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Decisive Success Factors in Executing Prefabrication System in Malaysia

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ABSTRACT

Although Malaysian Government has promote prefabrication system systematically for several years starting from 2003 when the IBS Roadmap has been introduced, however the level of prefabrication system implementation is still consider as low compared to other country. There are many factors which affect the adoption of prefabrication system among practitioners which are demand and market factors, government initiatives and availability of expertise in prefabrication system. Some of other factors have been identified by researches especially by CIDB. CIDB is a main researcher responsible to make sure Malaysian Construction Industry become more competitive. This paper will discuss some critical success factors in implementing prefabrication system in Malaysia

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INTRODUCTION

Prefabrication system can be defined as a building process in which sections of modules of the structure are assembled at a remote location, and then transported to the construction site. This type of construction technique is very lucrative and often makes it possible to complete a building project in as much as half the time required for more traditional methods. Prefabrication construction is frequently employed with the construction of new houses; the strategy can also be used with other buildings. The outstanding ability behind prefabrication construction is based on the idea that by using standard components that are partly assembled on a manufacturing floor, there is less time involved in the actual construction process (Badir, Y.F., 2002). The modules are transported to the site, using freight transportation. At the site, the modules are unloaded, moved into position with the aid of heavy machinery, and connected to form a single building. Along with the fast assembly, prefabrication construction could often save a great deal of money on the building construction. By using standard patterns, the building materials are pre-cut at the manufacturing site. This eliminates an enormous deal of the waste in timber and other components that can crop up during the process of building. Consequently, a prefabricated

house with three bedrooms is likely to cost significantly less than a three bedroom dwelling that is constructed from scratch at the building site.

Currently, there are many private companies in Malaysia that have joint ventures in implementing prefabrication system with foreign experts from developed countries such as Australia, Netherlands, United States and Japan. One of the main reasons for doing so is to explore the possibilities of precast solutions to their projects. Numerous construction projects have utilised precast components that can help a project to work under the time constraints while still maintaining high accuracy and quality. The prefabrication components are commonly used in the construction of schools, colleges, quarters, apartments, hospitals, roads, port and other infrastructures (Othuman Mydin, M.A., 2014).

Decisive Success Factor in Implementing Prefabrication System:

Even though Malaysian Government has endorse the utilization of prefabrication system thoroughly for several years starting from year 2003 when the IBS Roadmap has been introduced, nevertheless the level of prefabrication system execution is still consider as low compared to other country. There are many factors which affect the adoption of prefabrication system among practitioners which are demand and

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market factors, government initiatives and availability of expertise in prefabrication system (Lew, Y.L., 2003). Some of other factors have been identified by researches especially by CIDB. CIDB is a main researcher responsible to make sure Malaysian Construction Industry become more competitive.

Demand and Market Factor:

Demand and market factor is one of the core factors which affecting the used of prefabrication system in Malaysian Construction Industry. If there are no demand from the customers (e.g. clients, developers, government or personal financial funded), there will be no project, neither conventional nor prefabrication system. For example, in United State, a study on prefabrication for conventional industry has started since early 1990 and until 1940; the respective parties were still struggling to developed prefabrication technologies. Only after the war period (1940-1945), the prefabrication being used extensively when government spent huge investment into very large settlement residential projects to overcome the problem of housing shortage. Then only the signs of prefabrication's growth showed up in United State (Triakha, D.N., 1999). Projects which used prefabrication system as a construction method in Malaysia mostly categorised as a mass project which involved thousands unit of houses for residential projects or more than 10 stories high-rise building. If not, the project must be government funded project such as schools project, government quarters or commercial buildings with special purposes.

Government Initiatives:

A government initiative in adoption of prefabrication system among contractors is a really important as a step to promote, guide, facilitate and reduce the burden on the contractors. Malaysian government through its agencies (CIDB and JKR) has done a lot of things to ensure successful prefabrication system implementation as targeted in IBS Roadmap (Warszawski, A., 1999). Modular design guide, IBS Score manual, Manual IBS implementation for government project and construction Industry Standard (CIS) as a guideline for the construction industry's practitioners. To promote prefabrication system, CIDB had published freely all about prefabrication system through its website. Not enough with organising international exhibition, CIDB has also organised road show on prefabrication system as a vendor development programme to tighten supply chain in prefabrication system industry. Even though a lot of facilities have been provided such as IBS one stop centre, IBS Orange Books, improve the policies through UBBL and Malaysian Standard (MS1064 Part 1-10) and development of IBS village at Cheras, however, there

is still various loops need to be covered to achieve a successful prefabrication system implementation (Thanoon, W.A.M., 2003).

