Examiner 2 : Norul Izzati

Financial Barriers in Archieving CIDB IBS Roadmap in Malaysia Private Sector Construction Industry

BY

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Declaration:

I, Desmond Lim Eng Hong, I12000494 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 researches.

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ABSTRACT

Industrialised Building System (IBS) was introduced by the Malaysia government at first was to provide affordable housing for the populace. At the later period, this construction method is encouraged by the government to the construction industry to solve the issues which the industry is facing now. This construction method has been implemented successfully in other countries most notably Japan and Singapore but over the years the implementation of IBS is still low in our country particularly the private construction industry. It is found out that financial issue is the main towards implementation of IBS. This research is to find out the financial barrier which causing the private sector from implementing IBS and achieving CIDB IBS Roadmap goal. Recommendations are also identified to tackle this issue and hence providing CIDB idea or ways to address this issue. Data and information obtained from questionnaire survey are analyzed using frequency distribution analysis method. From the findings, it is found out that financial issue is indeed a critical barrier towards implementation of IBS in achieving IBS Roadmap and CIDB is required to prioritize and focus on addressing this issue.

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CIDB	Construction Industry Development Board
CMU	Concrete Masonry Units
HDB	Housing Developmental Board
IBS	Industrialised Building System
KL	Kuala Lumpur
KLIA	Kuala Lumpur International Airport
PWD	Public Works Department

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Project Title

Financial Issues Barriers in Achieving CIDB IBS Roadmap in Malaysia Private Sector Construction Industry

1.2 Background

It is undisputed that the significant portion of Gross Domestic Product (GDP) is contributed by construction sector of the nation. (UKCG Report, 2009) explained that the nation economic is greatly influenced by the construction sector while it boosts the government revenue, investments opportunities and employment opportunities for its citizen. The demand is not short for construction in Malaysia as the demand increases as years passed by. The increase of demand owes to increasing population and life quality of the population for residential buildings in Malaysia (Tiun, 2009).

Implementation has started in since 1960 for Malaysia, it is not general or widely promoted until in 1998 when IBS Strategic Plan blueprint is endorsed by the Malaysia Government for the construction sector to enter total industrialisation. Since then, Construction Industry Development Board (CIDB) has been vigorously endorsing IBS implementation for construction project in construction industry. IBS Roadmap was even drew up by CIDB which consists of strategies, steps and measures in order to promote the widespread and increased content use of IBS in Malaysia.

CIDB which is one of the government branches is tasked to shift the construction industry from conventional construction method approach to industrialisation which is the use of IBS. This is

to modernise the Malaysia construction industry for ease of work. The main purpose of introducing IBS in Malaysia is to decrease the high dependency of foreign labour by Construction industry players and to increase productivity, reduce wastages in a whole and cope with affordable housing demands of the people. Since the endorsement till now, implementation of IBS is very low though it has been implemented in Malaysia in the early 1960's. A local news portal (Bernama 2014) reported that the usage of IBS content in the private sector is less than 10 per cent as it till April 2014. The current usage of IBS content by the private sector is far from the target or expectation set by CIDB in IBS Roadmap 2011 - 2015.

Thanoon et al (2003) underlined construction time can be shorten, saving in construction cost, and overall quality of the works. Warszawski (1999) also explained that implementing IBS reduce the needs of labour and subsequently increasing productivity and quality of construction is assured. Despite all these facts that IBS is clearly favoured by researchers and authority in general for this system benefits, the construction industry players are reluctant to implement IBS in their project and still favours conventional constructional method.

Due to these circumstances, an IBS survey was did to ascertain the problems faced by the construction industry players in implementing IBS. It has been concluded that the most significant barrier faced by the contractors in implementing IBS is the financial issue despite of other barriers faced such as awareness (Kamar 2014).

1.3 Problem Statement

In the past five decades, IBS system has been implemented in Malaysia since its inception. IBS is being regarded by government that it is the utmost appropriate solution to resolve problems

faced in the Malaysia construction business which are high numbers of foreign labour employed by private sector and low productivity output. The current IBS Roadmap in force plans to increase to 50 percent for the present IBS content in the private sector Malaysia by 2015 but the current usage of IBS content is still very low.

