undergone tremendous reforms, since, the days of the traditional systems. The emergence of the smart procurement system in Britain (Taylor, 2003), and the enactment of various procurements acts, in Uganda, Tanzania and Kenya (Odhiambo and Kamau, 2003), are attempts to make the public procurement more proactive, to respond to the aspiration of the citizens of these nations. The execution of maintenance services in state office buildings, has indeed fallen under public procurement and is therefore, expected to benefit from any reform. The need for further reforms in the public procurement systems, is dictated by their performance, in response to accountability and transparency demands, from the public. Although, Kenya enacted the Public Procurement / Disposal Act (2005) and numerous amendment, it has not been able to deal with corruption and bureaucratic systems, adequately (Transparency International, 2007). These loopholes have seriously undermined the delivery of the national maintenance

and development programs, leading to major delays and cost overruns. Procurement is therefore, another critical variable in the achievement of maintenance targets.

The above critical maintenance accomplishment variables, have affected maintenance of public buildings in the developed and developing world, at different scales. While, the developed world has adopted better maintenance strategies, for public buildings, to achieve improved maintenance work accomplishment, the same is not true for the developing world. Idrus*et al* (2009) and Ishal*et al,* confirms this fact, by citing the situation in Malaysia, where maintenance targets cannot be met, mainly as a result of limited budgetary allocations and ineffective maintenance framework. Similarly, Lekan (2005) explains the sorry state of public buildings, in Nigeria, occasioned by the inability of maintenance managers, to accomplish maintenance targets. Consequently, in order to avoid the costly consequences of defect backlog, as a result of failure to accomplish maintenance targets, it is desirable that, the developing world responds appropriately with the variables, that have contributed to this state of affairs.

In Kenya, numerous shortcomings of the current maintenance framework, make it impossible to achieve maintenance targets. This is worsened by the fact that, the maintenance vote is only 17% of the development budget, coupled with the fact that, the building maintenance budgetary vote in the 2010/2011 fiscal year, was only 50%, of the corresponding estimated cost of the budgetary requirements (Republic of Kenya, 2010). Other major impediments to the non-achievement of maintenance targets include, delayed release of maintenance funds, moribund maintenance depots, low capacity of maintenance units, bureaucratic management systems, lengthy/corrupt procurement practices and the non-existence of a maintenance policy/ manual. State office buildings in Nairobi, the capital city of Kenya is therefore, in poor and deplorable conditions, due to inadequate maintenance. As a result of this state of affairs, defect backlog, due to non-accomplishment of maintenance targets keeps on piling up, every year. For instance, in 2010/2011 fiscal year, no government ministry or department was able to accomplish maintenance targets, only 33% achieved more than 50%, of the programmed maintenance work scope (Ochieng, 2012). The uncontrolled buildup of defects, if not addressed in time may lead to costly consequences, which include equipment breakdowns, building element/component failures and to the extent of total collapse.

The review of literature has identified the impediments, to the accomplishment of maintenance targets that include; lack of building maintenance policy/ manual, irregular maintenance, inadequate budgetary allocation, non-effective maintenance approach, poor supervision, inappropriate material specification, inappropriate procurement system, low capacity of maintenance units and negative attitude of users. The next section outlines, the methodological procedure that was adopted for the study.

RESEARCH METHOLOGY

The research strategy was qualitative, based on a cross sectional survey of responses, from the sampled maintenance experts, across the public service. Ninety (90) maintenance experts were selected, through a stratified random sampling technique, from a target population of one hundred and twenty (120) maintenance experts, working in various public entities. The sampling stratification was, through a proportionate representation of populations, from the Ministry of Works and Ministry of Housing and Parastatal Organizations. Primary research data, were collected from sampled maintenance experts, through structured questionnaires, which were designed in a Likert scale of 1 in 4. The perceptions were rated as insignificant, moderately significant, significant and very significant. Secondary data, were collected through

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a review of journal articles, textbooks, internet sources, Kenya government printer publications and records from the Ministries of Public Works and Housing. Raw data from the field were categorized and tabulated, prior to the analysis.

Ten (10) hypothesized independent variables, that theoretically impede accomplishment of maintenance targets, were derived from the review of literature and experience, from the researcher's professional background, as an architect. The dependent variable was non-accomplishment of maintenance targets. The perceptions of maintenance experts, on these variables were ranked, using mean item scores, generated through version 17 of the Statistical Program for Social Sciences (SPSS). The next section displays, analyzes and discusses primary data, with a view of determining the significant impediments, to the achievement of maintenance targets for state office buildings.

