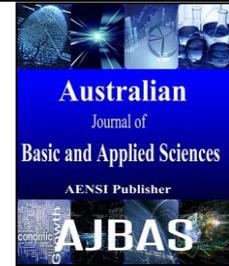




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### Towards the Development of Maintenance Culture: An Evaluation on Users Understanding towards the Building Maintenance Aspects

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#### ABSTRACT

The understanding among the users regarding the building maintenance has been considered as a fundamental or pre-requisite element that is needed in order to develop the maintenance culture. Therefore, this study has been conducted with the main objective to determine the level of understanding among building users towards the maintenance aspects. The determination was referred based on the assessment on a few variable related to the maintenance aspects. Building maintenance definition, maintenance objective, and the importance of building maintenance are the five basic variables that were used in order to determine the level of understanding among the buildings users on maintenance aspects. The data for this study has been collected through survey approach where the structured questionnaire forms have been distributed randomly among the respondents. Through descriptive statistic, the data has been analyzed quantitatively. The findings shown, the majority of building users who involved in this study have a good knowledge and understanding towards the definition, objective and the importance of the building maintenance.

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#### INTRODUCTION

In recent years, a rapid growth of building construction appears as a part of the development of most countries especially in developing countries. In public sector, increasing demand on public services resulted in increasing the quantity of public buildings which constructed in order to allow the government agencies providing various types of services such as education, health, welfare and others. This scenario led to the increase of maintenance works in order to enable building function as their intended purpose. Hence, building maintenance has become a major activity in construction industry as a whole. The importance of maintenance has been acknowledged. According to Abdullah and Ken (2008) Maintenance is an important activity for all types of building. Without proper and organised maintenance, a building will experience damages in a short period of time. Prior, Mill (1980) has insisted the maintenance-free building, like maintenance-free car will never exist.

There are many issues have been studied and discussed by the previous researchers, where most of it are considered as the negative issues which gave the negative impacts on maintenance performance and effectiveness. The proposition is supported by

Bazlin (2004) that states the failure to implement a good maintenance practices have been influenced by a number of significant issues and problems. The existence of these negative issues were linked with many factor such as the availability of fund, insufficient maintenance programme, human errors, lack of knowledge and expertise, lack of replacement materials, technology advancement and others. These issues have become a global phenomenon faced by most building stakeholders in any country including Malaysia. Without proper strategies, this phenomenon will cause big losses to the property industry.

Currently, besides the factor which discussed above, the poor performance of building maintenance is also being connected with the lack of culture in maintenance practice. According to Olufunke (2011), without a strong maintenance culture, efforts at infrastructural (including buildings) development will amount to nothing. It is because, the existence of maintenance culture is compulsory in order to sustain the availability and function of a building. In Malaysia, the discussion on the necessity and impact of maintenance culture is also discussed by many parties. The assets especially public buildings and infrastructures in Malaysia are not maintained properly because of the lack of maintenance culture

(2012). According to Eti *et al.* (2006) culture tends to mature (occasionally in unwanted way) as the external environment evolves. Culture could be defined as “The shared belief and values of a group; the beliefs, customs, practices and social behaviour of a particular nation or people” (2009). As the components of maintenance culture development are related with belief, lifestyle, attitude and knowledge of individual, thus the level of individual understanding on the key aspects of maintenance needs to be evaluated first. This is because a good understanding will able to create an awareness and pleasure that together influenced the attitudes and belief of an individual. Hence, this study was being conducted specifically in order to determine the level of understanding among the public building users towards a few maintenance important aspects which are definition, objective and the importance of building maintenance.

#### Literature Review:

Lee (1987) quoted that British Building Maintenance Committee has defined building maintenance as the work undertaken in order to keep, restore or improve every facility, every part of a building, its services and surrounds to currently acceptable standards, and to sustain the utility and value of the building. While previously British Standard (BS 3811: 1984) defined maintenance as a combination on any actions carried out to retain an item, or restore it to an acceptable condition (British Standards Institution, BS 3811: 1984). Based on this

