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Value engineering awareness study for sustainable construction in Malaysia

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Value engineering awareness study for sustainable construction in Malaysia

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Abstract. Construction process has often been described as a highly complex process because of the number of disciplines involved during the conceptual, design and construction stage. With the emergence of latest technology and concern for environment, increasing attention in construction industry is given on sustainability. Balance in quality and sustainability has become a major challenge to the construction industry. This paper presents a study that has conducted to determine the acceptance and application of Value Engineering (VE) and Life Cycle Cost Analysis (LCCA) in Malaysia construction industry. A set of questionnaire have distributed to different practitioners in construction industry and the result has reflect the fact that the application of VE and LCCA are still very low.

1. Introduction

Total population of Malaysia, according to the 2000 Census, was 23.27 million compared to 18.38 million in 1991. Malaysia's population have reached 27.6 million by 2010 with population growth 2.7% (2000 – 2010). See to back in the late 1970s and early 1980s, Malaysia, was developing the industry moved from import-oriented industry, begin to export oriented development, industries and factories. The construction sector is visualized to record marginal growth of 0.5% in 2004, supported largely by residential construction activity. Approximately 111,000 units of public affordable housing built during the 9th Malaysia Plan. During 10th Malaysia Plan 78,000 units of affordable public housing will be constructed by Federal Government across the nation. The housing sector would continue to play an important role in bringing development and growth for the country's construction industry. Construction industry in Malaysia contributes to the growth of the nation with the market industry of RM 91.58 billion and 22.66 billion for residential development based on the Construction Industry Board quarterly report 2012 [1].

Value Engineering (VE) was first applied mainly in the process and manufacturing industry. VE was introduced to the construction industry in 1968 as the United State Armed Service Procurement. Elias also mentioned that VE is one of the leading techniques in the study of projects unnecessary costs, setting the project requirements and functions. It is defined by the Society of American Value Engineering as “the systematic application of recognized techniques which identify the function of a product or service, establish a monetary value for that function, and provide the necessary function reliability at the lowest overall cost” [2]. While integration of VE in the construction projects elsewhere, the concepts and application of value engineering do not seem to be well embraced by the Southeast Asian (SEA) construction industry. In the studies conducted on 2004, most of the respondents had previously misconceived VE as just another usual cost cutting exercise. Apparently,



the lack of knowledge and awareness about VE is a major cause for its limited application in Southeast Asian construction industry [3].

2. Methodology

This study was conducted to not only have an overview of the VE application in the Malaysian construction industry but also to determine the application of Life Cycle Cost Analysis (LCCA) for VE. Data for this study was collected through questionnaire survey form. The questionnaire was focused on the respondents' knowledge and understanding as well as their experience in the application of Value Engineering (VE) and the concept of Life Cycle Cost Analysis (LCCA) in the construction industry. All the data have stored in the online database from Google Documents as the survey distribution method was through email.

3. Analysis and Discussion

There were 61 set of questionnaires sent to different respondents with different background in the construction industry. However, only 29 respondents made response. Therefore only 29 set of questionnaires were collected. This means that the questionnaire collected only constitute 47.54% of the total amount of the questionnaires sent. The main target of the respondents are from the consultancy firms, such as the Civil and Structural (C&S) engineering consultants as well as quantity surveying consultants, and finally the contractor. This is done to have an overview as well as to make comparisons between the different construction disciplines. However, only 48.0% and 36.4% of the questionnaire response are from the contractor and quantity surveying consultants respectively. The largest numbers of questionnaire response are from the consultants (52%), which make up 45% of the respondents.

3.1. Degree of Understanding about Value Engineering

Questions about the degree of understanding about Value Engineering (VE) were asked. The results and analysis of the questions are further elaborated in the Figure 1. The first question was to assess whether the respondents have knowledge in the concepts of VE, however not to ask the question if they have heard of VE. Figure 1 shows 59% of the respondents know the concepts of VE, while 24% of the respondents replied "No", and 17% of the respondents replied "Not Sure". The results suggest that a majority of the respondents is knowledgeable in VE. However, it is noted that the return rate of the survey form is only at 47.54%, since most of the targeted respondents who had never heard of these terms might not return their questionnaires. Figure 2 shows the questionnaire response to the second question. It shows that a majority, which is 69% of the respondents, replied "No" while only 28% of the respondents had formal VE training. 3% of the respondents replied "Do not Know" for the second question. The response shows that while a majority of the respondents have an understanding of VE (59%), only 28% of the respondents have any formal VE training.