Availability of Prefabrication System Expertise:

Low amount of expertise in Malaysia in prefabrication system method is another reason why prefabrication system is not being used extensively until now. The current civil engineering and architecture curriculum rarely state prefabrication system as one of compulsory subjects to be taken by student while taking their degree at university. As a result, there are not enough professionals that can be claimed as experts in precast concrete systems. Therefore, this may lead to poor design, plant management and production and erection practices (Thanoon, W.A.M., 2003). According to manufacturer perspective, lack of competence can cause failures in the production stage that in turn may cause delays in the erection schedule. These affect not only to the manufacturer but also to the contractor, because it avoid contractor from gaining profit through short construction period. Beside that, lack of expertise on behalf of the contractor can cause delays in the erection schedule, even if the components are delivered to site on time

Finally, the designers with expertise in precast concrete system have no choice and inevitable to used conventional method to avoid the use of these system. In terms of structural analysis and design of precast concrete components, there is not much different with conventional reinforced concrete structure, but an important issue when applying prefabrication system is joint analysis and design. Thus, conflicts of responsibility often arise between manufacturers and designers at that state (Rahman, A.B.A., W. Omar, 2006).

Prefabrication System In Practitioners Perspective:

In construction industry there are four players consist of contractor, consultant, client and manufacturer. Each of them involved with prefabrication system usage in different ways but sometimes within the same scope of works. For example between manufacturer and designer, both of them involved with design works but in different phase of works. This may lead on conflict among them.

Manufacturer Perspective:

In prefabrication system, contribution of manufacturer is not only limited to manufacture the product but also involved in planning, design, and project management and implementation process. Looking the experience of Setia Precast Sdn Bhd as an established precast concrete manufacturer, first thing to do is converting the conventional design into more comprehensive design needed for precast construction. After that, the production work will

take place and followed by transporting, erecting and joining the elements. In this context, even though they are manufacturer, the scale of work being covered is broad compared to manufacturer for conventional system who's only responsible to supply materials for contractor (Hussein, J., 2007).

Client Perspective:

Client is the most important party in improving the used of prefabrication system in construction industry. Unfortunately, there are lists of barriers which overcome client enthusiasm to used prefabrication system. According to Orange Book, ten out of fifteen precast manufacturers located around Selangor and Kuala Lumpur and only five distributed in other states in Malaysia (Hamid, Z., 2008). The problem become more critical because only several of them produce complete set of prefabrication components. That's why client need to reconsider their decision to use prefabrication system for their projects. Development of prefabrication system limited due to Malaysian 'island mentality' and lack of collaborative approach. In developing industry, project leadership and site management issues like lack of standard and certification as a guideline for products, process and short of specialist crew have amplified the barriers (Othuman Mydin, M.A., 2014).

Consultant Perspective:

Current technical solutions including Modular Coordination, Malaysian Standard and Precast catalogue are not sufficient to suit traditional procurement process and it will affect the preference of designer on traditional method. Most of civil and structure consultant (C&S) will be appointed by contractor who have win Design and Built tender on prefabrication system project. Based on architectural drawing, structural drawing will be produces traditionally but stress more on joining element. Generally, suggestion of joining element and component will be suggested by manufacturer and C&S consultant will just follow the suggestion. This is sometimes may lead to redesign work which means increased in design cost (Othuman Mydin, M.A., 2014).

Contractor Perspective:

Most of the contractor in Malaysia already have permanent relationship in supply chain, sub contractors and clients who are the main contributors for their projects and they are already comfort with their working environment which indeed explained why they reluctant in changing the method of construction from conventional to prefabrication system. Even though they are willing to change, a lot of incentives for training purposes are needed which means higher cost to start implementing prefabrication system.

Conclusions:

Even though the prefabrication system has been in existence for a long time but there are still many unresolved issues. One of the prefabrication system issues is the ability of the industry players to equip with necessary technical knowledge in order to adopt prefabrication system in their project. Lack of involvement from small contractor is of the issues of execution prefabrication system in Malaysia. Many small contractors are reluctant to adapt prefabrication system and prefer to continue using the conventional method of construction. In addition, lack of knowledge and exposures to prefabrication system technology discourages further implementation of prefabrication system. The subject of precast concrete design is normally not delivered to undergraduate students in many universities. Due to this problem, junior engineer does not know about precast concrete compare to the technology of structural steelwork. Knowledge in construction technology is equally important.

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