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Implementation of Effective Maintenance Management in Building Works

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ABSTRACT

All buildings need proper maintenance management hence the knowledge about building maintenance in this regard is very significant particularly during the diagnosing and building analyzing works. In general, maintenance means to hold, keep, sustain or preserve the building or structure to an acceptable standard, in which acceptable standard is defined as one which sustains the utility and value of the facility. While maintenance management should properly be regarded as describing how a system of maintenance effort could be organized to deal with the problems of building maintenance as whole. It will involve systematic approach in planning, organizing, monitoring and evaluating maintenance activities. This also means that financial considerations and techniques play a vital role in enacted a good maintenance management. A good maintenance management is able to preserve building in its initial stage, as far as practicable so that it effectively serves its purpose. Some of the main purposes of maintenance a building are to retaining value of investment of property and to presenting a good appearance. This paper will discuss some major components of building maintenance such as the vital issues in implementing building maintenance management, the important, aspect of occupant's satisfaction, and ways to improve building maintenance management holistically.

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INTRODUCTION

Some of the advantages of the involvement maintenance department in early stage are it would be able to check the practicability of the design details, the suitability of patent joint, anticipate leaks, staining, expansion joints and many other things that can prevent further defects in the future caused by miss-design [1]. In respect to what Armstrong stated, we can relate that good maintenance management usually depends at early stage of the building construction that is pre-design stage. At this stage, designer must be able to produce design that considering maintenance work such as route to maintenance access work, ability to maintenance inspection and etc [2].

However, if the buildings were constructed without considering maintenance aspects, demolishing are not the only choice if that buildings facing the defects and failures [3]. Instead, we can have proper maintenance management to correct the defects and failures in order to sustain and prolong the life of the buildings. Figure 1 shows the life cycle stages of building in general [4].

Maintenance is a continuous process of balancing services and costs, the manager work to get the tenants and preserve the physical condition of the property while minimizing operating expenses and improving the owner's margin of profit [5].

Efficient property maintenance demands an accurate assessment of the needs of the building and the number and kinds of personnel that will meet these needs. Following are the maintenance strategies [6] that are commonly applied in the plans:

- Breakdown Maintenance or Operate to Failure or Unplanned Maintenance
- Preventive or Scheduled Maintenance
- Predictive or Condition Based Maintenance
- Opportunity Maintenance
- Design out Maintenance

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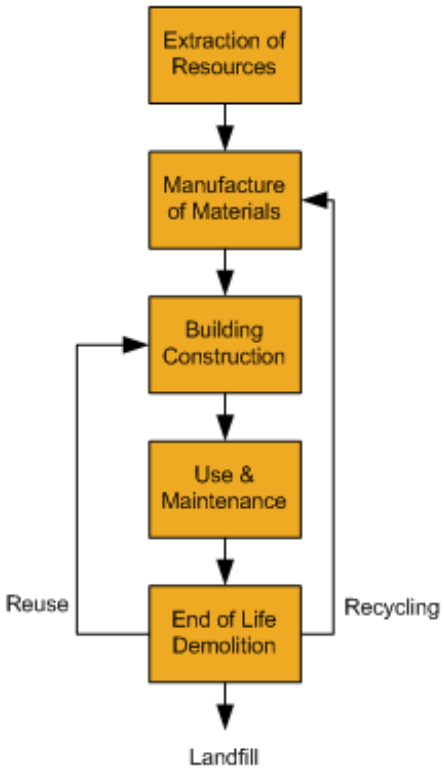

Fig. 1: Life cycle stages of building in general

Issues In Implementing The Maintenance Works:

i. Impact of Design on Maintenance Work:

Herbert (2010) said it is said that when working on difficult to maintain areas, some maintenance personnel may feel like the person who has just bought a new vehicle that, when it comes time to change the oil, leaves him scratching his head, wondering why the designers of the vehicle didn't make it a little easier to maintain. This problem is quite apparent on some buildings [7]. For example, some buildings do not have the catwalks that usually ease the maintenance on high bay light fittings. All too often, maintenance-friendly designs are sacrificed in the name of competitiveness or cost.

ii. Maintenance Financing:

Budget or cost allocated for maintenance works sometimes give Facility Department a big headache to implement the maintenance work. Many owners or higher administrative does not take maintenance as vital element in company budget or account. This kind of attitude make maintenance work does not get a very proper place in industry [8]. Maintenance financing in different organizations is still a very sensitive and often discussed question therefore it presents a very important cost item contributing to total manufacturing costs. Maintenance financing introduces permanent balancing between losses due to different down time of machines and equipment, lower quality of production etc. And total maintenance costs both during the given time interval (week, month, year etc.) [9]. Financial resources allocated to maintenance have their limits and constraints.

iii. First extreme, no maintenance (no maintenance costs):

If the organization allocates very limited resources to maintenance it is able to carry out only corrective maintenance because money and maintenance capacity for preventive maintenance will not be available. Under this condition the organization can produce and show a profit but it will be limited due to different occurring failures and consequent losses [10].