RESULTS AND DISCUSSIONS

The data collected from the field survey were categorized and converted into tables, pie-charts and bar charts, to facilitate descriptive statistical analysis. The preliminary items of the study focused on response rate, that influences level of reliability of research data. The results indicate 82% response, justifying the representativeness of the data and therefore, minimizes errors. Questionnaire enquiries were made, to establish the profiles of the sampled respondents. The results indicate that, 87.8% of the respondents were Architects, Engineers, Quantity surveyors and Building Surveyors, who were all knowledgeable in the field of building maintenance, enhancing the accuracy of the results obtained. The rest categorized as others, formed only 12.2% and included technicians, who work closely with the above professionals and have expansive experience. Relevant qualifications, enhance the quality of responses and therefore, the accuracy of the research findings. Table 1, shows professional qualifications of the respondents.

Table 1: Professional Qualification of the Respondents

Profession					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Architect	26	35.1	35.1	35.1
	Engineer	21	28.4	28.4	63.5
	Building Surveyor	1	1.4	1.4	64.9
	Quantity Surveyor	17	23.0	23.0	87.8
	Others	9	12.2	12.2	100.0
	Total	74	100.0	100.0	

Further, questionnaire enquiries were made, to establish the level of experience of the respondents. The results indicated that, the respondents with experience of below three (3) years, were only seven (7) out of seventy-four (74), representing 9.5% showing that, the majority of the respondents were experienced enough and therefore, understood well building maintenance systems and structures, in state office buildings. Just like relevant qualifications, experience of the respondent on the subject of study, improves on the reliability of data. Table 2, indicates Professional experience of the respondents.

Table 2: Professional Experience of the Respondents

Professional Experience					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Below 3 years	7	9.5	9.5	9.5
	4-7 years	8	10.8	10.8	20.3
	8-11 years	6	8.1	8.1	28.4

Table 2: Contd.,				
12-15 years	10	13.5	13.5	41.9
Above 16 years	43	58.1	58.1	100.0
Total	74	100.0	100.0	

The professionals interviewed in this study, were mainly from the ministry of public works, at 79.7%, followed by those from the ministry of housing, at 17.6%. The remaining professionals, represented by 2.7% were drawn from state corporations and parastatals. The sample population was therefore, majorly drawn from the two government ministries, who are mandated to carry out maintenance of public buildings, through the Presidential Circular No. 1 of year 2008, specifying the mandate and functions of government ministries and departments. This was intentional, to enhance the level of accuracy of the research findings. The proportions of maintenance experts, in various state ministries and corporations/ parastatals, are represented as a pie-chart and shown below, in Figure 1.
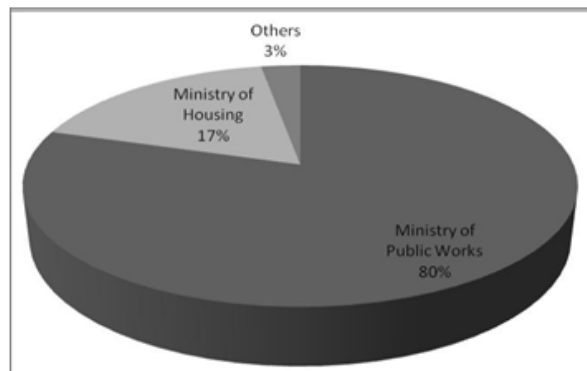

Figure 1: Deployment of the Respondents

Ten (10) hypothesized variables were ranked, on a Likert scale of 1 in 4, to establish their level of significance, on the impediment of accomplishment of maintenance targets. The ranking was based on perceptions from maintenance experts, sampled from the public service. The rankings of the perceptions were assigned numerical weightings as follows: not significant-1, moderately significant-2, significant-3 and very significant-4. The lack of building maintenance policy/ manual was ranked the most significant variable, at a mean item score of 3.98. This was followed closely, by irregular maintenance at 3.84, inadequate budgetary allocation in 3.82 and non-effective maintenance approach, in 3.65 as significant variables, contributing to non-accomplishment of maintenance targets. The other variables, including poor supervision at 3.31, inappropriate material specification at 3.18, inappropriate procurement system at 3.14, low capacity of maintenance units of 3.07 and negative attitude of users in 2.62, were ranked as moderately significant, in contributing to non-accomplishment of maintenance targets. Management problems were less significant at 2.43. The rankings were represented in a bar chart form, as indicated below in Figure 2.
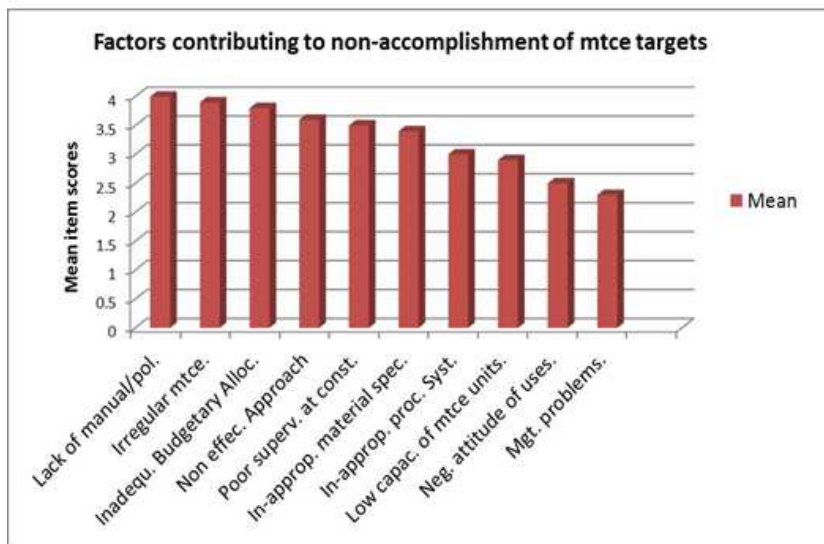
Figure 2: Ranking of Variables that contribute to the non - accomplishment of Maintenance Targets

