The Acceptance of Industrialised Building System (IBS)

BY

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DECLARATION

I, Ng Choong Eu, I08002786 confirm that the work in this report is my own work and the appropriate credit has been given where references have been made to the work of other researchers.

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Abstract

This study is to evaluate the level of acceptance for Industrialised Building System (IBS) implementation in Malaysia. Industrialised Building System know as prefabrication, a construction system which components are manufactured in a factory or site factory according to a standardize shapes and dimension that could be transported to construction site to form a building.

In this research, I would need to determine the obstruction factors and problems in using IBS and also the perception from construction industry. After that, I would evaluate the IBS level of acceptance in Malaysia.

Based on result from Construction Industry Development Board (CIDB)-IBS Roadmap 2011-2015, their data collected from two sectors: Private Sector and Government sector. As per their result, the usage of IBS content in private sector is less than 35% while the Government sector contains of 70% usage.

My research respondents are also from the construction industry.53 % of them is from private sector and 47% of them are from Government sector. 75% of my respondents are participating in IBS and 80% of the respondent are accepting IBS and would recommend IBS to others in future.

I also manage to find out the reason of why IBS is not effective and the benefit of IBS in Malaysia in this research paper. From my research, I would say that IBS is starting to be picking up in the Malaysia, it would be more effective if government could provide more workshop on IBS.

Contents

Chapter 1

Introduction

1.1 Background

The Industrialised Building System (IBS) is a building components that are mass produced in either factory or site factory according to a standardise shapes and dimensions that could be transported to the constructions site to be rearrange with certain standard to form a building.

Industrialised Building System (IBS) is not a new thing or technology in the construction industry. In the history, IBS is known as prefabrication, was being used in UK since Crimean War 1855. At that time, Florence Nightingale requested a prefabricated hospital building be designed and shipped to the Dardanelles for construction. The hospital was successfully constructed but only used for eighteen months, the purpose of the construction is to reduce in the death rate. Prefabricated houses were also being constructed during World War 2 as there was a huge demand for military staff. Due to the vast number of houses that were destroyed during the war, prefabricated dwellings was quick and affordable ways to create quality houses for the homeless. By the late 1940s, there was around 160,000 of these prefab homes had been built with the largest prefabricated estate in Liverpool where over 1,000 were constructed. Much against the residents wishes this estate was demolished in the 1960s.

In the United States, the use of precast in the construction industry began in the construction of prefabricated steel house by General House in 1930. However the early efforts of rationalising and implementation faded quickly due to price in competitiveness, high capital and inconsistent local codes. The use of precast increased sharply after the Second World War due to the need to resolve critical shortage of houses.

1.2 What is Industrialised Building System (IBS)

In Malaysia, Industrialised Building System (IBS) is named by the industry and government in Malaysia to represent the use of prefabrication of components in building construction. IBS is defined as a construction technique in which components are manufactured in a controlled environment (on or off site), transported, positioned and assembled into a structure with minimal additional site work (Hamid et al.,2008; CIDB, 2007; CIDB, 2005 and CIDB, 2003).

It consists of precast component systems, fabricated steel structures, innovative mould systems, modular block systems and prefabricated timber structures as construction components (CIDB, 2003). Parts of the building that are repetitive but difficult – and time consuming and labor intensive to be casted onsite – are designed and detailed as standardised components at the factory and are then brought to the site to be assembled (CIDB, 2003). The onsite casting activities in IBS utilize innovative and clean mould technologies (CIDB, 2007; CIDB, 2005 and CIDB, 2003). In the Malaysian context, the classification by the CIDB is widely used and well understood by practitioners. CIDB has classified the IBS systems into five categories as depicted in Table 1 (CIDB, 2003).

Table 1 : IBS Classification

Classification	Description
Precast concrete framed buildings	The most common group of IBS products is the precast concrete elements; precast concrete columns, beams, slabs, walls, 3-D components (e.g. balconies, staircases, toilets, lift chambers, refuse chambers), lightweight precast concrete, as well as permanent concrete formworks.
Formwork System	Considered as one of the low-level or the least prefabricated IBS, as the system generally involves site casting and is therefore subject to structural quality control, the products offer high-quality finishes, and fast construction with less site labour and material requirement.
Steel Framing System	Commonly used with precast concrete slabs, steel columns and beams, steel framing systems have always been the popular choice and used extensively in the fast-track construction of skyscrapers. Recent developments in this type of IBS include the increased usage of light steel trusses consisting of cost-effective profiled cold-formed channels and steel portal frame systems as alternatives to the heavier traditional hot-rolled sections.
Prefabricated Timber Framing System	The system consists of timber building frames and timber roof trusses. While the latter are more popular, timber building frame systems also have their own niche market, offering interesting designs from simple dwelling units to buildings requiring high aesthetical values such as chalets for resorts.
Block work System	The construction method of using conventional bricks has been revolutionised by the development and usage of interlocking concrete masonry units (CMU) and lightweight concrete blocks. The tedious and time-consuming traditional brick-laying tasks are greatly simplified by the usage of these effective alternative solutions.

IBS has started to adopt in the construction industry as in to achieve a better quality and productivity, risks reducing that related to occupational safety and health, improve issues for skilled workers and the need of foreign workers and also reducing the overall construction cost. Besides that, it offers minimal wastage, less site materials and a

cleaner environment, quality of work could be controlled and lowers construction costs (Pan et al.2008, Hamid et al.2008 and Pan et al.2007).