definition, Chanter and Swallow (2007) explained that the word retain and restore is not limited to the actions that relate to the physical execution of maintenance work, but also those concerned with its initiation, financing and organization, while the word acceptable condition implies an understanding towards the requirements for effective usage of the building and its parts, which in turn compels broader consideration of building performance. The definition by British Standard than was updated when the term maintenance has defined by BS 3811:1993 as ‘the combination of all technical and associated administrative actions intended to retain an asset in or bring it to a state in which it can perform its required function’ (RICS, 2009). Based on the discussion above towards the meaning of maintenance, it can be understood the term maintenance is normally referred to any action that need to be done in effort to ensure a building and its parts are in good condition as it was required to ensure the optimum use, well function, convenience and safety on users. The activities or services which related to maintenance are broad. This is because the maintenance activities in general can be classified into servicing, repair, replacement and upgrading (Building Department, 2004) and were categorised under preventive, scheduled, condition-based and corrective maintenances. Based on previous researches, there are many objectives of maintenance. Table 1 has listed the objectives of maintenance.

**Table 1:** The maintenance objective.

No.	Statement of Maintenance Objective	Source
1.	<ul style="list-style-type: none"> <li>➤ To keep the building at its original standard;</li> <li>➤ To improve the building in order to benefit the users in short and long term;</li> </ul>	[8]
2.	<ul style="list-style-type: none"> <li>➤ To ensure the buildings and their associated services are in safe condition;               <ul style="list-style-type: none"> <li>➤ To ensure the buildings are fit to use;</li> </ul> </li> <li>➤ To ensure that the condition of the building meet statutory requirements;</li> <li>➤ To maintain the value of physical assets of the building stock; and               <ul style="list-style-type: none"> <li>➤ To maintain the quality of the building.</li> </ul> </li> </ul>	[13]
3.	<ul style="list-style-type: none"> <li>➤ To preserve the building so that it can effectively serves its function and other aspects in the maintenance objectives</li> </ul>	[14]
4.	<ul style="list-style-type: none"> <li>➤ To keep the building and facilities in optimum operating conditions so that the intended functions are performed satisfactory</li> </ul>	[15]
5.	<ul style="list-style-type: none"> <li>➤ To preserve machinery, building and services, in good operating condition.               <ul style="list-style-type: none"> <li>➤ To restore it back to its original standards, and</li> </ul> </li> <li>➤ To improve the facilities depending upon the development that is taking place in the building engineering.</li> </ul>	[16]

Through the information that was listed in table 1, it has shown that the statement for maintenance objectives are variety and it was design with different intention and expectation of related parties. However, all the objectives were established by referring to the needs and necessity to upkeep the buildings and their components by fulfil the interest of related parties who are having a direct connection with a building. Besides the maintenance objectives, the users also need to understanding about the importance of building. By having a good understanding on this matter, the building users will

have a capability to appreciate why the maintenance programme needs to be implemented on any building. At same time, a good understanding also will raise up the level of awareness among the building users to entirely involve in any building maintenance programme. Then, this involvement will create a good opportunity in developing the maintenance culture.

According to the Hong Kong Home Affairs Department (Home Affairs Department-Building Management, 2008), the importance of building maintenance is revolve to the weakness of a building

which will be weathered quickly when exposed to the natural environment. Without having an effective and continuous maintenance system, the building will deteriorate easily. The importance of building maintenance is also can be linked with the benefits that will be produce when the maintenance procedure has been executed by the maintenance team. For instance, regular inspection and maintenance may enable timely identification of deteriorated building elements and moreover, in the certain circumstances overlooked dilapidation and inadequate maintenance in the building may lead to loose mosaic tiles and plaster of external walls, and threaten users' safety (Home Affairs Department-Building Management, 2008). In some cases, the importance of building maintenance is referred to the actions which generated when the maintenance programme has been implemented by an organisation. This statement is supported by the information from SPAB (2010) which insists that the importance of maintenance cannot be over-emphasised. There are many good reasons for maintaining a building, which may be concise as follows:

- Preserving an asset and heritage – the implementation of maintenance programme will keep up a building's physical appearance and extends its lifecycle. It also prevents the loss of original fabric, economic value and decrease the rate of depreciation.
- Avoiding large repair bills – the implementation of systematic and effective maintenance programme may reduce or potentially eliminate the need for, and the extent of, major repair project towards the buildings. 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 (SPAB, 2010).
- Protective resources - The implementation of maintenance program is considered as a part of naturally sustainable activity. This is because an efficient and effective maintenance programme will lead to keep the existing buildings in use, full of functions and in a good and reliable condition. This scenario will reduce the need for new resources (such as construction materials and energy) which are usually needed in the development of new building. When the demand for new property development is reduce, it may also reduce the demand for new development site.
- Promoting the convenience and safety use - maintenance will capable to ensure that the building is in a fit state when it was opened to be occupied or used by the related parties.

