

A CONCEPT: STRATEGIC MAINTENANCE MANAGEMENT FOR BUILT FACILITIES OF UNIVERSITIES

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Abstract

The built facilities of universities are essential facilities that are procured to support smooth administration of the primary functions of the institutions, which is the dissemination of specialist knowledge that will boost development of human capital. However, the degree of deterioration of built facilities at many educational institutions, including universities has been hinged majorly on ineffective maintenance management systems. To address problems related to ineffective maintenance systems, a strategic approach to maintenance management has been suggested by researches in the maintenance related fields both in the building construction and the manufacturing industries. This paper provides an understanding of the concept of maintenance management of built facilities using the strategic management approach. The methodology adapted for this investigation was basically an intensive literature review of related publications that underpin the theories and concepts of maintenance and strategic management. The exercise enabled an indepth understanding of the importance of strategic management principles towards achieving an effective maintenance management system for built facilities. The articulated concepts and principles from the existing theories of which maintenance management is imbedded informed the concept of strategic maintenance management which is needful for managing the esteemed built facilities of universities. The paper recommends the integration strategic maintenance management principles in the development of a maintenance management system by maintenance management unit/department of universities.

Keywords: Maintenance management, Strategic management, Built facilities, Universities

1 Introduction

Maintaining built facilities in best possible condition on a university campus is important for the well-being of the staff and students that use or occupy these facilities (Iyagba, 2005). Maintaining buildings is an optimum initiative and intervention for preserving and supporting the values of the built environment and the entire community (Dann *et al.*, 2005; Idrus *et al.*, 2009).

Unfortunately, maintenance of buildings and incorporated facilities in many organisations including universities is perceived to be of less important as compared to construction or procuring new facilities (Cleote, 2002). However, maintenance has a major influence on the reliability and safety of buildings (Abdul Lateef *et al.*, 2010), therefore, well defined strategies are vital for maintaining all facilities in the best condition possible (Buys and Nkado, 2006),

that will create a conducive environment for academic activities which is the prime function on any university campus.

The consequences of neglecting maintenance in the built environment are less visible in the short-term, and as a result, management groups short-sightedly cut down maintenance budgets (Mc Duling *et al.*, 2004). In the United Kingdom (UK), Chanter and Swallow (2007) have observed a decline in the condition of built assets of educational institutions since the early 1980s, which they hinged on resource constraints. According to Adenuga *et al.* (2010) the United Nations (UN) Centre for Human Settlements found that many Developing Countries (DCs) lack effective maintenance management systems for the efficient utilisation of available resources. In addition, Bowazi and Buys (2009) observed that these DCs lack adequate maintenance policies to guide the maintenance operations of their built environments. Cloete (2002) also found that information on the current condition and maintenance requirements are inaccurate and unreliable. Furthermore, maintenance management is not a strategic issue at most tertiary educational institutions in South Africa (Buys and Nkado, 2006).

2 Overview of the Concept of Maintenance

Maintenance is a key support function in building performance and it deserves a strategic position in the management structure in an organisation (Abdul Lateef, Khamidi and Idrus, 2010; Olanrewaju, 2013) because it ensures that the functional, structural and aesthetic conditions of the built facilities are upheld throughout their service life (Waziri and Vanduhe, 2013). In so doing, safety of occupants/users would be enhanced, and the quality of life of the community would be improved. However, the concept of the term ‘Maintenance’ has evolved from a non-core but integral production function in manufacturing to a strategic management function (Pintelon and Parodi-Herz, 2008). The evolution of maintenance is believed to be influenced by the changes in concept of maintenance function due to a steady growth in the realisation of its importance to achieving core goal of an organisation. Dunn (2003) argues that changes in the expectations of maintenance are linked to the perceptions about failure patterns of facilities and that these perceptions determines the maintenance approach that are adapted by managers. Dunn (2003) described four generations of maintenance perceptions and expectations over six decades (1940-2000). A summary of the decennial analysis is presented on Table 1.

Table 1. Concepts and expectation of maintenance

Generation	Concept	Expectation
the 1940s “Necessary evil”	“Fix after it breaks”	“All wear out.”
1960s “Technical matter”	Fix before it breaks” predict, plan, conscious of cost	Higher equipment availability Lower equipment life Lower maintenance cost
1980-1990s “Important for production”	Improve it” Value focus (minimise defects, improve precision, redesign)	Higher equipment availability & reliability Safety, product quality longer equipment life & cost efficiency
2000 “Strategic issue”	“Optimisation” Maintenance management (align vision, integrate skills, improve performance)	Excellence

(Source: Dunn, 2003)

2.1 First and Second Generation (Necessary Evil - Technical Matter)

In the first generation (1940s) the maintenance approach was mainly fundamental repair skills because facilities were expected to be fixed only when a failure occurs. This view changed in the 1960s because of a growing realisation that the life span of facilities could be increased which implies that the facilities could be used effectively and efficiently for a longer period. The need for cost reduction of maintenance activities informed the ushered in the second generation. In addition, the cost of maintenance is reduced. Thus, the maintenance approach for facilities generation that characterise the second generation of maintenance focuses majorly on scheduled overhauls, employing management techniques such as Program Evaluation and Review Technique (PERT) for planning and controlling the maintenance operations.

