

## **MAINTENANCE MANAGEMENT PRACTICES FOR HOSTEL FACILITY: A CASE STUDY**

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### ***Abstract***

The practices of conventional methods for maintenance management in Kolej Universiti Islam Melaka (KUIM) faced many issues due to poor service delivery, inadequate finance, and poor maintenance plan and maintenance backlogs. The purpose of this study is to improve the conventional method practices which tend to be ineffective in KUIM. The selected KUIM is based on conventional method practices and its major problems, attempt to implement computerised technology and the willingness of staff to share their experiences. The responses from semi-structured interview with engineer and assistant engineer were recorded using video camera and transcribed verbatim. The overall findings of this research indicated; poor service delivery, inadequate financial, poor maintenance planning and maintenance backlogs. There is also need to overcome less man power competencies of maintenance management practices which existed KUIM. In addition, the study also found that the KUIM still use conventional maintenance management processes in managing hostel facility condition. The proposed solutions are intended to be used for maintenance management practices at KUIM in order to provide high-quality of hostel facility with safe and healthy environments.

***Keywords:*** Maintenance Management; Conventional Method; Maintenance Management System; Kolej Universiti Islam Melaka (KUIM).

## **1.0 INTRODUCTION**

Nowadays, maintenance management is the essential issue in the construction industry. This issue is related to the disastrous defects as the roof collapsed at Stadium Terengganu [1] and the collapsed building at Jaya Supermarket in Petaling Jaya [2]. The reasons for those collapses are the deficiency of technical and administrative services in maintenance management. [3] Stated that, the reasons for maintenance management deficiencies are delay of action taken, inefficient steps toward decision making processes and other related factors of staff weakness. Effective maintenance management has significant value on running cost of particular building and infrastructure throughout its operation.

The other identified issue of maintenance management is lack of completed system that helps to plan, implement, control and measure the maintenance performance of the facilities [4]. Although there are many systems related to maintenance management, but it still not consists of defect diagnosis for building and infrastructure in order to explain the real situation of maintenance defect [5]. Therefore, the problems emerged from treating the defect for heritage or old hostel structure over 25 year's age to avoid it from being collapsed abruptly. The preservation of critical building such as hospital is another issue in maintenance management. Hospital is one of the public buildings in Malaysia that has many facilities, which requires effective maintenance management to prevent it from deterioration.

There are two types of maintenance presently applied at the hospital which is preventive maintenance and corrective maintenance. As an example, maintenance problem occurred at Hospital Raja Permaisuri Bainun (HRPB) when lifts was not functioning and also have limited space for car parks [6]. These scenario turns into people's disappointment to obtain medical services at hospital. The broken lifts are articulated due to insufficient attention given to building maintenance which related to poor design planning, conventional and weak management. Presently, most organizations are still implementing conventional method rather than computerised systems to manage the maintenance of hostel facilities and infrastructure [7]. The conventional method such as using paper-based form and unsystematic database are apparently not able to capture long term business targets [8]. The problems emerged as a result of the need to manage huge and complicated data, for instance, data loss caused by unsuitable places for file storage, excessive retrieval time in the data files recovery and not supported with maintenance decision making.

## **2.0 ISSUES OF MAINTENANCE MANAGEMENT AT KUIM**

KUIM intends to transform into University status in year 2020. Consequently, the KUIM transformation indirectly increase maintenance development and need for sophisticated management system. KUIM has a department to coordinate maintenance and repair of equipment, buildings, infrastructure and facilities related work, including supporting services at KUIM. However, the management system implemented by this department faced the problems of reporting the defect. All of the reports regarding facilities defect must utilize "Borang Laporan Kerosakan", where the student and staff have to fill up the paper-based form and being sent to the related department unit respectively. Student and staff are not motivated to report defect due to many form needed for that task. They also have to take the risk of report losses before reaching the related department.