Besides the above discussion, the statement regarding to the maintenance importance is also could be found through the review on the general announcement toward the maintenance advantages that have been made by previous researchers or organisation. For examples, effective maintenance

of buildings not only improves the quality of living environment but is also a vital means to uphold or even raise the value of properties (Building Department, 2004). Another one, maintenance is not only important in ensuring the condition and physical of the old building to operate safely and effectively, but it also for an activity that is important in determining the lifelong of the building, so that it can be preserve and be inherit by the next generation (Rahman, M.A.A., 2012). Based on the overall discussion about the importance of maintenance, it can be summarised that the importance dimension of building maintenance is different for each parties and it was discussed in their owned perspective. However, the essence of building maintenance importance is always been referred to goodness or benefits that has been produced as maintenance performance.

#### **Methodology:**

This study was conducted in 4 phases which are known as research background establishment, conceptual framework development, data collection and, data analysis and interpretation. At the first phase, the activities for this study has been focused on the effort to gather the information which is needed to prepare the background of the study which consists of problem statement, objectives, research question and the scope of the study. While, at the second phase, namely as conceptual framework development the literature search has been done comprehensively in order to develop main structure of the study. The related information has been collected through various secondary resources such as journal article, published report, academic thesis, text books, conference papers and others. The outputs from this phase are very benefit to be used as the input towards the development of survey instrument. In this study, the questionnaire form has been used as a survey instrument. Next, the study progress has been pursued with the data collection phase where the questionnaire forms have been distributed among the respondents via face to face meeting. The respondents in this study were randomly selected among the public people or users that has visited the federal government buildings located at Pulau Pinang, Malaysia from 13 March to 26 March 2014. Within 2 weeks data period, there are 326 respondents have fill up and return the questionnaire. Finally, at the final phase which is called as data analysis and interpretation, the collected data was analysed using the descriptive statistic where the frequency, percentage and mean score analysis have been directly used in order to get the results.

#### **Data Analysis:**

##### **Demographic Results:**

From 326 respondents were identified in this study, it was found that 145 respondents are male

and 181 of them are female. In terms of age, majority of respondents (64%) are between 36 to 45 years old. While, for education level, 57% of them have received formal education scheme at tertiary level of education since they have graduated with diploma, bachelor and master degree. The details of respondents demographic output is shown in table 2.

#### **The Understanding on Maintenance Definition:**

Through the questionnaire survey, 4 statements have been listed as the definition for building

maintenance. The result has been shown in table 3. Through the table, it was revealed majority of respondents have a good level of understanding towards each definition statement. It because the result for mean score for each statement is more than 4.0. The highest mean score is 4.92 where it belongs to the statement building maintenance as a combination on any actions carried out to retain a building or restore it to an acceptable condition. This statement of definition provided a simple brief about the meaning of building maintenance.

No.	Demographic Items		Frequency	Percentage	
1.	Gender	Male	145	44%	
		Female	181	56%	
2.	Age	Less than 18 years old	0	0%	
		18 to 25 years old	17	5%	
		26 to 35 years old	73	22%	
		36 to 45 years old	209	64%	
		46 to 55 years old	18	6%	
		More than 55 years old	9	3%	
3.	Level of education	Tertiary Education	Diploma	49	15%
			Bachelor Degree	126	39%
			Master Degree	13	4%
			Ph.D	1	0.3%
		Secondary Education	LCE	5	1%
			MCE	72	22%
			“STPM”	58	18%
Primary Education	2	0.7%			