Furthermore, Tan Sri Dato' Ir. Jamilus Hussein in Malaysia IBS Exhibition 2009 has admitted that the construction industry of Malaysia is still remote from realizing the ideal objective as planned accordingly to IBS Roadmap although with most of the strategies and activities are implemented accordingly when giving his speech to the audience. Although the construction industry stakeholders are open to the idea of implementing IBS, there are still a large group of stakeholders posed resistance and reluctance to implement IBS. Pan et al (2009) underlined that contractors find the implementation of IBS is less convincing and unattractive largely due to cost issues.

Why is this so when IBS helps in cost reduction of construction in a whole? Thus, this issue has led to the study of determining financial issues become a barrier on achieving the CIDB Roadmap for private sector of construction industry of Malaysia. (CIDB, 2003)

1.4 Aim

To determine the financial issues which prevent from achieving CIDB roadmap for IBS system for private sector in Malaysia Construction Industry.

1.5 Objective

For the aim to be achieved, the following objectives have been identified:-

- To identify the factors which causing the financial issues to be the major barrier from implementing IBS.
- To identify ways to tackle the financial issues in IBS construction towards achieving CIDB roadmap.

1.6 Scope of Study

This research focuses on medium sized contractor perspective and to determine the financial issues which deters from achieving the CIDB Roadmap for private sector in Malaysia Construction Industry. Many medium sized contractors are aware of the IBS in Malaysia but the main barrier which is the financial concerns hinder them from fully implementing it in the project and realize the plan that CIDB have for the construction industry. This study is limited to on building projects which have implemented IBS in private construction sector. The study is also limited to the current developments and happenings in construction industry of Malaysia especially concerning on IBS issues. Although study based on clients or developers, consultants, government linked firms such as suppliers and contractors in Malaysia construction industry are permitted but the main study focus should be on medium sized contractor of private sector. The information and data will be collected from these contractors for analysis.

1.7 Research Methodology

The study to accomplish for this project is by using the literature method and conducting survey by using questionnaire survey form. This project's preliminary study where a literature search is carried out to obtain information regarding on the background, development and issues faced in achieving CIDB Roadmap for IBS. The work is carried out by looking to sources such as article journals, books which are published, research papers, published research works, magazines, and information from internet, newsletter and brochures. After the literature search is completed, an interview with the expert panels deals with IBS will be conducted and questionnaire survey will be followed right after. Figure 1.1 explains the brief flowchart of methodology conducted for this study.