2.2 Third Generation (Technical Matter - Necessary for Productivity)

The early 1980s to the late 1990s witnessed another change in the concept and practice of maintenance management in many industries. Main changes in the expectations of maintenance that characterised the third generation (in addition to the second generation perspectives) are: the need for greater safety, reliability, a growing consciousness of sustainable environment and improvement in the quality of production. The focus was not only on availability but also on reliability. The pattern of failure by Nowlan and Heap (1978) known as the 'PF-curve' which is believed to have ushered in the concept of Reliability Centred Maintenance (RCM). The 'PF' concept is applicable to any facility, the 'P' represents part of the facility (likely failure point) is observed using a condition monitoring method, which enables identification of an impending failure. 'F' refers to the failure point as the letter suggests (Sondalini, 2007). RCM, focuses on sustaining the functionality of the facility while maximising its availability and reliability. The maintenance approach in the third generation which is the RCM concerns itself with condition monitoring, maintainability and reliability and considered at design stage of a facility that is achievable with teamwork and empowerment (Smith, 1993).

2.3 Fourth Generation (Necessity for Productivity - Strategic Issue in an Organisation)

Towards the end of the 1990s and early 2000, the concept of the term maintenance of built facilities changed especially in the manufacturing industry. Reason for the change in concept has been attributed to the heavy reliance on mechanised or built facilities for production by many organisations of both goods and services (Murthy *et al.*, 2002). Maintenance during this period is considered a strategic issue that requires strategic management skills to aid the planning and execution of maintenance operation programmes. According to Pintelon and Parodi-Herz (2008), the concept of maintenance in the generation fourth is realistically perceived and valued by facilities owners, owing majorly to the rapid changes in the construction and manufacture of facilities (changes in technology). Technical approaches to maintenance without strategic planning skills was no longer effective and efficient. A rethink on the maintenance management system was inevitable. Many manufacturing organisations consider maintenance as an internal or external partner for success in pursuing prime goals (Lee and Scott, 2009b; Khazraei and Deuse, 2011; Selvik and Aven, 2011). Smith and Hinchcliffe (2004) argue that the maintenance approach of the fourth generation is an improvement on the RCM.

2.3.1 Principles of Strategic Maintenance Management

The term 'maintenance management' combines two important and distinct functions viz. operational and managerial. The range of skills required for operational functions is very different from those required for managerial input. The operational aspect requires purely technical skills, while the managerial deals with decision making, precisely "*what and how to decide*" (Pintelon and Parodi-Herz, 2008). However, maintenance personnel are more

concerned with technical issues and less concerned with strategic plans of the maintenance department and the strategic goals of an organisation (Lee and Scott, 2009b). Therefore, an understanding of the relationship between executive management at a strategic level and maintenance personnel at an operational level is important for effective management of facilities maintenance functions.

The operational function consists of various tasks to be executed in accordance with a maintenance policy (Marquez and Gupta, 2006). This is necessary for achieving the maintenance objectives as set by an organisation for maintaining a facility and its associated services (Abdul Lateef *et al.*, 2010). The basic tasks in this process are corrective or preventive operations; where the former refers to all activities undertaken after the occurrence of a failure, the latter refers to activities in anticipation of a failure occurring (McLean, 2009). The execution of maintenance tasks involves one or a combination of the following activities: Service, rectification or replacement (Buys, 2004; Olagunju, 2011).

3 Research Methodology

An intensive literature search was conducted with the aid of maintenance related published journal articles, books, conference papers and a few unpublished PhD thesis. The concept of a strategic maintenance management for universities was articulated from the concepts and principles of maintenance management for facilities from the reviewed literature.

4 Strategic Maintenance Management

Maintenance management has evolved from a stand-alone technical function to a multi-functional process that involves key management units (strategic and operations managements) of an organisation (Yahya and Ibrahim, 2010). Therefore, strategic management plays an important role in the strategic maintenance process.

According to Tse (2010) “Strategic management is a process that requires the input of top management’s analysis of the environment in which the organisation operates prior to formulating a strategy, as well as the plan for implementation and control of the strategy”. Strategic management is in the domain of executive management of a university. Its main function in relation to maintenance management is the formulation of maintenance policies that will guide maintenance managers in preparing programmes and choice of maintenance strategy (Lee and Scott, 2009a). A strategy is insufficient and has little or no value to an organisation without a strategic plan for deployment and implementation of resources as well as operations (Wells, 2000). Major roles and importance of strategic management include:

- i. it has a major influence on maintenance management processes in an organisation because the maintenance objectives must align with the main objectives of the organisation (Yahya and Ibrahim, 2010);
- ii. the position of a maintenance department within an organisation is dependent on the strategic objectives of that organisation and the importance it attaches to the condition of its buildings (Chanter and Swallow, 2007); and
- iii. strategic management guides the formulation of maintenance policy, determines the strategic direction, approves the budget and other necessary resources for maintenance management (Lee and Scott, 2009b).

A strategic maintenance management is a world class maintenance management method used by many industries for optimizing the valuable assets such as built facilities. The maintenance process is considered a cost efficient which enables focus on resource management for best return on investment and avoids intrusive maintenance, it adapts performance evaluation

techniques which produces results that aids strategic planning to improve maintenance strategies (Smith and Hinchcliffe, 2004).

5 Conclusion and Further Research

This paper presented an evolutionary perspective of maintenance especially in the manufacturing industry. Understanding the strategic stand point of maintenance management is the crux of the study, which has been achieved through theoretical search. In conclusion, the paper contends that a sustainable maintenance management approach for built facilities in a university must integrate strategic management. In so doing, facilities serve for a longer period with minimal maintenance cost and the safety of users/occupants is also enhanced. Therefore, strategic maintenance management is recommended as a key agenda for preserving valuable built facilities that universities procure to support their primary goal of human capital development. The paper suggest an empirical study of current maintenance management systems at universities to enable the development of a framework and model for sustainable maintenance of their built assets.

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