

An overview of industrialized building systems construction essay



In recent years, the government is trying to transit the frequently used conventional construction method toward a more technologically advanced construction method, Industrialized Building Systems (IBS). Several policies are developed for the interest of promoting IBS by the government. In order to hasten the IBS usage in the construction industry, IBS Roadmap 2003 - 2010 is published to promote the IBS through 5M strategy (Manpower, Materials, Management, Monetary, and Marketing). On the other hand, CIMP 2006 -2015 also highlights a strategic thrust for IBS appliance in the construction projects. Furthermore, every new government projects are compulsory to compound at least 70% of IBS components start from year 2008.

Although this technology has introduced in Malaysia since 1960-an, the volume of IBS project is still lack compare to the conventional project (Kwai, 2010). It seems to be the acceptance of IBS has not been encouraging among Malaysian builders. The wet trade construction is still widely applied in construction industry in Malaysia although it is actually incurred higher construction cost and longer construction time. Moreover, the conventional construction method is always giving the impression of “ Dirty, Difficult and Dangerous” of construction industry Malaysia.

IBS is peddled to be used in the construction industry as it can solve the issue associated with problems faced in conventional system. CIDB (2003) has presented that by using IBS, it can cope with a growing demand of affordable housing; less dependence on the foreign labours and enhance labour skills. Furthermore, Kamar, K. A. M. et al. (2009) also stated that IBS can also provides shorter construction period, better quality of construction, <https://assignbuster.com/an-overview-of-industrialized-building-systems-construction-essay/>

cleaner and neater construction environment, less site material and also minimal construction materials wastage. In addition, the appliance of IBS can also further decreases the accidents or injuries happen on site compare to the conventional construction method which has less emphasis on the occupational safety and health.

Moreover, IBS also enhances the image of the construction industry in Malaysia as the current construction condition is always considered as “ Dirty, Difficult and Dangerous” (CREAM and CIDB, 2010). The advantage of improving the image of the construction industry is essential as the industry using conventional method is always associated with unprofessional practices (Mail, 2010). This implicatively discourages the local workforce to join the construction industry. Moreover, the low wage scheme of the construction labours also impedes the locals to involving the construction industry Malaysia. Therefore, the IBS is encouraged among the construction industry in order to attract more locals to involve in this field.

Kamar K. A. (2010) further enhances that IBS can increase the competitiveness of Malaysian firms by offering better price in the overseas projects. This can indirectly provide good reputation of construction industry Malaysia in international level.

1. 2 Problem statement

Conventional construction industry, which also considers as wet trade construction is relied heavily on the manual manpower. CIDB (2007) stated in CIMP that as most of the locals are having the mindset that this industry is “ Dirty, Dangerous and Difficult”, along with the low salary scheme and low

occupational safety and health, it deters the locals from involving the industry. This leads to manpower shortage in construction industry and redounds to the reliance of the construction industry on the foreign labours. Furthermore, the industry is more willing to employ unskilled foreign labour with cheaper rates compare to employ local labours who require for higher wages. This further deteriorated the situation of reliance on foreign labour in construction industry Malaysia. Many foreign workers are recruited from neighbouring countries such as Indonesia, Bangladesh, India and others.

Although the foreign labour is important in balancing the high construction cost and also overcome the problem of the lack of labour in construction industry, there are several issues occur as the impacts of the dependence of the foreigners. It leads to the currency flowage to other countries, socials problem, crimes and also disturbing the growth of domestic economy of Malaysia (CREAM and CIDB, 2010).

Thus, in order to avoid the relying on the foreign workers and attract the locals, Kwai (2010) and CIDB in IBS Roadmap 2003-2010 (2003) suggested using IBS instead of the conventional construction method. Ahmad Bari et al. (2008) also hoped the utilisation of IBS in construction industry in Malaysia can handle the issue of the dependency of the foreign labour. The foreign labour is planned to reduce gradually from 75% in year 2003, 55% in year 2005 until 15% in year 2009 in IBS Roadmap 2003-2010. Beside from making the construction less labour oriented, IBS also faster as well as fulfilling quality concern (Kamar K. A., 2010).

Apart from that, as a consequence of the relative cheap and abundant supply of foreign labour from neighbouring countries, it has deterred local contractors from pursuing new and innovative ways of construction also. This leads to the condition of lack investment in the technology and equipment, and thus construction sector in Malaysia is being considered as low productivity sector (Chan, 2009). Hence, IBS is introduced to overcome this matter.