Moreover, the student and staff have to replenish the form after rejection in case of fault information and other related factor. As a complainer, staff and student also have the difficulty to identify their complaint status whereby they have to call or send an email for action progress. In addition, the teaching and learning process cannot work smoothly and bother the lectures session of this haphazard complaint system [11]. The deficiency in maintenance management system also makes the department staff hard to totally record facilities defect periodically, thus increase the deferred maintenance. The existing system need to be improved in order to provide an efficient maintenance management processes at the KUIM. The conventional method affects the quality and efficiency in maintenance management processes at KUIM [12]. The cause for the problem is improper supervision of scrapping work in painting processes. Meanwhile, [12] stated that, one of the hostel at KUIM in United States of America has collapsed due to time gap of building repairs and fortunately no injury because of the incident. Mostly, RPI buildings are old structured and poses extended lifecycle services. This accident indicates the importance of building sustainability that includes facilities maintenance management services.

As a result of the inherent weaknesses in maintenance management at polytechnic, an alternate maintenance management models are proposed, namely, Computerised Maintenance Management System (CMMS). This model is designed by integrating causes and reasons from shortcomings in the conventional process through the "constructability concept". The CMMS model is engaged in the new system to improve the characteristic element with the decision making process. The significant factor to select a CMMS is much more advantageous than just a way to schedule maintenance management processes and able to perform the task needed without stressing the budget [14]. The CMMS

does not make decision, rather it provides the maintenance manager with the best information which affects the operational efficiency of a facility [15]. Thus, the new system is equipped with the decision making process for maintenance identification, assessing and planning activity. The development system consists of three main components, which are Electronic Form (EForm), relational database and Online Customer Complaint (OCC) for data collection as well as using an automation system to handle defect complaints from staff and student. This is important as a platform for huge data storage and to manage complicated data such as old structure building and equipment data. New system is expected to be beneficial to increase the efficiency of the maintenance management processes at the KUIM [11].

### **3.0 METHODOLOGY**

The case KUIM in order to identify the maintenance management problems, the current approaches to address the problems, the ICT implementation and the maintenance management system to obtain information relating to the maintenance identification, assessment, planning and execution processes. „KUIM hostel which manages the maintenance operation with fully equipped new amenities and facilities. The justification for the selected case studies is according to the main criteria; exposed to the conventional method use and major problems, attempted to implement computerised technology and the willingness of staff to share their experiences in improving the maintenance management processes at the KUIM. The combination of these different types of KUIM hostel was used to gain the comparison of the maintenance management practices including the implementation of current ICT. The different types of KUIM hostel also provides the variations on the maintenance management practices that is classified as old, new and KUIM hostel respectively. The professional staffs were interviewed which either the engineer or assistant engineer and had the experiences in the maintenance management practices. The summary of the information on the case studies is presented in Table 1.1.

Table 1.1: Total number of faults and type pf fault for the KUIM hostel

Component		Jul	Aug	Sep	Oct	Nov	Dec	TOTAL FAULT	PERCENT
		Jammed	Broken	Leak	Age	Poor Design	Other		
<b>COMPONENT NAME/ AREA OF FAULT</b>	Lamp	35	35	25	15	14	11	135	<b>28.1</b>
	Door	43	37	21	16	10	5	132	<b>27.5</b>
	Window	30	27		15	12	18	102	<b>21.3</b>
	Shower	7	6		7	10	4	34	<b>7.1</b>
	Sink	7	11		3	4	4	29	<b>6</b>
	Pipe		7	10	7		3	27	<b>5.6</b>
	Toilet	6				9	4	19	<b>4</b>
	Bed		1		1			2	<b>0.4</b>
<b>PERCENT</b>		<b>128</b>	<b>124</b>	<b>56</b>	<b>64</b>	<b>59</b>	<b>49</b>	<b>480</b>	<b>100%</b>

Responsibility for the maintenance management of the entire College's building facility under Facility Management and Development Unit (UPPF) and Maintenance and Development Unit (UPS). The interview sessions took around half an hour to accumulate the data on the maintenance processes including the demonstration of the current maintenance management system with the implementation of ICT tools by the engineer or assistant engineer. All of the data from the interviews were recorded using video camera and transcribed verbatim.