Further increasing money flow into maintenance enables that the organization can carry out not only corrective maintenance but also preventive maintenance which reduces the undesirable loss factors. If the organization achieves optimal ratio between preventive and corrective maintenance and uses preventive maintenance methods it will minimize all loss factors and maximize building performance effectiveness and its profit [11].

Eventually further rising money flow into maintenance will be oriented practically only into preventive maintenance. Large maintenance department capacity and large volumes of the preventive maintenance cannot further reduce the loss factors but will in fact cause more down time due to the very extensive preventive maintenance. Expected results of the maintenance financing policy will not be positive: building performance

Journal of Industrial Engineering Research, 1(4) July 2015, Pages: 17-22

will be decreasing and maintenance costs can exceed direct profit gain by owner. Figure 2 shows model of the systems development life cycle, highlighting all the vital maintenance phases [12].

Fig. 2: Model of the systems development life cycle, highlighting the important maintenance phases [12]

a) The second extreme:

Preventive maintenance will be carried out absolutely continually that causes permanent down time building maintenance (fabrics, structure and etc) and resulting production will be zero and profit changes into loss.

b) Maintenance needs:

The prime aim of maintenance is to preserve a building in its initial stage, as far as practicable, so that it effectively serves its purpose. However due to lack of awareness, many owners take easy step, and ignore the needs of maintenance practise in their office buildings.

Occupant's Satisfaction:

Comfortable building occupants are happy, healthy, and productive occupants. Occupant can regarded as following:

i. A person who resides or present in a house, vehicle or building etc. [13]

ii. Resident of a dwelling, piece of land, or premises, as its owner or tenant, or one who occupies a space in or on something. Privileges (such as easement) enjoyed by all other occupants, not matter how small space they occupy [14]

iii. Fulfilment of one's wishes, expectations, or needs, or the pleasure derived from this: "he smiled with satisfaction" [15]

iv. The fulfilment or gratification of a desire, need, or appetite OR Pleasure or contentment derived from such gratification or a source or means of gratification [16].

Understanding Why Maintenance Is Important:

There are four natures of maintenance work which is servicing, rectification, replacement and renovations [17].

i. Servicing:

Servicing is cleaning operations undertaken at regular intervals of vary frequency and is sometimes termed day to day maintenance. Typical frequencies could be:

- Floor swept daily and polished weekly
- Windows washed monthly
- Painting for decoration and protection every 5 years

ii. Rectification:

Rectification is discusses as activity occurs early in the life of the building and arises from default in design, inherent faults or unsuitability of components, damage of goods in transit or installation and incorrect assembly. Objective of rectification is to ensure that components and materials are suitable for their purpose and are correctly installed. With proper preventive maintenance, your elevating device can last 20 or more years before a modernization is necessary. Figure 3 shows the elevator life cycle in building maintenance work [18].

