



## A REVIEW OF DELAY FACTORS IN MALAYSIAN INDUSTRIALISED BUILDING SYSTEM (IBS) CONSTRUCTION PROJECT

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### ABSTRACT

This paper contribute towards factors of delay as a whole in Malaysian construction sector by application of Industrialized Building System (IBS). Similarly to other developed countries, Malaysia getting benefits through returns from construction industry, as identified through Gross Domestic Product (GDP). However, there are still some issues in the IBS construction industry to overcome until the time and cost performance plunged to reduce. The focus of this study is to inquire factors in delay issue which involves series of people which act as project stakeholders particularly in Malaysian Industrialized Building System. A number of factors causing delay to construction project in IBS are found by previous study. The prominent factors of delay in IBS are poor expertise to engage with unpleasant situation during handling IBS project, lack of communication between stakeholders, ineffective team alliance, poor client behavior, poor financial management and external factor. Study regarding delay issue with IBS adoption in foreign countries such as United States and China was progressively conducted. In Malaysia, a survey towards establishment and development of IBS has been conducted. It can be concluded that IBS project faces numerous challenges to be implement resulting in the delay. However, very few studies have been attempted on the factors causing time delay. Therefore, this paper will focus on factor which contribute into delay in Malaysian IBS project.

**Keywords:** industrialized building system, delay, Malaysian construction industry, IBS implementation.

### INTRODUCTION

IBS is acknowledged as an on-site construction process comprises of methods, products and a set of connected component which work together to achieve an objective in construction project. IBS requires prefabrication component and installation of component structure on-site (Kassim, U. & Walid, L. 2013). In Malaysia, Construction Industry Development Board (CIDB) categorized the IBS system in general into five categories, which are precast concrete system, steel formwork system, steel framing system, prefabricated timber framing systems and block work system (Mydin, M., Sani, N. & Taib, M., 2014). The implementation of IBS in Malaysian Construction has been popular by CIDB through Malaysia's Roadmap of IBS (CIDB, 2003). The implementation of IBS in construction project is known as a main key to produce a high productivity in housing construction. (Din, 1984; Karim and Adeeb, 1993; Trikha, 1999; Engletrik, 2000;

Omar, 2000; Koo, 2000). Based on previous study, Hwang *et al.* (2013) found that site management, coordination among various parties, and accessibility of labor on site is a main critical factor which affect schedule of construction project. In Malaysia, lack of time management skill become a major concern in housing delivery. It is because the returns of the industry depends on the time taken by the housing business (Soon, 2010).

The issue which hit the Malaysia housing construction performance noteworthy because citizens demands for residence boost up over 30 million in year 2020 (Chan, 2009). Therefore, Malaysian Construction Industry need to pay a high attention towards housing plan for sustainable development. According to Abedi,

M., Fathi, M. S. & Mirasa, A. K. (2011), the implementation of IBS is believed able to boost up the housing units until achieve the demand target. In year 2003, 20005 and 2008, a research has been carried out by CIDB to investigate the rate of knowledge of IBS among participant in construction project (Majid, T. A. *et al.*, 2011). However, the attention towards IBS in construction is started as early as 1964 until today. Before IBS been introduced and practiced in the construction sector, a few projects had faced with various problems which affect the construction performance (Ismail, F. *et al.*, 2012). It can be proved through large MARA construction project, which had to bear with 90% of delay since 1984 (Abdullah, *et al.*, 2010). After the construction industry become expanded all over the world, a few parties had realized the importance of its implementation. Government also tried to combine the system of IBS in handling construction project, but the rate of acceptance in the industry still unfavorable (Anuar, K. *et al.*, 2012). Lack of IBS support is due to delay which is obviously given a side effect towards construction performance in term of time and budget. The phenomena of delay become a main issue in construction industry which become a favorite topic often discussed in this sector.

### A factors cause of delay in IBS projects

IBS has been implemented for ages in Malaysia. It was started since 1960, where construction industry in Malaysia had implement IBS after being introduced widely by Ministry of Housing and Local Government of Malaysia through observation in the use of IBS in some European countries and study towards the effectiveness



and achievements of its housing development program (Thanoon *et al.*, 2003).

Based on study from previous researchers, IBS has been proved as a main key to boost up the productivity in construction industry. E.g. reduce time consuming to complete construction project, extremely high durability and less employed people. These beneficial of IBS is very useful to ensure project achieve its objective in term of time and cost. Many developed countries and Malaysian government attracted to adopt IBS in construction industry (Thanoon, W.A.M. *et al.*, 2003). However, the problem of delay becomes major problem in IBS construction project that affected the successful of IBS implementation in Malaysia.

According to study of Endut I.R. *et al.* (2009), it shows that public and private projects able to prevent time overrun along period of construction as much 18.2% and 29.45% respectively. However, other project had through as much 49.71% of delay. Due to high percentage of delay in other construction project in Malaysia, it obviously shows that phenomena of delay highly experienced since a long time ago. Therefore, it shows that most of the construction project in Malaysia has experienced of delay. In private housing sector, an agreement is made through contract document to meet an agreement at a preliminary step (Mydin, M. A. O. *et al.*, 2014). However, by omitting a contract agreement, the chances of delay will increase (Assaf, S. A. *et al.*, 1995). The period of the delay in construction occur depending on the circumstances of a project. In a certain situation, the original duration of project require to be extended either for a few days or over a year (Alaghbari, W. *et al.*, 2015).