In 1960s, Industrialaised Building System (IBS) were being introduced by the Ministry of Housing and Local Government of Malaysia after their vist to European countries and evaluate their housing development program (Thanoon et al, 2003). Malaysia government had seen the potential improvement in construction industry by implementing Industrialised Building System (IBS), based on the speed up the delivery time and built affordable and quality houses. IBS first project was Pekeliling Flats in Kuala Lumpur in 1964 and the second was Taman Tun Sardon, Gelugor, Penang in 1965. (Din,1984). Unfortunately, these two projects did not bring a good image to Industrialised Building System (IBS), because the projects were found to have water leakage. European system used were not suitable to apply in Malaysia's wet toilets and bathroom. (Rahman & Omar 2006). Due to these two projects was not successful, the effectiveness of implementing Industrialised Building System (IBS) by the government toward the construction industry was failed.

Today, many companies have gained lots of experience in using Industrialised Building System (IBS) from foreign experts such as Australia, Netherlands, United States and Japan in offering precast solution to the construction industry Malaysia. Numerous construction projects have utilized the precast components especially to meet the requirement of time constraint and with high accuracy and quality. Below is the passed project that used Industrialised Building System (IBS) in Malaysia:

- Custom, Immigration & Quarantine Complex, Johor Bahru Precast concrete beams, columns and hollow core slabs

- Open University formerly known as JPA, Kuala Lumpur Precast concrete beams, columns and hollow core slabs
- Projek Perumahan Rakyat, Telipok, Sabah Steel formwork system
- Apartment for Government Staff, Putrajaya Precast concrete walls
- Telekom Tower, Kuala Lumpur Steel structure for the sky garden and top part of the building
- Water Sports Complex, Putrajaya Tubular steel, steel decking for the floor system
- Kuala Lumpur International Airport (KLIA), Sepang Steel roof structure
- KL Sentral Station, Kuala Lumpur Steel roof structure, precast hollow core slabs
- Serdang Hospital Steel beams and columns, precast concrete half slabs
- Government School Steel beams and columns

Even though, Malaysia government have heavily promoted Industrialised Building System (IBS) to the private sector, but the usage is still low compared with those developed countries such as Japan, United States and Europe. As survey was conducted by Construction Industry Development Board (CIDB) Malaysia shown that the level of usage of IBS in the local construction industry is at 15% although there are a lot of initiatives provided by government to encourage the use of IBS (CIDB, 2003). There are many factors that cause of low usage of IBS as a survey of the industry shows that 66% of architects admit to have "Poor" knowledge in IBS (CIDB 2005). In fact, most of the respondents (34%) have requested for more awareness and education programmes on IBS. Therefore, CIDB should implement awareness to promote IBS, in order to widely spread to construction industry to achieve greater the level of acceptance of IBS in Malaysia.

Besides that, a detail study of barriers of IBS should be done to overcome the problems faced to implement IBS. This could increase the usage of IBS in construction industry in Malaysia. Based on surveys conducted in 2010 IBS survey 2010 was conducted to measure the drivers, barriers and the critical success. The survey shows that the acceptance, adoption and deployment of IBS in the Malaysia construction industry is still low and does not help to improve outstanding and persisting problems in productivity, dependency on foreign workers and high level of construction wastage (Kamar ***et al,*** 2011). This is because of significant barriers restricting the use of IBS among contractors were due to higher construction cost, high capital investment, difficulties in achieving economies of scale, inability to fix design early and complex interfacing, and lack of knowledge in IBS. On the other hand, factors related to level of Information Technology (IT), building regulation, and code and standard however, were not considered relevant by the contractors (Kamar ***et al,*** 2011). The most important drivers for contractors to use IBS were achieving high quality, fasten the speed of construction, and shorten the site duration, client's demand, and addressing skill shortage. Factors such as energy saving, building's regulation, and dealing with adverse weather condition appear to have been overlooked by the contractors (Kamar ***et al,*** 2011). The most important critical success factor that has been identified is early decision of using IBS and assembling the project team in the early stage. Therefore, there is important for the policy makers like CIDB to convince the top management of the companies and the CEOs on the benefits of IBS (Kamar ***et al,*** 2011).

1.3 Problem statement

IBS had been used in many countries. The issue for Malaysian building industry to adopt IBS is still far from achieving the ideal objective as articulated in IBS roadmap even though most of all activities are identified in the roadmap (Tan Sir Dato' Ir Jamilus Hussein 2009). Why IBS is still not adopted? Even though contractor whom experience in using IBS in their project before, reluctant to use in their future project. Why is this so?

This study also intended to investigate the level of acceptance Industrialised Building System construction industry Malaysia.

1.4 Research Objective

- To determine the obstruction factors and their problems in using the IBS
- To identify the perception from the construction industry
- To evaluate the level of acceptance for IBS implementation in Malaysia

1.5 Scope of limitation

This research will be carried out within the peninsular Malaysia of the acceptance of IBS in construction industry. The respondents are the professional in construction industry within the peninsular Malaysia.

The objective of this study is collecting data and research toward professions such as developers, quantity surveyors, architects, contractors and engineers. In fact they have different view of Industrailised Building System in their project.

1.7 Significant Contribution to Construction Industry/ QS practice

The study will gives opportunity to the construction industry as well as CIDB to acknowledge the status of toward the acceptance of Industrialised Building System in the market of Malaysia. Also, the problems that faced by the user of IBS.

1.8 Research Methodology / Outline:

Research methodology