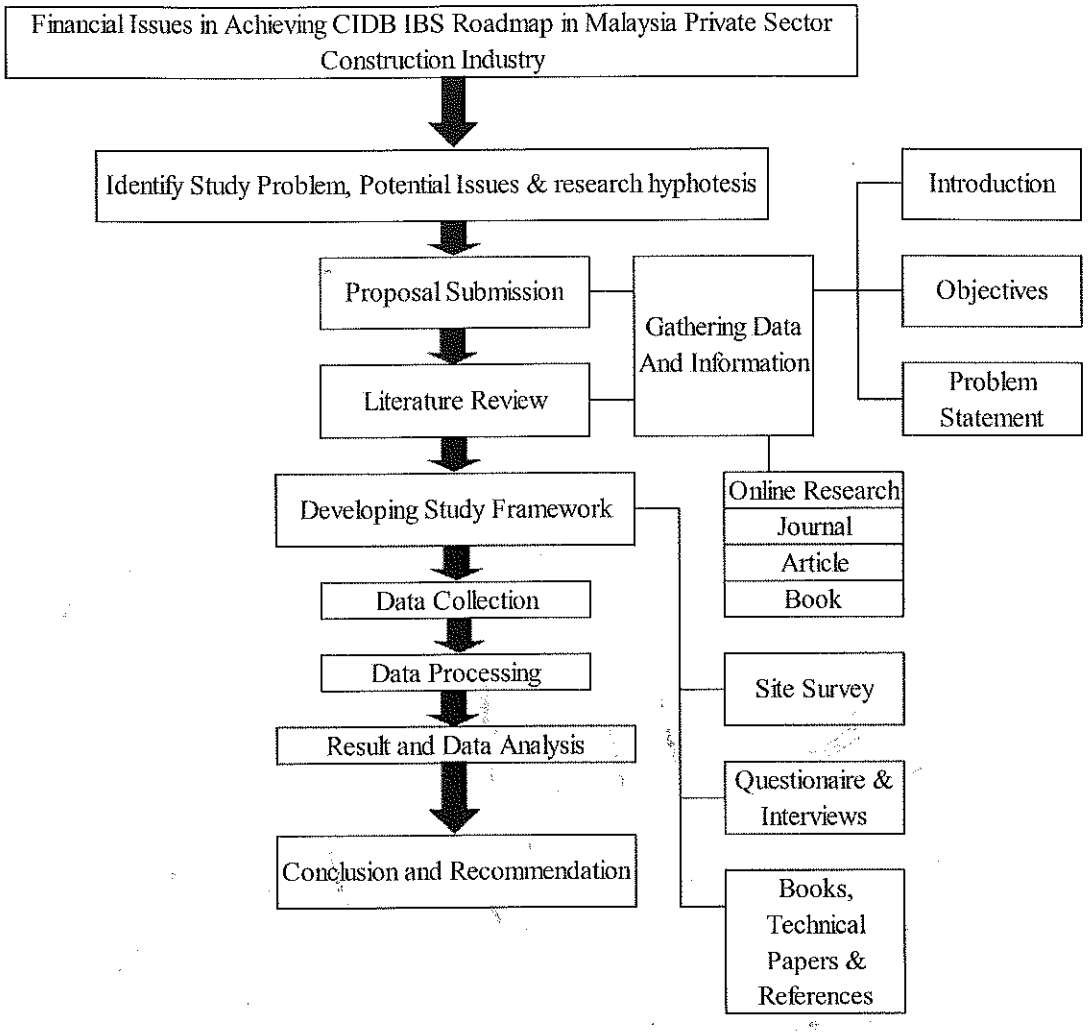

Figure 1.1 Flowchart of Research Methodology

1.8 Significance of Study

The aim of this research is to determine what are barriers of financial issues towards achieving Roadmap prepared by CIDB for Industrialized Building System (IBS) of Private Sector in construction industry of Malaysia and whereby promoting private construction sector in IBS construction towards achieving CIDB Roadmap. IBS application in construction benefits the stakeholders who adopts and eventually help Malaysia to achieve Vision 2020 of becoming developed nation. Nonetheless, a research is to be conducted and further improvements can be made for IBS application in Malaysia.

Significance or importance of research towards of industry is, it can assist CIDB to find out the reason why financial issues is consider as a major issues for the private sector to adopt IBS in their project. This will also help in investigating whether financial issues are really an major issues as perceived by the private sector. By understanding the issue, this will help CIDB in better understanding of what private sector are facing and assisting them in any ways.

Besides that, this research is to help in factors which cause financial issues for private sector to adopt IBS. Factors being identified will help CIDB to tackle this issue quickly and effectively. For the Malaysia IBS construction industry to move forward, identifying the factors of financial issues are essential.

This research is also conducted to investigate the effectiveness of CIDB's steps and measures in achieving its roadmap for the private sector construction industry. The role of government in establishing its policy and decision making in realizing CIDB's goal and its roadmap are essential.

Also, by doing this research understanding of the current development of IBS in Malaysia construction industry will be better. Better understanding helps in tackling the issues and challenges currently plagues IBS from full implementation in private sector construction project.

1.9 Summary

This chapter was explained to introduce and further describe the study background for better understanding on the issues of the project. The issue to be studied is the financial barrier which plagues the private construction sector in Malaysia hindering them from implementing IBS and achieving the target content usage stated in IBS Roadmap by CIDB. This study will also provide some in depth information on IBS technology and IBS Roadmap.

2.0 LITERATURE REVIEW

2.1 Introduction

Through industrialisation, cost of construction work can be reduced substantially with improved quality of works coupled with the populace can acquire complex building. Demand for complex construction products grows steadily in the market today, which includes construction materials. Till this day, industrialization is really applied in the Malaysia construction market for buildings fully. These days client's need and demand are getting complex, consultant with builders need to fulfill according to their requirement and most importantly keep the construction cost as low as possible but without foregoing quality coupled with on time delivery of works. The industrialisation will help to achieve these essential elements. Though IBS is not new in Malaysia, it should be encouraged to be implemented for the construction projects which provide many benefits and able to overcome the conventional construction method flaws and issues currently faced by Malaysia construction industry.