The building maintenance policy/ manual, set guidelines standards and strategies, for executing maintenance programs, which are the key to the achievement of maintenance targets. This view point is projected by the Republic of Kenya (2011), Bastidas (1998) and Okwemba (1981), who view maintenance policy and manual, as tools for facilitating efficiency and effectiveness of any maintenance framework. The findings from the study has ranked this variable, as the most critical impediment to accomplishment of maintenance targets which agrees well with the past studies cited above. It is necessary that appropriate maintenance policy/ manual, are reformed to streamline maintenance operations, for effectiveness and efficiency. The developed world has succeeded in meeting maintenance targets, through numerous reforms that focus on maintenance policy / manual.

In addition, many agencies, managing maintenance programs for state buildings, have not performed well, as a result of failure of governments, to allocate sufficient budgetary allocation. This is indeed true, as Lateef (2010) argues that, the budgetary allocations for maintaining public buildings in Malaysia and Singapore are so low that, there is a need to re-invent and adopt a different approach to maintenance. Adenuga (2007) and the Republic of Kenya (2011), cite similar circumstances in Nigeria and Kenya, respectively. Past findings therefore, agree with the study findings that, in-adequate budgetary allocation can adversely affect achievement of maintenance targets.

Maintenance approach can either be proactive or reactive and therefore, as shown by these findings, it can curtail or enhance efficiency and effectiveness. Lateef (2010), argues that, the conventional maintenance approach practiced in Malaysia is corrective in nature, and only undertaken, when an equipment breaks down or when a defect occurs and therefore, is in favor of an alternative approach, based on value principles. The scenario is largely replicated in the Kenyan situation, where maintenance is not planned, but just executed on the condition of the building (Republic of Kenya, 2011). As established by the investigation, lack of effective maintenance approach is one of the key variables, that impede achievement of maintenance targets, calling for re-inventing and adopting an alternative maintenance approach.

Regular maintenance is a significant factor, that enhances the accomplishment of maintenance targets. Cane *et al* (1998) and White (1979), argue that, lack of regular maintenance contributes to defect backlog, with consequences of the eminent equipment breakdown, or building component failure, or to the extent of structural failure and collapse. In line

with the study findings, lack of regular maintenance is therefore, another significant variable that impedes accomplishment of maintenance targets.

CONCLUSION AND RECOMMENDATIONS

Identification of variables, that impede accomplishment of maintenance targets is a key, in prioritizing them for minimization or elimination. From the study findings, it can therefore, be deduced that, lack of building maintenance policy/manual, irregular maintenance, inadequate budgetary allocation and non-effective maintenance approach, were the most significant impediments, to the accomplishment of maintenance targets. On the other hand, poor supervision, inappropriate materials specifications, inappropriate procurement system, low capacity of the maintenance units and negative attitude of users, were moderate impediments to the accomplishment of maintenance targets. Appropriate strategies should therefore, be put in place to manage the significant impediments.

It is therefore, recommended as follows: -

- Formulate appropriate maintenance policy and manual anchored in a solid, legal and institutional framework, to guide the maintenance of public office buildings.

- Plan for optimizing resources, to have maintenance activities carried out regularly.

- Develop an appropriate maintenance cost minimization strategy, to be able to achieve more with the available funding allocations.

- Adopt an effective alternative maintenance approach to building maintenance, with short, medium and long term planned/preventive maintenance strategies, to guide the maintenance of public office buildings.

It is therefore, necessary that, an effective and efficient maintenance framework, that incorporates the above recommendations is developed. An appropriate maintenance framework, should manage the impacts of the four factors, to ensure maintenance programs are accomplished as programmed and within a set time frame, and optimizing budgets. Further research should be directed on the formulation of appropriate strategies, to address the impacts of the critical factors. The findings will aid maintenance policy makers formulate policies, that can guarantee the accomplishment of maintenance targets, for state office buildings.

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