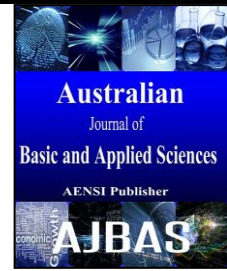




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Suitability of IBS Formwork System in Malaysian Construction Industry

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ABSTRACT

Sector-based building industry or IBS (Industrialised Building System) is still considered relatively new in Malaysia. Although this system has long been used in developed countries such as in Europe. Based on previous studies, the main element that attracted many developers to use the system is a factor in terms of construction time, quality and cost. Generally, this system is divided into five main categories: prefabricated concrete frame systems, panel and box, steel frame system, the system box, steel form work system-block and wood framing systems. This paper discusses the types of systems steel box (steel formwork system) which also covers the installation procedures and work plans based on the concept of IBS. This study was conducted on mega construction projects in and around Kuala Lumpur and Selangor. The result deduced through analysis of usage statistics according to classification system box in construction projects.

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INTRODUCTION

In order to face the challenges of the construction industry, designers and contractors should be sensitive to the use of the latest technologies. Lately the government through the body CIDB (Construction Industry Development Board) seriously promote the use of Industrialised Building System (IBS) in the construction sector. IBS is believed to provide a construction system that promises better quality, fast and cost effective (Nawi, 2011; Nawi, 2014a).

Industrialised building systems (IBS) is defined as the overall structural components of a building, including walls, floors, roofs, stairs, etc. that were built at the factory or at the project site with the supervision of the quality factor and reduced activity at the construction site (Triakha, 1999). IBS is categorized into two, namely the prefabrication method and cast-in-situ.

It is the way the system formwork (formwork) in construction. Mould defined as wood or other materials where concrete has been mixed at the construction site will be poured into it while waiting for the concrete to harden.

Challenges in the Construction Industry:

Based on studies conducted by [4], the demand for the construction sector is exceeding supply, by which case, the material and the labor factor is very important. Foreign workers are usually unskilled when they first arrive in Malaysia and this impacted on the productivity and the quality of the construction industry (Che Mat, 2006).

The Construction Industry Development Board (CIDB) Malaysia, in collaboration with various organizations representing the construction industry, has been urged to use innovative construction techniques, and to shift from the traditional practice of brick and mortar systems to an Industrialised Building System (IBS) of construction (Hamid, 2011). One of the technique is called as IBS form work system which able to speed up the delivery time, and to build affordable and quality houses.

In the building industry, the existing (conventional), the cost of labor to contribute up to 80% of the project cost (Junid, 1986; Bennet, D.F.H., 1993) while the estimated cost of formwork 'is about 20% of the project cost. One solution to the problem is through the use of technology-based industry, commonly known as IBS. Use of Prefabricated Forming can reduce labor and waste material from cuts and damage is found through the use of the

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conventional system (Regional Workshop; CIDB), 2001; Trikha, D.N., 1999).

Formwork system (box mold) is defined as the mold wood, steel or other materials which are mixed concrete at the construction site will be cast into it while waiting for the concrete to harden. (Azman, 2012). According to JT Grundy, box mould (Formwork) is sometimes known as a cover board or vertical pieces to form the still wet concrete during placing of concrete work. The component also some of the most concrete finishing strong. The mould constructed must not have a significant effect on the economy, strength, firmness and rigidity.

Generally, there are two types of mould box (formwork) that are commonly used that kind of permanent and temporary. Box mould (formwork) is a type of permanent mold box (formwork) that will be left after the completion of the concrete work. Type box mould (formwork) while waiting for the building was used in the concrete hardens. Appearance at the end of the concrete surface and the development work of the mold box (formwork) of this type is based on the frequency of use of the system.

Finding:

Based on several studies, it was found there were 29 construction projects that exceed the cost of RM 10 million who use the system molds (formwork) based Industrialised Building System (IBS). Through this research, has identified several factors booster toward the use of systems 'Formwork' IBS based on factors of which are procedures and planning work on a construction site. However, using the IBS system is not yet stable and consistent due to the cost factor. Majority opinion for the cost of a system is quite high and result in only a small number of contractors capable of using IBS in the construction project [9]. In addition to cost factors, the knowledge and information about the systems 'Formwork' IBS also affect its use. The contractors who know or have information on the system will lead to its use.