IBS is introduced for innovation of the construction technology and also handling the labour issue. Industrialized Building System (IBS) has been duly highlighted in Construction Industry Master Plan 2006-2015 as being significant importance in construction industry. It is hoped to be carried out in the construction industry under Strategic Thrust 5: Innovation through R&D to adopt a new construction method. Treasury Circular Letter No. 7 of 2008 also released as one of the ways to promote the usage of IBS in construction industry. The government construction projects are required to content at least 70% of the IBS components. These show the importance of the application of IBS in construction industry.

On the other hand, the enhancement of technology in IBS is also introduced to improve the productivity of the construction. CIDB also prepares several programmes of promoting industrialised buildings, modular coordination and system embracing of prefabrication technology (CIDB and Chan, E. H. W., 2005). The productivity of IBS can reduce the reliance on the manpower.

But in the current scenario of the construction industry in Malaysia, the issue on reducing dependence on foreign workers is great concern as still has 52%

of the construction works is foreign workers (CREAM and CIDB, 2010). This is far from expectation in IBS Roadmap 2003-2010 which hope to less the foreign labour until 15% in year 2009. By using the IBS, it hopes to reduce the dependency on foreign labour and save on the foreign exchange (Abdul Rahman, A. B. and Omar, W, 2006).

Thus the study on the comparison on IBS and conventional system is carried out to find the effectiveness of IBS in reducing the labours needed on site, especially the reduction of the foreign labours. The comparison of number of locals of involving in the IBS and conventional construction also will be studied. Furthermore, the labour productivity of the manpower in both construction methods is also investigated for the efficiency of the labour in site. Last but not least, skill improvement in IBS also will be studied.

1.3 Aim and Objectives

The aim that initiates this research is to study on the comparison on construction labour between Industrialised building System (IBS) and conventional system.

The research is carried out to achieve the objectives below:

To study the characteristic of IBS and conventional system in construction industry Malaysia

To study on construction labours in construction industry Malaysia

To identify and compare construction labours between IBS and conventional building system

To determine the effectiveness of IBS in reducing dependence on foreign labours

To determine the labour productivity in both IBS and conventional building system

1. 4 Scope of Study

The scope of this research focus on the comparison of the construction labours needed in similar housing project characteristic by using different construction method (IBS and conventional system). The research also will be used to identify whether IBS is effective in handling the issue of the reliance on foreign labours and also increase the number of skill labours in construction industry. It also reviews if the locals will involve IBS projects more than conventional construction projects. The productivity of the labour in two construction methods also will be reviewed.

1. 5 Research Methodology

The research methodology is schemed to carry out in the stages of literature review, data collection, data analysis and last but not least, the conclusion and recommendation.

In the first and the earliest stage, the literature review on the IBS, conventional system and construction labours in construction industry Malaysia will be carried out. The relevant information can gain from books, journals, articles, magazines, newspaper, and conference proceeding papers, internet and other reliable sources.

Following that, the questionnaires of research are distributed to the selected investigate parties on the research aspects. Furthermore, interview will be conducted with the contractors who involve in IBS and conventional construction projects. Relevant project information will be obtained from the interview persons too for the data analysis. Data analysis will be carried out by using both quantitative and qualitative methods toward the questionnaire results and the interviewers' information. Case studies also will be analysis based on the project details provided. Discussion will be conducted on the findings of the results.

Lastly, the conclusion and recommendations are proposed to promote the use of IBS in the construction industry Malaysia. Moreover, the suitable ways to increase the skills of the construction labours in the construction industry will also be suggested.

Chart 1. 1 Research Methodologies

1. 6 Limitation of Study

The limitation of the study helps to focus on the study areas that should be emphasis on during the research progress. In this research, it will focus on the building construction companies in Malaysia, which the names will be obtained from the list of directory CIDB. The study will focus more on the building construction companies which involves both of IBS and conventional construction method for the ease of comparison. The interviews will also be carried out on the similar criteria as the questionnaire survey parties.

1. 7 Significant of Study

The study on this topic is hoped to let the public know more about IBS and also conventional construction method. This can also aid to promote the use of IBS system in the construction industry Malaysia. Furthermore, the awareness of the reduction of the labour in IBS can be inserted to the parties in Malaysia and thus the implementation of IBS project can increase. Last but not least, the study can act as result survey that the effectiveness of IBS in handling the foreign labour issue and attract the local labours. The labour productivity estimated in the study can be used to estimate the labour input and crew size in the future projects.