2.2 Definition of IBS

To date, there are wide variety of definitions whereby there are none agreed or uniform definition for IBS which lead to some misunderstanding. The term IBS is gernerally used by government authority, construction industry stakeholders and researchers on IBS in Malaysia which signifies industrialization on construction. In a whole, a certain definition should be developed to lead to correct understanding of IBS. Nevertheless one of the well accepted definitions in Malaysia is by Lessing, et. al. (2005) explained that IBS is process of industrialization and construction

integrated thru well executed organization for well-prepared plus optimal material with competent management, results and activities supported by usage components of highly developed.

According to Rahman & Omar (2006), IBS is also explained as a type of system of construction using pre-manufactured system for construction works. Machine, formwork and other mechanical associated equipment are used to systemically manufacture these components. The components are manufactured offsite and upon completion ready for assembly and erection once transported to construction site. IBS can explained that industrialised manufacturing of pre-fabricated components offsite or onsite involved for a building system and for assemble and erection of these components into building desired through machination means and avoid in-situ construction as little as possible at construction site.

In another definition by Chung & Kadir (2007), IBS is the building components whereby mass produced at offsite or at onsite in accordance to requirements of dimension and shape and delivered to construction site to be erected and assemble to form a building with standards to adhere strictly. Uniformly, CIDB (2003) has defined that IBS is a type of technique in construction whereby IBS products are manufactured in a controlled manner of fabrication factory and then transported to construction for assembling and erecting into a building without much working on site.

2.3 Classification of Building System

According to Badir et al (1998), there are four types of building systems being classified in Malaysia. The types of buildings systems are:-

- Conventional method construction of beam-slab-column using timber and plywood formwork
- Prefabrication system
- Composite construction of building
- System of cast in situ concrete using formwork made of steel or aluminum

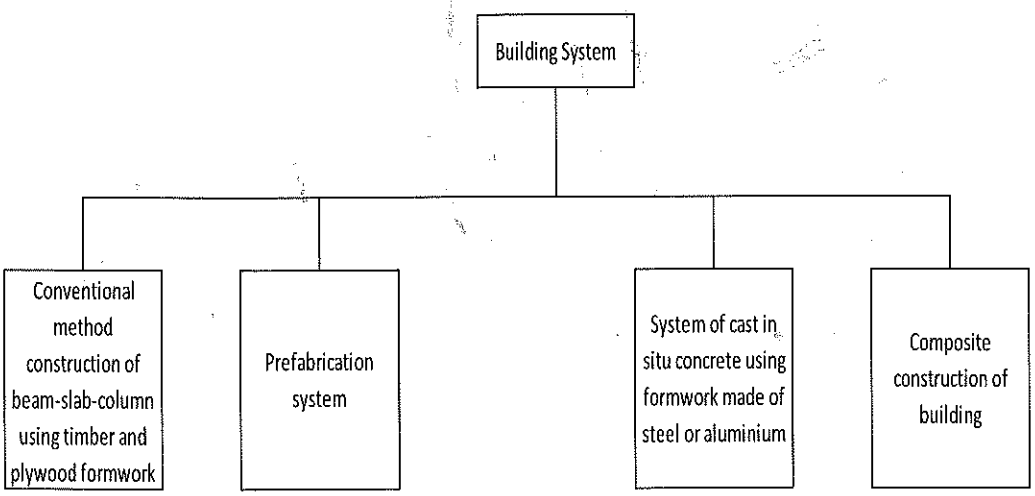

Figure 2.1 Types of building system in Malaysia (Badir et al, 1998)

However, before the time Badier et al of building system classification, there was already a classification of building system. This earlier classification by Majzub (1977) described that for the building classification which consists of frame system, panel system and box system, components relative weight factor should be considered in classifying. As shown in below of Table 2.1 of general building system, it is found out that components able to be transported and method of production for construction components and on site method of erection has considerable impact by

weight factor of the components. Regrettably, this method of classification in Malaysia is found not suitable and adequate to integrate other or new building system in recent years.