Journal of Industrial Engineering Research, 1(4) July 2015, Pages: 17-22

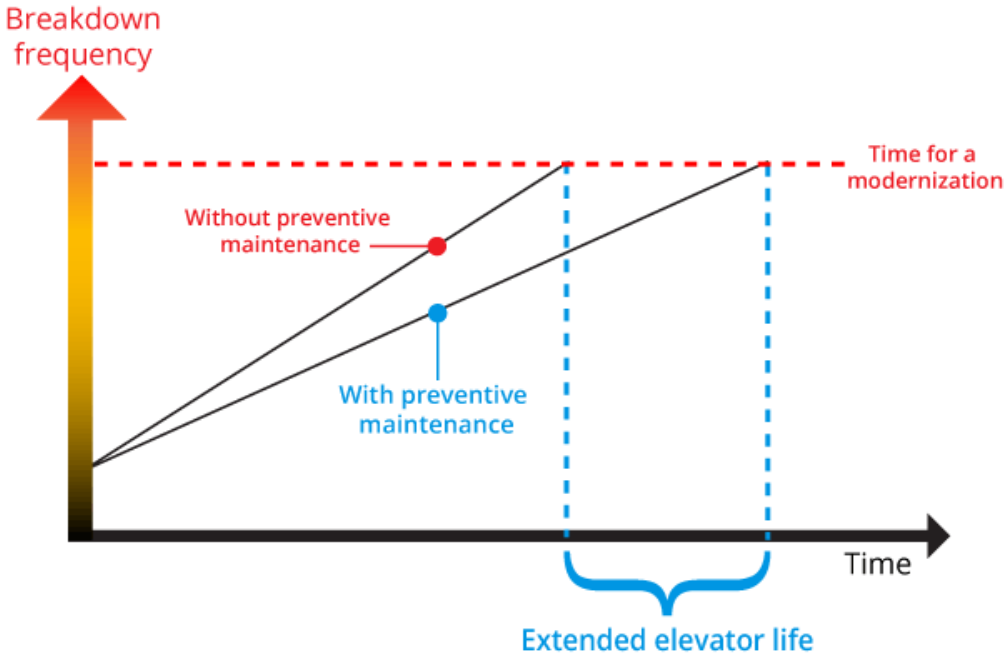

Fig. 3: Elevator life cycle in building maintenance work [18]

iii Replacement:

The replacement of construction material, component of building can be made if there the damage and the building cannot function as well. It is inevitable because service conditions cause materials to decay at different rates. Usually, most of replacement work is carried out not so much from physical breakdown of the materials or elements as from deterioration of appearance. Thus the length of acceptable life often involves a subjective judgment of aesthetics of change [19]. One of the biggest problem of judgment is we hardly cannot determine the durability or length of life of a materials; it is very difficult work to do. However, common methods used in observing are:

- Observing materials in building
- Simulated exposure or use

iv. Renovation:

Renovation stage consists of work done to restore a structure, service and equipment by a major overhaul to the original design and specification, or to improve on the original design. Retrofitting works includes all work designed either to expand the capacity of a facility or to enable the facility to perform some new function [20].

Good Reasons For Maintaining Buildings:

i. Preserving our heritage:

Preventative maintenance keeps up a building's appearance and extends its life. It also prevents the loss of original fabric, as less material is lost in regular, minimal and small-scale work than in extensive restoration projects.

ii. Preventing large repair bills:

Preventative maintenance makes economic sense as it may reduce or potentially eliminate the need for, and the extent of, major repair projects. Repairs can be disruptive and costly in terms of fabric and finances, so extending the period between repair campaigns by carrying out maintenance places less of a burden on community resources. A small but regular investment in tasks such as the routine cleaning of gutters and drains can be much cheaper and less inconvenient than having to cope with a serious outbreak of dry rot in timber roof trusses following years of neglect.

iii. Providing employment:

Practising maintenance can provide opportunities for employment as some maintenance tasks such as cleaning high-level gutters may require specially trained personnel and specialist equipment. The cyclical nature of maintenance is therefore a steady source of all year round work.

Improving Maintenance Management In Buildings:

When maintenance is tasked to be a business-building function it becomes necessary to adopt different views as to how maintenance and operations should be performed. Keeping equipment running in a condition to make quality product for the lowest production cost is the job of maintenance. Maintenance carries the responsibility to bring innovative methods and new technologies into a company and to use them to make the company more competitive.

According to Worthwords (2001) there are five categories interdisciplinary need to improve in maintenance management [21]:

i. Improve the financial capacity for maintenance management. The four elements to this question include managing finances to make services self supporting, determining the best roles of the three levels of government, evaluating tax and regulatory policies, and evaluating the results of privatization.

ii. Reduce constraints caused by codes, standards and incentive structures. The specific studies needed, according to that report, were an inventory of federal standards, an analysis of relationships between key federal standards and the related state, local, and professional standard areas; an evaluation of the likely impact of federal standards on the overall cost; and an analysis of the opportunity costs.

iii. Utilize new technologies and materials in management. In this field of technology, there are many opportunities to improve the cost effectiveness of services, including instruments to measure performance and predict failures, materials for construction and repair, use of information systems and models to locate problems, and making in situ repairs and tests.

iv. Adjust maintenance management of future pattern of living. Consider trade -offs, and where a level or service cannot be maintained, bite the bullet and reduce it.

v. Improve the processes of public works management. In this category four elements of the research problem appear: to improve the effectiveness of public works managers, to improve the processes of management, to use computer – based tools, and to encourage innovation in management.

Conclusion:

Maintenance means to hold, keep, sustain or preserve the building or structure to an acceptable standard, in which acceptable standard is defined as one which sustains the utility and value of the facility. While maintenance management should properly be regarded as describing how a system of maintenance effort could be organized to deal with the problems of building maintenance as whole. When the maintenance function is used to produce business-growth and success, it requires us to take-on new beliefs and paradigms about the way Operations and Maintenance need to work. Following the above five theories can increase the good in maintenance management, thus can decrease cost for future defects and failures.

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