1. 8 Work Plan

The progress on the academic project is started in August 2010 and estimated to be ended in March 2011. The tasks are divided into several stages and will be carried out as the schedule below:

Task

Aug

Sept

Oct

Nov

Dec

Jan

Feb

Mar

Proposal

Introduction

Literature review

Data collection

Data analysis

Finalizing

Miscellaneous

Submission

The research outline layout is proposed to separate into 7 chapters which show as below:

Chapter 1 : Introduction

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Chapter 2 : Industrialised Building Systems (IBS) & Conventional Building System

Chapter 3 : Labour

Chapter 4 : Research Methodology

Chapter 5 : Result and Case Studies

Chapter 6 : Data Analysis

Chapter 7 : Conclusion and Recommendation

CHAPTER 2

INDUSTRIALISED BUILDING SYSTEMS (IBS) & CONVENTIONAL BUILDING SYSTEM

CIDB defined IBS as a construction technique in which components are manufactures in a controlled environment (on or off site), transported, positioned and assembled into a structure with minimal additional site works.

CIDB (2010) described that IBS has similar definition with Offsite Construction (OSC), Modern Method of Construction (MMC), Offsite Manufacturing (OSM), Offsite Production (OSP), Production (OSP), prefabrication, and modularization. Similarly, Abdullah, M. R. et al. (2009) stated that IBS is also defined as mass production of building components, Industrialised Building, pre-assembly, precast building, precast construction or non-traditional building.

2. 1 History of IBS

The IBS system already was adopted in construction Malaysia in year 1964 to build quality houses in speedy construction time. IBS was introduced by Ministry of Housing and Local Government after visited several European countries and their housing development program evaluation (Kamar, KA. M., 2010). The first IBS project consisted of seven blocks of 17 storeys flats (3, 000 units low cost flat and 40 shop lot) costing RM 2. 5 million was built along Jalan Pekeliling. The construction area was around 22. 7 acres of land (Kamar, KA. M., 2007). Kamar, K. A. M. (2010) stated that this project was using Danish System of large panels precast concrete wall and plank slabs and constructed by JV Gammon & Larsen and Nielsen. This project was finished constructed in 27 months from 1966 to 1968.

The second IBS project was launched in year 1965 at Jalan Rifle Range, Penang. The project comprised of 6 blocks of 17 stories flats and 3 blocks of 18 stories flats, which done by Hochtief/ Chee Seng using French Estoit System (Kamar, KA. M., 2010).

The IBS project done in late 1960-an was described to be low quality buildings, impressed with leakage, abandoned projects, unpleasant architectural appearance and other holdbacks by Abdul Rahman, A. B. and Omar, W. (2006). This contributes to the poor images of IBS in construction industry Malaysia and deters the construction parties from adopting IBS in the future.

Between 1981 and 1993, low cost houses and high cost bungalows were built in mass in Selangor state using IBS technology from Praton Haus

International (Kamar, K. A. M., 2007). Furthermore, other earlier IBS projects in Malaysia included Taman Tun Sardon, Penang (1000 units of five storey walk up flats).

However, as the poor images from the utilisation of the IBS construction and the failure of the closed system, it deters many construction parties to change the conventional construction method into IBS. Although much newer technologies and methods are introduced to promote the use of IBS, many contractors are rather using the old construction methods. Furthermore, there is foreign systems introduced in late 60s and 70s were found to be unsuitable to use in weather and climate in Malaysia. Thus some of the IBS method using in the overseas are unable to be applied in Malaysia.

In the 1990s, IBS construction has shown improvement in terms of architectural and structural design with the implementation of computer technology. The implementation of the IBS in construction industry Malaysia is evolving as the method to overcome the demand of housing needs. By using IBS method, the construction of low cost high rise residential buildings was built in shorter period to supply the housing needs.

In the later stage, the successful of implementation of precast, steel and hybrid construction contributed to the rapid construction of quality structures (CIDB, 2003). IBS is many applied in many mega projects during the flourish period 1995 until 1998, such as Kuala Lumpur Conventional Centre (KLCC), Bukit Jalil Sport Complex, Lightweight Railway Train (LRT), KL Sentral Station, KL Tower and others. The development of new administrative capital,

Putrajaya and Cyberjaya are also using IBS construction method (Kamar, K. A. M., 2010).

Now, the use of IBS as construction method is evolving by using the new technology from foreign countries and also developing own new technology (Kamar, K. A. M., 2010).

2. 2 Characteristic of IBS

According to the IBS Survey 2003, first of the characteristic of IBS is the IBS components are produced through prefabrication or highly mechanised process in factory. The precast components prefabricated in the factory includes slip-forms, post tensioning and tunnel shutters. Furthermore, as the majority of the work is done offsite, the number of manpower need during prefabrication of components and site works can be reduced.

On the other hand, IBS also involves modern design and manufacturing methods. The process of designing the prefabricated components is technology-aided, such as involvement of Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM). The using of the technology in designing can ensure the zero defects of the designed components and thus construct better quality products.