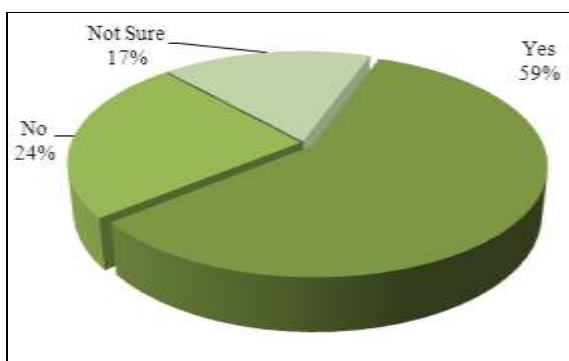


Figure 1. Questionnaire response to question, "Do you know the concept of Value Engineering?"

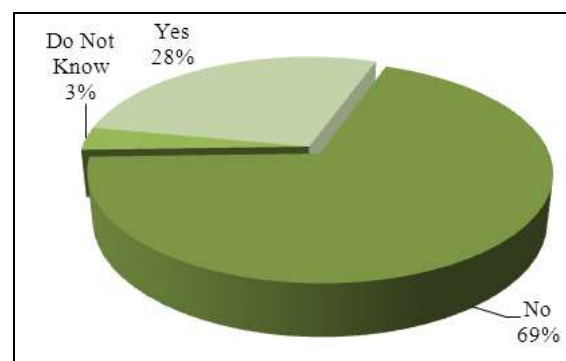


Figure 2. Questionnaire response to question, "Did you have formal Value Engineering training?"

3.2. Frequency of Applying Value Engineering in Construction

In Figure 3, 34% of the respondents either replied “Do not know” or “Never” for the question on application of VE in the construction industry, while only 38% of the respondents frequently apply the concepts of value engineering in their work. There are 14% of the respondents said that they very frequently apply VE concepts in their work. 28% of the respondents replied “Rarely” in Question 3. The result shows that the application of VE in the construction industry is low, as only 38% of the respondents replied either “Quite Frequently” or “Very Frequently”. The mean index value for this question is 3.03, which is “average”.

3.3. Degree of Understanding about Life Cycle Cost Analysis

One of the techniques that incorporated in Value Engineering is Life Cycle Costing (LCC) or Life Cycle Cost Analysis (LCCA). This technique is used to estimate or evaluate the sums over a given study period, which would include the operational, maintenance and disposal cost. From LCC, VE is applied as to have the most value over a given time period. Figure 4 shows the result of the questionnaire to have an overview to the application as well as the awareness of one of the VE techniques, LCC from the respondents. 33% of the respondents have not heard of Life Cycle Costing, while 22% of the respondents heard of the term, but were not sure what it is. The results suggest that a majority of the respondents do not know what LCC is, as only 33% of the respondents are knowledgeable of LCC and 11% of the respondents replied “Quite Knowledgeable”.

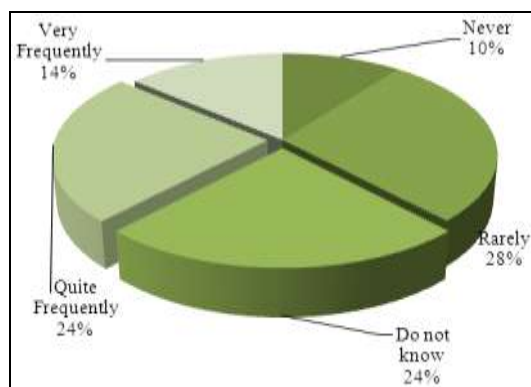


Figure 3. Questionnaire response to question, "How often is the application of VE in your work?"