**Table 3:** Output for statement of definition.

No.	Statement of Definition	*Frequency		*Percentage (%)		Mean Score
		/	x	/	x	
1.	...as the work undertaken in order to keep, restore or improve every facility, every part of a building, its services and surrounds to currently acceptable standards, and to sustain the utility and value of the building	284	42	87	13	4.52
2.	...as a combination on any actions carried out to retain a building or restore it to an acceptable condition	326	0	100	0	4.92
3.	...as the combination of all technical and associated administrative actions intended to retain an asset in or bring it to a state in which it can perform its required function?	271	55	80	20	4.02
4.	... any action that need to be done in effort to ensure a building and its parts are in good condition as it was required to ensure the optimum use, well function, convenience and safety on users.	317	9	97	3	4.68

\*/ : the symbol for understand category where it consist of answers which are received for scale 4: Understand and 5: Completely understand

x – The symbol for not understand where it consist of answers which are received for scale 1: Completely do not understand, 2: Do not understand and 3: Little understanding

#### **The Understanding on Maintenance Objective:**

The result for understanding on maintenance objective has been detailed up in table 4. The result shows that all the objective statement are producing the score mean more than 4.0. It means, most of the respondents are knowledgeable and have thought in understanding the actual objective of building maintenance. From 12 objective statements that have been listed, three of them have scored 100% of understanding towards maintenance objective.

#### **The Understanding on the Importance of Maintenance:**

Based the findings from literature view, 7 dimensions regarding to the importance of building maintenance have been listed in questionnaire form.

The output is shown in table 5 below which illustrated the mean score for each aspect that related to the importance of building maintenance is more than 4.0. Based on the output of frequency analysis, it demonstrates the quantity of frequency for understanding scale is more than half or with the percentage more 50%. This result directly proved that the respondents in study are certainly capable to link and understand about the importance of building maintenance based on the listed dimensions.

#### **Discussion and Conclusion:**

Based on the output of analysis which are shown in table 3, 4 and 5, it is proven that most of the respondents have a good understanding towards the basic aspects of building specifically focusing on

definition, objective and the importance of maintenance. The findings is in line with the background of the respondents in this study since most of them have the good track record on education level. Furthermore, this good level on understanding towards the maintenance aspects is supported by training and experience that was gained by the respondents in certain places such as school and their work place. In fact, the awareness campaign regarding to the maintenance that has been promoted by the government agencies through television, radio, new papers, brochure and others, it has also contributed the information to respondents which finally make it their understanding towards

maintenance aspects become better. The desire of the government top management to acculturize maintenance into each individual's lifestyle is believed to contribute towards a better understanding of maintenance aspects. With the existence of this findings, it able to be made as a ground foundation for nurture the seriousness among the members of the society in efforts to develop the maintenance culture. The development of maintenance is considered as a critical need to ensure the government asset especially building and infrastructure always in well condition.

**Table 4:** Output for statement of maintenance objective.

No.	Statement of Maintenance Objective	*Frequency		*Percentage (%)		Mean Score
		/	×	/	×	
1.	To keep the building at its original standard	326	0	100	0	4.94
2.	To improve the building in order to benefit the users in short and long term	326	0	100	0	4.75
3.	To ensure the buildings and their associated services are in safe condition	298	28	91	9	4.46
4.	To ensure the buildings are fit to be used by the users	311	15	95	5	4.66
5.	To ensure that the condition of the building meet statutory requirements	245	81	75	25	4.12
6.	To maintain the value of the building	287	39	88	12	4.32
7.	To preserve the function of the building	326	0	100	0	4.88
8.	To satisfy the building users	278	48	85	15	4.24
9.	To preserve the financial interest of building owners	262	64	80	20	4.18
10.	To maintain the image and reputation the building	255	71	78	22	4.14
11.	To maintain the reputation of building owners	264	62	80	20	4.21
12.	To maintain and improve the profit gain from the building	247	79	76	24	4.17

**Table 5:** Output for dimension on the importance of maintenance.

No.	The dimension of the importance of maintenance	*Frequency		*Percentage (%)		Mean Score
		/	×	/	×	
1.	Building function	302	24	93	7	4.68
2.	Building performance	312	14	96	4	4.72
3.	Safety	280	46	86	14	4.31
4.	Investment value	297	29	91	9	4.42
5.	Building image	265	61	81	19	4.10
6.	User and owner satisfaction	277	49	85	15	4.17
7.	Convenience	280	46	86	14	4.28

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