Issues and Challenges in Implementation of Planned Maintenance

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Planned maintenance is one of the maintenance strategy used by building owners to ensure a building functions well. It is also the most effective maintenance approach in order to ensure a building operates and functions well at all times as well as reduces system failures. However, evidence shows that planned maintenance is not being implemented systematically.

The main purpose of this research was to identify the effectiveness of planned maintenance approach used by building owners in Malaysia. The methodology adapted includes identification of research problem, literature review, data collection, data analysis and conclusion. The research was conducted using qualitative measures. An interview was carried out with the building managers of A, B and C Shopping Complexes. Several issues and challenges were identified which include poor collection of maintenance fees, cost constraint, lack of maintenance personnel, maintenance personnel lack of knowledge and others. Findings in this research concluded that the issues and challenges identified affected the performance of planned maintenance. The issues are modern technology used, inadequate resources, insufficient budget allocated, attitude of maintenance personnel and poor collection of maintenance fees.
1. Introduction

The building maintenance industry is growing rapidly and increasingly globalised recently. According to Lateef et al. (2008), a building is an asset where its values will be altered consistent to the value of maintenance invested in them. Lee and Scott (2008) claimed that planned maintenance makes too early and unnecessary replacement. This is agreed by Wood (2005) and claimed that Planned Preventive Maintenance (PPM) failed to make best use of each component and thus, not cost-effective. In addition, it is the lack of empirical data to support the effectiveness of planned maintenance (Lee and Scott, 2008).

Baek (2007) stated that the rapid growth of modern technology may result in the products becoming more and more complex which require better quality and higher reliability. Indirectly, the cost of Planned Preventive Maintenance (PPM) increased. This may affect the decision of the owner of the building to carry out planned maintenance as the cost becomes higher and complex technology may affect the schedule of planned maintenance. Based on all of the statements above, it is undeniable that planned maintenance faces several issues and challenges. This will be able to assist building managers to familiarise on the issues and challenges that may arise and the need to mitigate them in the future in order to ensure a building operates and functions well at all time as well as reduce system failures.

2. Issues and challenges in implementing planned maintenance

Through literatures, several issues and challenges were identified which are stated as follows:

(a) Building owner claimed planned maintenance is ineffective

It was claimed that planned maintenance failed to make the best use of each component and thus, it is not cost-effective (Wood, 2005). Lee and Scott (2008) also agreed that planned maintenance is considered an ineffective way out since it makes too early and unnecessary replacement. Lee and Scott (2008) further stated that the study about the effectiveness of Planned Preventive Maintenance (PPM) with empirical data is lacking and incomplete.

(b) Technology complexity

Baek (2007) stated that the rapid growth of modern technology may result in the products becoming more and more complex which require better quality and higher reliability. Indirectly, the cost of preventive maintenance increased.

(c) Inadequate resources

Top management also challenges maintenance as wastage of maintenance resources. (Lee and Scott, 2008, Lam, 2008; Tse, 2002). Lee and Scott (2008) also stated that it is identified that maintenance work go beyond budgets but maintenance personnel at the operational level find it difficult to obtain adequate maintenance resources in planning maintenance works. As the result, some studies that had been carried out claimed that the approved maintenance resources cannot meet with the maintenance requirements (Lam, 2000 and Tse, 2002). Furthermore, the allocation of maintenance resources is often not in priority of an organisation and may bring impacts on the health and safety issues.

(d) Insufficient maintenance budget

Tse (2002) highlighted that the operational maintenance team always argue that the maintenance budget is always below the needs and requirements. This issue is worsened when top management criticises the ineffectiveness of the maintenance approach which contributes to wastage. As a result, more resources become difficult to obtain. Olibudun and Mole (1999) stated that "maintenance is budget oriented rather than needs-oriented" which led to deduction that maintenance will only be carried out when and where maintenance is required and at the same time, adequate funding exists. In addition, El-Haram and Horner (2002) highlighted that there are delays in carrying out maintenance work because the budget allocated is not sufficient to cover the needs for maintenance.

(e) Attitude of maintenance personnel

Lee and Scott (2008) noted that maintenance personnel are too dependent on technology and lack the understanding of management and operational framework. As a result, the importance related to human dimensions and the relation between buildings and the users are neglected. Similarly, Wood (2003) agreed that the maintenance personnel are too dependent on technical knowledge and experience which may affect the performance of the building.

(f) Poor collection of maintenance fees

Lateef (2008) pointed out that the most problematic issue faced by property developers in Malaysia was the poor collection of maintenance fees as the users were not satisfied with the condition of their building. If the users do not pay sufficient maintenance fees, it is difficult for the maintenance personnel to carry out maintenance work according to the schedule as it lacks funding.