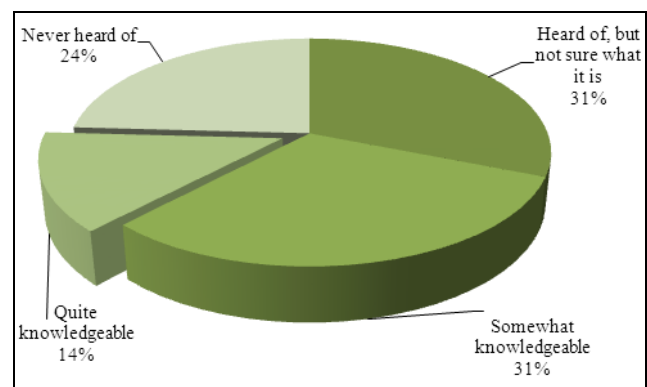


Figure 4. Questionnaire response to question, "What is your prior knowledge on Life Cycle Costing (LCC)?"

3.4. Factors that Hinders the Implementation of Value Engineering in the Malaysian Construction Industry

The results as in Figure 5 suggest that the lack of application of VE and/or LCC is mainly due to either lack of VE and LCC knowledge (66.67%) and the lack of tools or training to apply VE and LCC techniques (55.56%). This shows that training is critical in the awareness as well as application of value engineering concepts in the construction industry. In fact, the lack of knowledge and training for VE and LCC is an expected answer from the respondents, as half of the respondents do not have an understanding of value engineering. Therefore, training as well as courses is required as to focus on the implementation of Value Engineering. Furthermore, 38.89% of the respondents agree that the lack of communication among project stakeholders is the reason why VE and LCC is not applied in projects, while 27.78% of the respondents replied that the lack of time to implement VE in the project as the reason. Lastly, only 22.22% of the respondents agree that the conflict of interest among project stakeholders is the reason why VE and LCC are not applied in the construction projects.

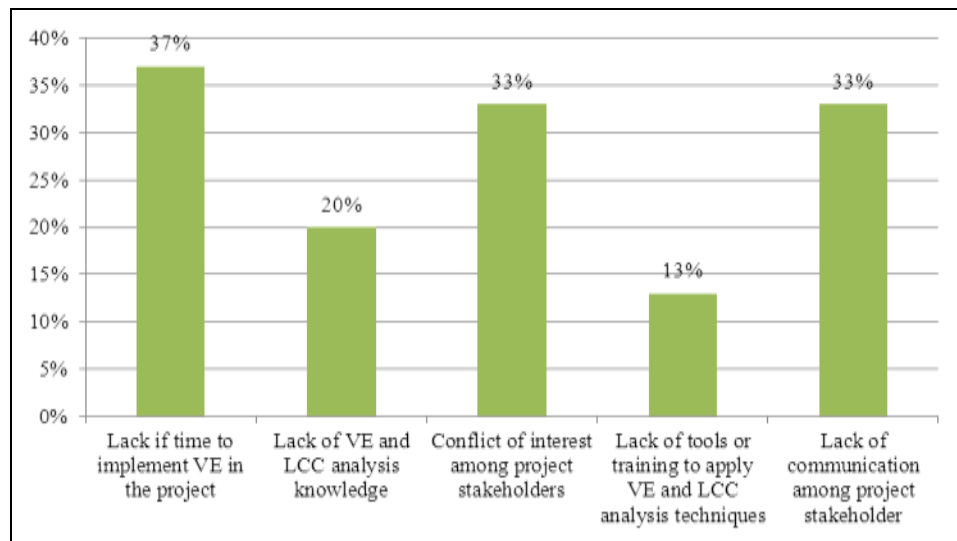


Figure 5. Questionnaire response to question, "If Value Engineering concepts and/or Life Cycle Cost Analysis is not applied in projects, it is mainly due to..."

4. Conclusion

The questionnaire survey have distributed to Civil and Structural Engineering (C&S) consultancy firms as well as Quantity Survey (QS) consultancy, and contractors. The respondents' knowledge and understanding of Value Engineering (VE) is average, as 50% of the respondents understand what VE is. However, the questionnaire results suggested that the implementation of VE is low, considering the awareness of VE in the construction industry, as the average index shows an average frequency of VE implementation. Other findings include the reason why VE is applied in projects, which is upon clients' request as the main reason. The questionnaire also highlighted the factors that hinder the application of VE as well as life cycle cost analysis as, the lack of VE and LCC knowledge as well as the lack of tools to or training to apply VE and LCC. The results indicate that that not only the awareness and understanding of VE and LCC is required, training to apply VE is vital to increase the use of VE and LCC techniques in the Malaysian construction industry.

References

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