In the same study on a sample of 29 construction projects in Selangor and Kuala Lumpur, has been categorized according to the classification system of 'Formwork' IBS. Figure 1 shows the percentage of the adoption of formwork system in the area.

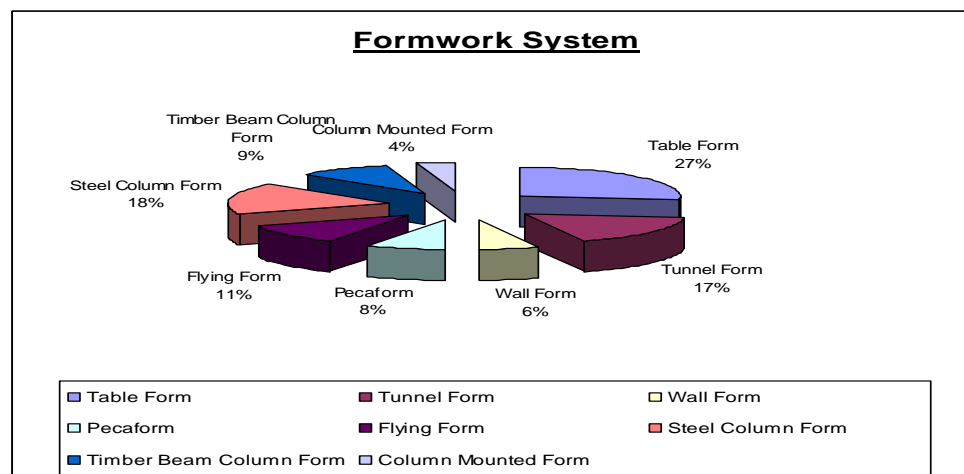


Fig. 1: The Adoption of IBS Formwork System.

Recommendation:

This study found that the use of Formwork IBS system in the construction sector is ideal because it can create a sense of well construction site clean, easy to use a measure of the best solutions and efficiency, especially in terms of cost and time savings. This system also can be used repeatedly, and modification by concrete difference. It is also suitable for the construction of a typical design and repeatedly need for construction projects such as low-cost housing, moderate, flats, and single and double storey housing.

In addition, it is proposed also to developers or contractors to use the system Formwork IBS 'because factors other advantages, such as allowing the use of less skilled labor and the need for a little number of

employees. It also allows the construction of a modular, flexible, and quality assurance of the good work. In conclusion, the use of 'Formwork IBS' is able to 'finishing' a concrete finishing and attractive work environment that is more environmentally friendly.

So on these factors, it is believed that the system can 'Formwork IBS' certainly has its advantages and privileges that cannot be doubted whether the aspects of construction and safety on construction sites. Here are the figures working on a construction site using a variety of 'Formwork IBS.



Fig. 2: Column Work.



Fig. 3: Simple form system.

Conclusion:

IBS has established relationships with aspects of technological and economic development, particularly in the construction sector. In some developed countries such as Japan, Germany and the United Kingdom, which has a high density ratio as well known for the latest technologies, the potential use of the IBS building systems is very promising and encouraging. Therefore, this study tried to find the suitability of the box shape (formwork) in the Industrialised Building System (IBS) for construction.

However, from the results of this study find that box on the form of IBS is still too new and its use in the construction sector in Malaysia. Thus, the various step approach towards the use of this system should be further improved. Things also get support from the government when granting exemptions levy imposed by CIDB to the developer using IBS. Among the recommendations made from this study is to provide full information to the developers and contractors about the advantages and benefits of the system. Such as labor saving, safety and cleanliness of construction sites as well as solutions to issues involving time such as delays and abandoned projects. Things like this are very important to ensure that the construction technology of IBS, especially

box shape (formwork) can be used to give maximum effect to the construction sector as a whole.

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