

**MAINTENANCE MANAGEMENT OF HIGH RISE BUILDINGS IN MALAYSIA: A  
PRELIMINARY STUDY IN KLANG VALLEY**

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*Abstract*

*Large highrise building is relatively complicated in maintenance. This paper presents the preliminary finding of a study on the building maintenance management of selected large highrise buildings in Klang Valley, Malaysia. Four highrise buildings with a floor number ranging from 20 to 88 floors and a total floor area from 585,527 to 4,252,000 square feet were investigated. Information on maintenance policy including the type of maintenance conducted, the existence policy and budget is collected through unstructured interviews. The paper concludes that a clear maintenance policy does not exist yet in the maintenance of highrise buildings.*

*Subject keyword: maintenance management, facilities management, highrise building*

**1. INTRODUCTION**

The appropriate maintenance of buildings is considered to be fundamental part of ensuring high-quality service for the commercial building such as Petronas Twin Tower. Large highrise building is relatively complicated in maintenance. Maintenance may be defined as the preservation of a building so that it can serve its intended purpose (Arditi & Nawakorawit, 1999). British Standard 8210 defined maintenance as the combination of all technical and administrative action intended to retain an item in, or restore it to, a state in which it can perform its required function. The previous version of the British Standard, BS

3811: 1964, defined maintenance as a combination of any actions carried out to retain an item, or restore it to, an acceptable condition. Wordsworth (2001) interpreted the action stated in the standard as the initiation, organization, and implementation of series of works. There are two processes of works that envisage, retaining and restoring. Retaining is more to the work carried out in anticipating of failure, and restoring is the work carried out after failure. Maintenance management refers to how well a building is maintained.

According to the categorization proposed by King, Langendoen, and Hummel (1984), the methods to maintain a building include corrective maintenance, service maintenance and routine maintenance. British Standard 3811: 1964 categorised maintenance into seven categories: planned maintenance, unplanned maintenance, preventive maintenance, corrective maintenance, emergency maintenance, conditioned-based and scheduled maintenance. In this paper it is divided into 2 main categories: planned and unplanned maintenance. Planned is divided into two subcategories: preventive and corrective maintenance. Planned maintenance was defined as maintenance that are organized and carried out with forethought, control and the use of records to predetermined plan. Unplanned maintenance is ad hoc maintenance carried out to no predetermined plan. Preventive maintenance is the maintenance carried out at predetermined time or to other prescribed criteria with an intention to reduce the likelihood of an item not meeting an acceptable condition. Corrective maintenance is maintenance carried out after a failure has occurred and intended to restore an item to a state in which it can perform its required function.

British Standard 3811: 1964 defined maintenance policy as a strategy within which maintenance decisions are made. A maintenance policy includes set of ground rules for the allocation of resources between various types of maintenance as stated before.

According to British Standard BS8210: 1986 Section 2, a maintenance policy should ensure that value for money expended is obtained, in addition to protecting both the asset value and the resource value of the buildings concerned and the owner against breaches of statutory and legal obligations.

## **2. INVESTIGATION METHOD**

This study attempts to provide a perspective on the maintenance management of high rise building. The study consists of two steps. First, to determine the availability of ground rules, and documentation including O&M, maintenance checklist, and monthly maintenance report. Second, to check the practice of annual budget for unplanned maintenance, long-term planning for planned maintenance, and periodic space and building services audit.

Four intelligent highrise buildings in Klang Valley were randomly selected. Some of the building maintenance personnel of the building were interviewed including at least one building maintenance manager, one building maintenance supervisor, and one chargemen for each building. The buildings are Menara Telekom, Dataran Maybank, Petronas Twin Tower, and Putra World Trade Centre.

## 2.1 Menara Telekom (or Menara TM)

Menara Telekom, means Telecom Tower (also known as Menara TM), is the headquarters of Telekom Malaysia. The 310m (1,017ft) tower has 55 floors, and is shaped to represent a sprouting "bamboo shoot". It is located along the Federal Highway, Sprint Expressway and Jalan Pantai Baru. It was designed by Hijjas Kasturi Associates and was constructed between 1998 and 2001 by PECD Berhad.