#### **4.0 MAINTENANCE MANAGEMENT PROBLEMS, APPROACHES TO ADDRESS PROBLEMS AND MAINTENANCE MANAGEMENT SYSTEM**

The maintenance management practices in this KUIM had used conventional method such as paper-based form in managing the building maintenance. The maintenance processes were concerned on planning, surveying, procurement, supervision and handover project. There were several problems identified in this college as followed:

- i. **Nonspecific complaint:** The complainer interpreted the defect information with general perception. As an example, the report informed that there was a damaged pipe valve at Block A. However, the actual defect was referred as a leaked pipe through the technician's inspection.
- ii. **Time Gap of Building Repairs:** The technician unidentified the building defects in the customer complaint and need to inspect the defect at the site location. This affected the time taken for maintenance planning execution.
- iii. **Limited budgets:** There were many departments at the Polytechnic such as Department of Civil, Mechanical and Electrical Engineering. The budget deficiency was due to upgrade of these building facilities at the KUIM. Besides, the unspecified database using the conventional method causing report overlook for the maintenance planning. The maintenance management staffs also found it difficult to calculate the budget amount for the particular facility because of the unspecified information on the customer complaint.
- iv. **Less Competent manpower:** The manpower consisted of technician to perform the building inspection at the college. The engineer and assistant engineer did not gain the specific explanation of defect that was described in the general perception. At the same time, the defect repetition also occurred due to technician's failure to identify the actual defect at site location.

The defect repetition and vandalism cases frequently happened at hostel. A few students cause enormous damage by hitting the smoke detector in order to ease them smoking in the room. The maintenance management staff had to allocate the budget in the maintenance planning including the punishment towards student. Meanwhile, the old structure building contributed to the issue of defect repetition for the particular facility such as leaked pipe. The approach is to replace the old material (e.g. timber) with strong material (e.g. heavy steel). This provides the material's durability and prevents it from being damaged easily. The building improvement with the specific material replacement was executed at this college.

ICT Implementation the technology system was used in managing maintenance consist of "my SPATA" and "my SPA" to record the data inventory at the college. Both of these systems were developed by the JKR and Malaysian Administrative Modernisation and Management Planning Unit (MAMPU) to improve the inventory management of facility. The systems are to record the inventory number, equipment, department location, building level including the

room number into the database system. The maintenance management staffs were not required to contact the complainer to clarify the information on particular defect and location. These systems enable the data inventory to be accessed for further corroboration in maintaining the building defect effectively.

The current maintenance management system is conducted manually and used paper-based form in managing the maintenance processes. “my SPATA” and “mySPA” application are also conducted in the same way. The interviewees recommended improving the system through paperless office in performing the building maintenance at the college.

## **5.0 KEY FINDINGS FROM CASE STUDIES**

There are eight case studies involved in this research to identify the maintenance management problems, the approaches to address problems, ICT implementation and the maintenance management system at the nominated college to improve the maintenance management practices for building facility and infrastructure. The findings from the case studies are summarised and presented in Table 1.2 below. The discussions involved a cross-case analysis and have been grouped into four main “embedded units of analysis” that has been identified which is (1) Maintenance Management Problems, (2) Approaches to Address Problems, (3) ICT Implementation and (4) Maintenance Management System.

## **6.0 SYNTHESIS OF GOOD PRACTICES**

Table 1.2 below represents the suggested solution from the case studies to improve their current practices on the maintenance management by ICT implementation at the KUIM hostel, they have been suggested to improve the particular defect of information in the complaint by combining with the related software technology. The customers will use the electronic form to report the defect complete with the data facilities and more detail of the defect explanation to gather accuracy of the inspection works. The other suggestion from the assistant engineer is to provide the information on the particular defect to diagnose the facility at the KUIM hostel. Improve the specific defect information in complaint

Table 1.2: Suggested solution

<ul style="list-style-type: none"><li>• Provide more specific information on inspection</li><li>• Decrease the defect repetition through assessment for material quality used</li><li>• Control the budget allocated for maintenance planning</li><li>• Improve the specific defect information in complaint</li><li>• Decrease the defect repetition through assessment for material quality used</li></ul>
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## **7.0 CONCLUSION**

There is a case studies have been used to analyse the key problems, approach to address problems, ICT implementation and maintenance management system at KUIM The factor of nonspecific complaint, defect repetition, limited budgets, time gap of building repairs and less competent manpower are the main problems on the case studies findings. In order to improve information adequacy in the complaint, the new system will be developed which provides building attributes, for instance, the facility type, defect and location in detail. Other than that, the new system can manage budgets on ad hoc and preventive maintenance effectively. Regarding the above findings, this research will concentrate on the development of a new system to integrate the maintenance identification, assessment and planning processes to improve the decision making process and maintenance management at KUIM.

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