Commonly, in Malaysian construction project with IBS adoption, delay phenomena is blazing because of a few factors. Among the factors that led construction projects into delay is due to poor integration and communication between stakeholder at design stage (Nawi *et al.*, 2014a; Thanoon *et al.* 2003; Haron *et al.* 2005; Chung, 2006; Kamar *et al.* 2009). Abd Shukor *et al.* (2009) asserted that there is a variety of procurement stages that contribute towards prominent problems which make it challenging to integrate people. The process of procurement might be complicated due to many stages need to be acquired. Thus, the implementation of IBS needs an expertise to delegate and creating an attitude of cooperation and good relations between participants of the project to ensure main objective of IBS implementation is well achieved. The introduction of IBS is not so widespread because IBS level of understanding among the participants of the project are so superficial, resulting in difficulty in adapting these systems in construction projects (Kamar *et al.*, 2009). Therefore, the probability of making mistakes or negligence in the performance of the system is high. It clearly shows that the driving forces builders to adapt the IBS still at a low level. Lack of readiness among main project participant cause poor time performance in construction project (Kamar *et al.*, 2009). Lack of adequate preparation among project participants

in adapting IBS in construction procedure can smoothen the project through an effective two-way communication. In some cases, poor communication between stakeholder become a factor towards low level of integration (Mohammad, F. M. *et al.*, 2014).

Poor connection through communication between stakeholders during handling the IBS project would cause time wasting because of repetition of design plan and working drawing. It due to delivery and receipt of information that is not very effective. These problem probably incur a higher expenses and extra time to cover the damage in order to complete the project (CIMP, 2007; Kamar *et al.*, 2009). Therefore, interconnected of communication between people involve in projects should be given serious consideration. According to Kamar *et al.* (2010), a good management of communication able to provide effective information flow to carry out process arrangement. Other than that, time management of construction activities from start to final stage will be more organize (Pan *et al.*, 2008).

Conflict that occurred among project team had failed to establish a transparent discussions and ultimately making decisions that do not has quality. As a result, the project team failed to get a suitable alternative for the implementation of IBS in construction projects (Abedi, M., Fathi, M. S. & Mirasa, A. K., 2011). Conflict in project team may affect the project progress until cause of some delay during in construction stages. Top managers should plays an important role in ensuring that project teams are encourage to be cooperative and supportive. Lack of attention from seniors managers and project manager planning cause poor procurement management level (Akintoye, *et al.*, 2000; Brown, 1999; Suhol & Peter, 2004). Charnwasununth, Yabuki and Tongthon (2009) identified that the weakness in project team due to deficiency source of information, authority among different types of role among project participants on site and other role in the main and branch offices. The construction delay was due to lack of coordination between projects team (Ibrahim, H. *et al.*, 2012). The connection among team member to perform a certain function is very crucial to keep the project on track in connection with IBS implementation (Rahman & Omar, 2006). It shows that, all project participant have their own functions and it is very important to complete the whole project needs from beginning to end.

Furthermore, the cost for IBS implementation at early stage require a huge amount due to the paid up capitals and maintenance of machineries. (Thanoon *et al.*, 2003; IBS Steering Committee, 2006; Rahman & Omar, 2006). It was found that owner of construction project with IBS adoption also has to bear a high cost to build factories and purchasing expensive support machineries. (Mydin M. A. O. *et al.*, 2014). Nawi *et al.* (2012), also agreed that to organize IBS construction project, it need a particular type of equipment and machinery to produce required component. In order to ensure the work at optimum and continuously, periodical financing to support it utilization is necessary. However, some



construction companies have a poor financial status and unaffordable to support continual funding in a challenging industry (Nawi, M. N. M. *et al.*, 2011). In certain cases, projects had to limit the amount of investment because the cost is too high and does not have sufficient capital (Kamar, *et al.*, 2012). Thus, incapable companies to funding the facilities had a high probability to obstruct project completion on time.

The poor financial status of a company may also effect on the completion IBS construction project. The situation is happened when the management does not have a good financial plan on the IBS construction project. The financial problem happened in the company could delay the completion of IBS project. For example, higher initial cost to implement IBS and will end up with cash flow issues, struggle to pay the significant costs such as those associated with raw materials. Cash flow issues is referred as money flowing in and out of a business over set periods of time such as monthly, quarterly or annually.

Others financial issues that common face by contractors is lack of initial capital when they start a project. The lack of available capital is most often cited as the reason that will prevents business to growth and to complete the project that they have started. As we know the IBS construction project is required higher initial cost. A contractor should well plan their financial needs before they start a project, they should looks to any available financing that suits to their needs and able to get the financing from financial institution. Most of construction companies never really succeed because of lack of capital and will end up with lack of staying power on the industry.