3. Research Methodology

The research was conducted using qualitative measures. Ali (2009) stated that this method of analysis has been used by Ali et al. (2010) and Arditi (1999). Qualitative data are data that explain and describe something by using words rather than numbers. An interview was carried out with the respondents who are building managers. Building managers are the target for this research because they have knowledge and understand the technical and administration of building maintenance well. In this sense, they have wide experience relating to building maintenance.

The case studies selected are shopping complexes in the Klang Valley that practice planned maintenance. These buildings are selected to identify problems faced by building owners in implementing planned maintenance approach. At the same time, maintenance performance of the building is evaluated. There are three buildings selected in this research. For the purpose of publication of this paper and confidential issue, the authors have tagged the case study buildings as A Complex, B Complex and C Complex. The information obtained from the interviews were analysed and discussed. Finally, a conclusion is made to tie up the objectives.
4. Data analysis and discussion

The selected buildings for this discussion are A Complex located in Kuala Lumpur which is one of the first shopping malls in Malaysia, B Complex and C Complex. These buildings are chosen because the three buildings function as shopping malls thus the functionality and condition of the building and its facilities are very essential in order to make the customers and the users feel comfortable.

Based on Table 2, A Complex is the second oldest building among the three buildings. But, there are more approaches adopted in implementing planned maintenance such as carrying out maintenance work according to the schedule, fill in the checklist during monitoring and inspection work, evaluate the performance of outsourced contractor and follow the procedure for every inspection and repair work. It is vital to evaluate the performance of the outsourced contractor in order to ensure that they carry out work in a proper manner and the items are maintained in an optimum condition. In addition, the maintenance company in charged also adopted Key Performance Indicator (KPIs) to measure the performance of the maintenance. There are several objectives formulated and maintenance performance is measured according to the frequency. This is to ensure that the maintenance work carried out achieved the objectives and follow procedures. Indirectly, the performance of maintenance can be increased as all work carried out are in the correct way and at the correct time.

Planned maintenance is also the most effective maintenance approach in order to ensure a building operates and functions well at all times as well as reduces system failures.

Table 2: Comparison of Three Selected Case Studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Building Age</td>
<td>36 years (Completed 1975)</td>
<td>37 years (Completed 1974)</td>
<td>14 years (Completed 1997)</td>
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</tbody>
</table>
| 2   | Ways in which planned maintenance were carried out | -According to the schedule
-Fill in the checklist during monitoring and inspection
-Evaluate the performance of outsourced contractor
-Every inspection and repair work must follow procedure | -According to the schedule
-Fill in the checklist during monitoring and inspection | -According to the schedule |
| 3   | Maintenance performance approach          | Key Performance Indicators (KPIs) | Key Performance Indicators (KPIs) | - |
| 4   | Facility Condition Index (FCI) for chillers | 0.05 %                | 1.13 %                | 3.00 %                |
| 5   | Year of replacement of chillers           | 2011                  | 2011                  | -                     |
| 6   | Failure frequency                         | Daily                 | Once in a month       | Daily                 |
| 7   | Issues and challenges faced               | - Building age causing a lot of unpredictable failures
-Some of the component in the building is still operating manually causing problems when applying advance technology to the building
-Cost constraint as many parts of the building is connected and if any parts need to replace, the whole set needs to be replaced. | - Building age causing many unnecessary failures
-Lack of in-house maintenance personnel
-Lack of knowledge on how proper planned maintenance should be carried out | - Collection of maintenance fees because some tenant refuse to pay
-Modern technology makes the maintenance process more efficiently but it increases the cost of maintenance
-Drag on maintenance work due to too many procedure to follow |
Findings conclude that the issues and challenges identified affected the performance of planned maintenance.

On the other hand, although B Complex is the oldest building, the planned maintenance approaches are not comprehensive. As the building gets older, the need for maintenance work increases as the functionality of the part or services of the building decreases. B Complex lacked in-house maintenance personnel as there are only five staff available and therefore, the maintenance work carried out is limited. In addition, the maintenance personnel lacked knowledge of the proper way to carry out planned maintenance. Although they carried out maintenance work according to the schedule, all work done is based on knowledge and not in accordance to procedure. As a result, the maintenance performance of the building is not good as there is lack of labour and resources in implementing planned maintenance. Therefore, it is proven that the issues and challenges occur may affect the performance of planned maintenance.

Although C Complex is the newest building of the three buildings, the planned maintenance approach is not comprehensive. There is no maintenance performance measurement approach in evaluating the performance of building maintenance. It is most probably because the building age is not that old therefore, the maintenance personnel thinks that the maintenance work carried out is sufficient to maintain the condition of the building. It is a wrong perception as maintenance performance needs to be increased in order to make the building perform well and becomes more cost effective.