Therefore, with the much more time offsite, the product produced in the factory can have systematic quality control. The product is abiding the ISO 9000 principle which ascertains the quality. The checking on the quality also been done in factory for the sake of quality control.

Lastly, the Open System which is also applied in IBS also been considered as one of the characteristic of IBS. Open system permits hybrid applications, which enable the products adapt to standardisation and Modular Coordination (MC).

2. 3 Type of IBS

There are five IBS structural main groups used in construction industry Malaysia (CIDB, 2003), which include precast concrete framing, panel and box; steel formwork systems; steel framing systems; prefabricated timber framing systems and block work systems.

2. 3. 1 Precast concrete framing, panel and box

This type of system is the most common type of IBS. It usually used as precast column, beams, slabs, permanent concrete formwork, 3-D components such as balconies, staircase, toilets, lift chambers and others (CIDB, 2003).

Steel formwork systems

This type of the system is considered as “ least prefabricated” IBS, as it generally involve site casting and subject to structural quality control, high quality products, faster construction period and less manpower and material requirements. This includes tunnel forms, beams and columns moulding forms, permanents steel formworks and others (CIDB, 2003).

Steel framing systems

This type of system is a popular choice and commonly used in skyscrapers. The system is used to construct steel beams and columns, portal frames, roof trusses and others.

Prefabricated timber framing systems

This system is normally use as timber frames, roof trusses and others. By using timber as materials of IBS, it provides nice designs apart from only constructing simple dwelling. The building built can have higher aesthetical values.

Block work systems

The conventional bricks can be replaced by using the block work produced in IBS system. The products produced including interlocking concrete masonry units (CMU), lightweight concrete blocks and others. The time consuming traditional brick-laying tasks can be simplified by using the units produced in the factory.

Closed System

Open System

The building components of IBS are not limited to the owner or certain proprietor.

Standardization

Form or appearance of common components has been determined the size and size

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Modular Coordination

Advantage

The benefits of betaking IBS as construction method are plenty.

CREAM and CIDB (2010) stated that the introduction of IBS by government is to reduce the manual work by moving the works to factory. It also transforms the image of construction industry into better image and thus can attract more locals to participate in construction industry.

2. 8. 1 Sheltered and controlled environment

2. 8. 2 Repetitive production give rise the operational efficiency and economies of large scale production

2. 8. 3 Reduce remittances by foreign labour (Haron, N. A. et al, 2009)

2. 8. 4 Reduce the need of formwork on site as the re-usable metal form is purposely made in the factory

Less site material and cleaner and neater environment- repetitive of formwork and scaffolding

Reduction in wastage as the reinforcement and concrete can control better

Less site material and cleaner and neater environment- repetitive of formwork and scaffolding

Produce quality controlled products in factory

Less labour intensive (Nurul Azam Haron, Hamzah Abdul Rahman, Mahanim Hanid, 2009)

Faster production of building components

Enhance build ability (Low, S. P. & Choong, J. C., 2000)

Faster completion (Haron, N. A. et al, 2009)

2. 8. 11 Not affected by weather (Haron, N. A. et al, 2009)

2. 8. 12 Flexible design (Haron, N. A. et al, 2009)

Disadvantage

Conventional method

Disadvantage:

vagaries of weather

labour intensive

productivity low

Barriers:

Resistant toward change

insufficient information/ lack of knowledge

Lack of technology method

(Kamarul Anuar Mohamad Kamar, Zuhairi Abdul Hamid, Mohd Khairolden Ghani, Ahmad Hazim Rahim, CREAM, 2007)

Costing problem

Insufficient push factor

Un-standardize joints making it difficult to design

Volume and economic of scale

Require training (MBAM 2007)

(Nurul Azam Haron, Hamzah Abdul Rahman, Mahanim Hanid, 2009)

CHAPTER 3

CONSTRUCTION LABOUR

52% is foreign workers from neighbouring countries, 48% is local workforce.

59% of the foreign workers are Indonesian, 13% are from Bangladesh and the remain are from Myanmar, Nepal, India, Vietnam and Sri Lanka.

More involve in private sector than government sector, probably because of the promoting use of IBS in government project (70%). Most of the foreign workers act as unskilled labour involve in manual works on site, for instance, carpenter,

Skill, unskill-define, jobscope

Labour productivity

Disadvantage of employing foreign labour: (CIDB, 2003)

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Increase the outflow of Ringgit Malaysia (RM) to foreign countries

Bringing negative impacts in the social and cultural context

Ways to increase skills (CIDB, 2003)

Prepare large fund for research, for example CREAM

Standard development

Training and promoting programmes, for example CIDB training

Research and Development Programmes to develop innovative IBS application, for example training in the skill of installing the precast components on site

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