Advantages of Using Hybrid System Method in Industrialised Building System (IBS)

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Abstract. Hybrid System method is one of the technology implements in Industrialised Building System (IBS). Methods has been acquaint in many ways in order to improve Industrialised Building System (IBS) in Malaysia. Other country such as United Kingdom also have used the term Hybrid for their concrete process known as Hybrid Concrete Construction (HCC). While in Malaysia, Hybrid System comes with a method that combines one component with two different method which are the precast component and cast-in situ method. This two combination method has called a Hybrid System method and started implements by Jabatan Kerja Raya (JKR) for mostly a government projects in Kedah state in Malaysia on 2017.

Industrialised Building System has been well known as a fast completion, saving cost, and less labour needed in construction. However, the issues by using Hybrid System method has double up the time completion, splurging the cost, and enlarge the labour since it needs to cast-in situ the components, let the concrete cured and more material usage. The significance of study for this research is the new method of IBS Hybrid System is a pilot project in Kedah by JKR. Thus, this research is to control the delay involves in projects that apply IBS Hybrid System. Hence, this paper is to identify the advantages of using Hybrid System method in Industrialised Building System (IBS).

1. Introduction

The Malaysian government has been quick to advance IBS. In 1999, the first IBS Strategic Plan was declared, trailed by two ‘guides’ proposed to help the utilization of IBS by 2015. Similarly as with any new innovation, cost would have been a key factor in the intrigue of IBS for Malaysian organizations. In 2008 the administration ordered that 70% of materials in any state-supported development venture must be IBS (up from 30% in 2004). The proposition was intended to cut down expenses, and by augmentation, support use in the private part. The 70% order depended on the IBS Scoring System, and an Implementation and Coordination Unit was built up to screen consistence. By 2010, ventures totalling nearly RM10 billion had been finished utilizing IBS [1].

Thus, the expense of IBS has fallen significantly. Sometimes, even before considering in diminished work costs, it tends to be less expensive than utilizing traditional techniques. CIDB has various measures set up to build reception of IBS in Malaysia. These incorporate advancing modularisation and institutionalisation in building forms. Computerisation and mechanical autonomy are going to assume progressively significant jobs in development. Instruction and preparing for Malaysian laborers is additionally a need as the new innovation makes strides. Designers have for
quite some time known about the advantages of utilizing IBS segments in their ventures, however with work costs giving no indication of changing, all the more should be done to encourage reception of IBS financially savvy building techniques, and the administration needs to lead the charge by further boosting temporary workers [2].

A contemplated had been finished by [3] expressed that the conventional development process is inadmissible for Offsite Manufacturing (or IBS development) and represents a significant boundary to its selection [4]. The finding of the examination is bolstered by different past investigations CIDB (2009), [5] and [6], whereby numerous IBS venture advancements in Malaysia is as yet dependent on the customary structure approach. It is suggested that IBS development life cycle procedure ought to include the appropriation of new business systems, with the points of incorporating the useful controls at the beginning times of venture [7].

From past examination, expressed that in configuration approach, IBS venture still utilize customary plan which isn't satisfactory and furthermore causes hindrance into this new innovation. IBS has been known as an innovation that utilized an instant segment technique and the jointing is the solid joint. While for the Hybrid System that have actualized in consolidating one segment with two diverse strategy (IBS precast part + cast-in-situ). This jointing of two diverse strategy have been distinguished as a polylithic joint [8]. In this way, in this examination there will be another technique that start executes from 2017 by JKR as a pilot ventures called Hybrid System to be highlighted. What's more, to be made sense of whether this strategy can causes delay nor get it be known as an effective technique [9].

2. Details Analysis

2.1. Method Analysis

The system that has been picked is the quantitative procedure to achieve the goals of the investigation and the subjective examining technique is used to get the data collection process. In Figure 1, the general flowchart of the investigation technique is as showed up as pursues. The accumulated data will be looks at by using the Statistical Package Social Science (SPSS) to get the measurement profile of the respondent and the free and ward variable subject to the objectives.

Before collecting the data, research has been studied from various sources which are primary data and secondary data. All the data been collected and respondents went through the survey questionnaire by interviewing the professional parties. The analysis run by SPSS in order to get an accurate results.

Thirty (30) professional parties were involves as a respondent in this research in order to get the availability results. Respondents are those who most involves in Hybrid System method projects which are the project manager, engineers, structural engineers, IBS consultant, and suppliers.
2.2. Data Collection

2.2.1. Primary Data
In this research, survey was utilized as the strategy to gather the information. Essential information is frequently gathered for strategies that utilization the contextual investigation, examinations and poll reviews [10]. The survey strategy was picked in light of the fact that the technique was considered as the best and most effortless technique to gathering the information required for this sort of research. Using survey precise data can be promptly gotten for investigation.
2.2.2. Questionnaire Distribution
The poll review was led as a self-appropriate survey and takes around one month to circulate the poll to every single proficient gathering includes in three contextual investigation. Then, before start the circulation of research survey, the location and contact number of the gatherings has been sort out get ready dependent on the ongoing Monthly Report Data from Jabatan Kerja Raya (JKR) Kedah. Prior to the conveyance of poll, phone calls will make to educate the respondent about the arrangement to guarantee that they are prepared for study session. During the accommodation of polls, introductory letter for the examination review will append and provide for respondent alongside poll to persuade them about the study. An aggregate of 30 respondents will be approach and surveys will be returns for analysis process.

2.2.3. Instrument
The survey was intended to the chose respondent with straightforward and way. It will be simpler to investigations by the recommended answers on the given scales. The survey was intended to concentrate on the four goals which are the elements that causes a deferral for all situation study venture, the appropriateness of structure and segment mix (Hybrid System) in development utilizing IBS (precast) and traditional strategy, the relationship of variable factors among components and technique that identifies with postpone causes and a suggestion on the best way to counteract delay in IBS venture. The survey will be set as shut finished inquiries to accomplish the destinations.

3. Results and Discussion
The results of the survey for this research has been analysed and found out the highest mean is the highest reason of the government projects nowadays implements Hybrid System for most of their projects. The result is as shown in figure 2 below.

![Figure 2. Mean of Reason for Using Hybrid System in IBS.](image)

From the graphs of the data analysis, it has been summarized by the mean of the data as table shown below. The Hybrid System is clearly not been applied because of its fast completion since the mean is the lowest at 2.61 which is mostly disagree among the respondents. Meanwhile, result shows that respondents are mostly agree that Hybrid System is better than conventional with the highest mean at 6.07 among other reasons.
4. Conclusion
From the result that had been done from poll review, the reason for using Hybrid System in IBS is because it is better than conventional. Thus, this shows that one of the highest reasons why Jabatan Kerja Raya (JKR) Kedah decided to use Hybrid System in the implementation of IBS is because the advantages of it is better than conventional method for the government projects.

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