In addition, the main issue faced by the management of C Complex is the uncooperative owners’ refusal to pay the maintenance fees. Some tenants feel that they seldom use the facilities provided and therefore, they do not need to pay any maintenance fees. There are also some tenants who are too busy and forget to pay the maintenance fees. As a result, there are insufficient funds for maintenance work. This may also affect the performance of planned maintenance as there is insufficient fund to carry out maintenance work accordingly. As discussed above, issues and challenges occur may affect the performance of planned maintenance but in contrast, bad maintenance performance may create issues in implementing planned maintenance as well.

In the aspect of Facility Condition Index (FCI) for chillers of the three buildings, A Complex achieved the lowest whereas, C Complex had the highest. The lower the FCI, the better is the condition of a facility. The FCI of chillers for A Complex and B Complex are lower compared to C Complex because the chillers of A and B Complexes have been replaced in the previous year therefore, the condition of the facility is better.

There are failures of components or parts of building occurring daily for A and Complexes but the failure frequency for B Complex is the lowest. This is most probably due to low occupancy for B Complex. As the number of occupants for building increases, the usage of the facilities and services will be higher and therefore, the probability of failure occurring will be higher.

If the performance of planned maintenance is not good, it may cause many customers and users to complaint. The failure frequency of A and C Complexes is high and definitely, the number of complaints received will also increase. If the failure frequency is high, the maintenance performance will be affected as some staff need to be on standby to attend to the complaint and fix the fault. This may cause the tenants dissatisfactory with the condition of the building and it may cause them to pay the maintenance fees unwillingly. Without maintenance fees from the tenant, planned maintenance cannot be carried out as there is insufficient amount of money.

The data collection from the three selected case studies identified that there are several issues and challenges from these studies which are similar to the literature review, they are as follows:

(a) Technology Complexity

This issue was identified at A Complex as some of the components in the building are still operating manually causing many problems when applying advance technology to the building. If the building applies modern technology to maintenance work, it may cost a lot of money. In addition, respondent from C Complex also stated that modern technology makes the maintenance process more efficient but it increase the cost of maintenance.

(b) Inadequate resources

B Complex lacks in-house maintenance personnel. There are only five maintenance personnel in the maintenance team. Thus, the maintenance work carried out is limited and only minor damages can be overcome. In addition, many major maintenance work need to be done by outsourced contractors as they are experts.

Planned maintenance is one of the maintenance strategy used by building owners to ensure a building functions well.
(c) Inadequate maintenance budget
According to respondent from A Complex, the main issue faced by the building management is cost constraint. It is due to many parts of the building being connected. If there are any parts that need to be replaced, the whole set needs to be replaced. Therefore, the budget allocated is not sufficient to replace many items that are not functioning well. As a result, the maintenance personnel need to spend a lot of time to repair and deal with corrective maintenance which will delay the schedule of planned maintenance.

(d) Attitude of maintenance personnel
The maintenance personnel of B Complex lacks the understanding on how planned maintenance should be carried out as the maintenance personnel operates maintenance work based on experiences and without using any advanced technology. They are too dependent on technical knowledge and experience, which may affect the performance of the building and delay the maintenance process.

(e) Poor collection of maintenance fees
The main issue faced by C Complex is the uncooperative owners' refuse to pay the maintenance fees. Some tenants feel that they seldom use the facilities provided and therefore, they do not need to pay any maintenance fees. According to the respondent, some tenants from ground floor refuse to pay the maintenance fees because they do not use the lifts and escalators to travel to upper floors; thus, they do not need to pay for it. Additionally, some owners are too busy and forget to pay the maintenance fees. As a result, there are insufficient funds for the maintenance work. Some services such as escalators, lifts and air conditioning system required a big amount of money for routine maintenance thus insufficient amount of money makes the planned maintenance work harder to carry out.

Among the six issues and challenges identified in the literature review, only one issue that is not faced by the building manager in carrying out planned maintenance. And, this issue is where the building owner claiming that planned maintenance is ineffective. In contrast, respondents stated that planned maintenance is the best choice among various types of maintenance approaches as maintenance work is well organised, the staff is always ready in case of any emergency work and it is most cost effectiveness. It is also supported by respondent from A Complex, which noted that planned maintenance strategy is much more efficient compared to unplanned maintenance because the maintenance work is well organised and the work is carried out according to the schedule, especially old buildings like A Complex. Also, failure of elements in the building can be minimised. Therefore, it can be concluded that planned maintenance is the most effective maintenance strategy although it faces several issues and challenges when implementing it.

5. Conclusion
It can be concluded that the objectives formulated for this research have been achieved through the literature review and the analysis of case studies. The literature review identified six issues and challenges in implementing planned maintenance. But data collection from the three selected case studies, five issues and challenges were found and only one issue that was not faced by the building manager in carrying out planned maintenance is that the building owner claimed planned maintenance is ineffective. However, the perspective of the building managers from the selected case studies, planned maintenance is claimed to be the most effective strategy among various types of maintenance approaches. All the issues discussed need to be overcome to ensure continuous improvement and ensure that the maintenance strategy is effective.

REFERENCES