The state-of-the-art building is rated as a six-star intelligent building by Kuala Lumpur City Hall, which provides infrastructure for multimedia services with high speed connectivity and features an energy-efficient facilities management system. Menara Telekom is equipped with an Integrated Building Management System (IBMS) concept created by Telekom Malaysia's research and development division to provide a productive and cost-effective environment. The IBMS has the ability to integrate 11 key mechanical and engineering sub-systems within the tower - ranging from the air-conditioning and ventilation system, to the lighting control system, and the security management and lift and escalator systems.



## 2.2 Dataran Maybank

Dataran Maybank consists of three tower blocks, with two tower blocks, each comprising 20 floors and the third tower block comprising 22 floors. Each tower stands independently, but is architecturally planned to adhere to the concept of 'family unity' within the Maybank Group. The design layout of the three towers is enclosed within a circle and shared a common podium at the base of each tower. On the podium roof top an 'eco-friendly garden' square reinforces the unity symbolism of the Maybank Group. The facilities such as food court, retail outlets, surau, crèche and multipurpose hall are located and shared among the three within the podium. The towers are fully air-conditioned and ample seating space is available at the customer service areas.

The Head Office of Mayban Finance and Mayban Assurance occupy each of the 20-floor towers, named *Mayban Finance Tower* and *Mayban Assurance Tower* respectively, while the 22-floor tower is occupied by Mayban Life and is named *MaybanLife Tower*.

Dataran Maybank adopted a concept of sharing lobby and a 'centralized airconditioning and electrical system'. The control room, major components of electrical and airconditioning system were centralised in *MaybanLife Tower*. The major airconditioning systems include cooling tower and chillers. The major electrical system includes the HT room, LV room and genset.



### 2.3 Petronas Twin Towers

The Petronas Twin Towers were the tallest buildings in the world until Taipei 101, as measured to the top of their structural components (spires, but not antennas), took over the record. Spires are considered integral parts of the architectural design of buildings, to which changes would substantially change the appearance and design of the building, whereas antennas may be added or removed without such consequences. The Petronas Twin Towers remain the tallest twin buildings in the world.



## 2.4 Putra World Trade Centre

Putra World Trade Centre (PWTC) was the main convention and exhibition centre in Kuala Lumpur until the construction of PICC Putrajaya. Sprawling over 1.7 million square feet with 253,000 sq feet of exhibition space, PWTC is known for its high levels of personal service and a flexible approach to event management, making it popular with event organisers and meeting planners alike.

This 42 storey exhibition centre cum UMNO headquarters combines the best of modern architecture with traditional Malay culture.

PWTC has been a venue to a great variety of events ranging from world class conventions, exhibitions, concerts, and corporate functions. Event organisers have more freedom in determining the overall layout of the event via the use of automobile ramps and cargo elevators that swiftly expedite the movement of large and heavy objects.



## 3. RESULTS AND DISCUSSION

It was found comprehensive ground rule, O&M, maintenance checklist, maintenance schedule, and monthly maintenance report were available in all buildings except one building. It was also found annual budget for unplanned maintenance and long-term planning for planned maintenance, were practiced at only two buildings. The other two buildings did not implement. Finally, it was found all buildings did not conduct periodic space audit and building services audit.

## 4. CONCLUDING REMARK

It is evident from the findings that the scope of building maintenance implemented varies from one building to another. This implies the quality of maintenance is not consistent. There is a need to develop a standard on maintenance to be enforced legally to ensure comfort and safety to public.

Maintenance seems to be implemented 'on call' basis. In other word, planned maintenance is not given a priority. This can be inferred from the finding of this study that

annual budget for unplanned maintenance and long-term planning for planned maintenance are not implemented in some buildings. This argument is supported by another finding that building audit is also not implemented. A sound planned maintenance relies on comprehensive data collection through building audit.

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