Furthermore, when lack of initial capital, construction companies will facing the problem of building materials and land costs vary. Contractors often need to bear the risk of cost changes because of fixed-price contracts for the signed legal contract of construction project. The major cost of construction in certain condition such as economic downtrend, can also change rapidly the cost of variable cost involve in the project. Sometimes builders or contractors can pass higher labor and material prices to end user; however, when prices rise quickly, some builders, especially smaller ones, can get caught with the costs between the time they agree on a price for a project and the time they finish.

In related to financial issues for delay factors in Malaysian IBS construction project might be due to late of payment between the contract issuers or sometimes among contractors and sub-contractors. Proverbs, Holt, and Cheok, H Y (2000), study on construction industries problem in United Kingdom (UK). They states that late payment (e.g. of contractors, subcontractors and suppliers) is more of a problem in the UK than any other European country. The late payment problem is difficult to be rid of this culture without the introduction of legislation to control or to manage the problem wisely. When this situation happened, unhappy parties either such

as sub-contractors might purposely delay their works of progress.

In addition, participant which played a key role in construction project have a problem to organize multiple job given and encourage downline to perform multi-task. Most of the key players in project team are lack of thought related to design and install procedure of IBS (IBS Workshop, 2011). Thus, the weakness in context of coordination cause the process of building approval take a longer time. Therefore, the original period for the project completion need to be extend until the verification process is completed. It has been proven that players in construction project have a lack of attention towards it interest cause poor of knowledge regarding IBS design and assembly process (IBS Workshop, 2011). As the consequence, many local authorities in construction industry misinterpreted towards IBS current guidelines building and building approval process. (Room *et. al.*, 2009). Thus, time taken for IBS project to successfully complete become longer than planned schedule.

#### Research methodology

The research was conducted by review existing literature and study previous fact based on general issues regarding construction delay in IBS. The main subject focuses in this study look into because delay issues has attracted much attention in recent years. The methodology applied is qualitative research methodology.

#### Discussion

Based on the study through a literature review, a few general issues has been highlighted which give a high influence towards time performance in IBS construction industry. It has been found that there is lack in information storing, information distribution, authority among project participant, and coordination between project team, high initial capital cost of IBS adoption, weak and unstable financial, unfamiliar with IBS procedure and poor jointing of fabricated or in-situ elements. Table-1 shows that influencing factors towards IBS project completion.

**Table-1.** Influencing factors towards IBS project completion.

No.	The Influencing Factors Towards IBS Project Completion
1.	Poor integration and communication among stakeholders at design stage.
2.	Poor team collaboration.
3.	High initial capital cost.
4.	Lack of knowledge towards design and installation procedure of IBS.
5.	Weak and unstable financial status.



Nowadays, delay issue seems very critical to discuss because it involved many factors which could affect duration of project completion in Malaysia. There are few common factors which often put forward as the main reason for the occurrence of delays in IBS Malaysian construction. It has been found that deficiency in management, collaboration, communication of IBS become an overall factor of delay phenomena.

Leaders in some organization or group in construction project play an important role in developing and managing all related tasks to ensure the objective is achieved which is completing the project on time as planned. Based on a study, 'right leader' could be describe not only from its style, encouragement, inspiration or its blueprint. But, a 'right leader' is known based on thought to possess the highest level of integrity, setting the right purpose, courage, high passion and leadership skills (George, 2003; George *et al.*, 2007).

In the meantime, leader should put a commitment into high priority to ensure all process in IBS construction become smooth which consist of initial works, components production at the factory, transportation of components into site, installation and finishing (Harjeev *et al.*, 2011). Therefore, without putting a right leader in IBS projects, there will be a high probability for the construction becomes disrupt and deviate from original schedule due to poor of competence to organize and monitor every stage of the construction of adopting IBS.

Therefore, deficiency in management, collaboration, communication and thought of IBS are highly correlated with phenomena of delay in IBS construction project particularly in Malaysia. Based on a previous study, there are various topics discussed regarding delay in Malaysian construction. However, major problem highlighted regarding delay in Malaysia is less discussed in detail particularly in IBS. Therefore, in-depth study should be conducted widely to find a specific delay issue in Malaysian Construction Industry with IBS implementation. An improvement and solution towards current factors of delay seems very significant to encounter delay issue. Hence, study towards delay in Malaysia is carried out to determine the general delay issue in IBS and scope of the delay issue.

## CONCLUSIONS

As an overall, there are many factors that can dominate the time performance of IBS project. Therefore, a leader in the IBS project should play a main role in controlling or preventing the issue of delay to ensure the project activities are consistently running for each phase until the project is completed. Effective communication between project team is needed through appropriate information channels to ensure the storage and dissemination of information between them are in a satisfactory level. This study is vital in order to identify the influencing factor towards time performance of IBS project. In the further extent research recommendation, a focus is necessary to create an effective management strategy as a delay preventive in Malaysian construction

IBS project. It will definitely assist other IBS practitioners in the construction industry to implement IBS in construction project efficiently and effectively without causing delay. Hence, the adoption of IBS in Malaysian construction industry will become more manageable and profitable with less number of project delays.

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