Table 2.1 Classification of Builing System (Noorein 2010)

No	General System	System	Production Material
1	Frame system	Light weight frame	Wood, light gage metals
		Medium light weight frame	Metal, reinforced plastics, laminated wood
		Heavy weight frame	Heavy steel, concrete
2	Panel system	Light and medium weight panel	Wood frame, metal frame and composite materials
		Heavy weight panel (factory produced)	Concrete
		Heavy weight panel (tilt up-produced on site)	Concrete
3	Box system (modules)	Medium weight box (mobile)	Wood frame, light gage metal, composite
		Medium weight box (sectional)	Wood frame, light gage metal, composite
		Heavy weight box (factory produced)	Concrete
		Heavy box (tunnel produced on site)	Concrete

2.3.1 Frame System

Buildings frames of the structure is the building or the structure itself that carry the building loads through beams to columns and to the foundation in the ground which are being constructed. With this system, the carrying member load of number and size can be reduced with the construction of skeletal structure explained by Junid (1986). With a large span, heavy loads can be transferred with minimal fuse for the skeletal structure has the required capacity to do so. This structure is largely used or adopted in construction by design engineers for constructing factories,

long span bridges, etc. As shown in Figure 2.2 below, typical steel framing construction of building which can be an ideal system for any country regardless of climate condition.

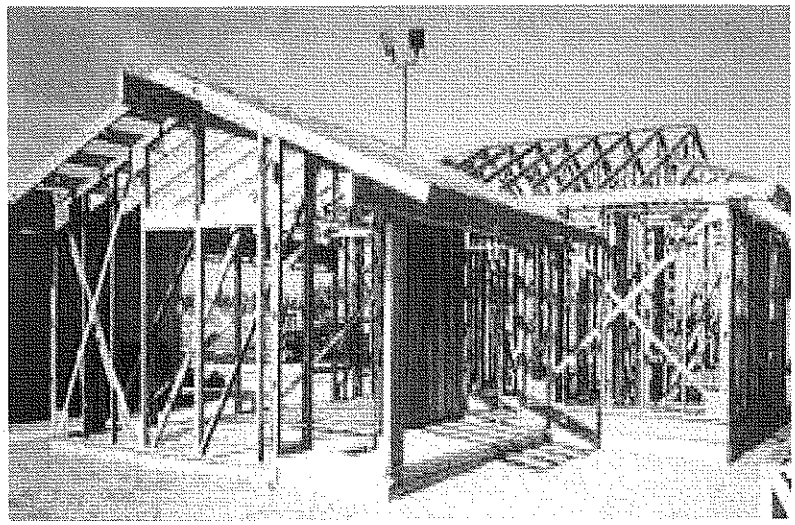

Figure 2.2 Steel framing system of construction (CIDB, 2003)

The skeleton of the building which is formed by the frame structures regardless of any framing system adopted is not sufficient in construction for this system will enclose the building area. For this reason, elements such as panels which are fabricated offsite or elements constructed on work site are required to enclose the area in order for the completion of the building.

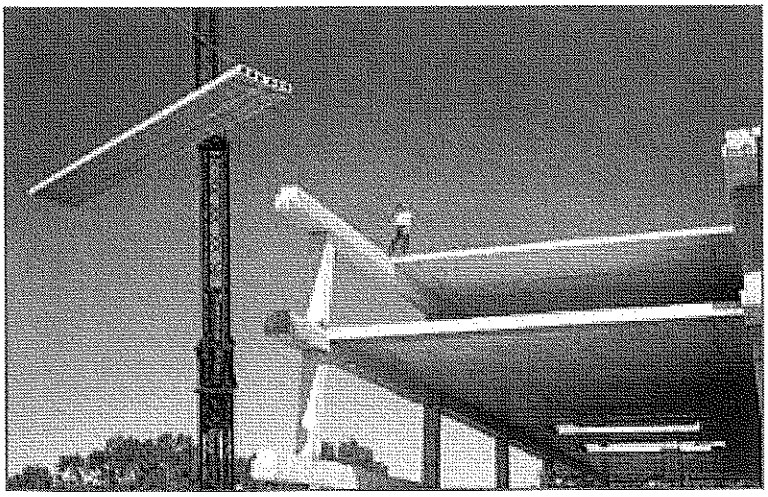

Figure 2.3 Erection of precast concrete beams and columns of a building (CIDB, 2003)

2.3.2 Panel System

Panel system or also called by others as planar system defined by Junid (1986) is that the loads carried by the structures of the building through panels of wall and floor which are large. As part of the prefabricated system in whereby the panel system is widely used by the construction industry adopts elements of panel or planer in shape to construct external wall, vertical supports, floor slabs, etc. In Europe, panel system which is of concrete are adopted especially for high rise building construction to ease or simplify the construction work. The concrete panel system is also widely used and favoured in construction of both high rise and low rise buildings especially residential buildings such as condominium and low cost flats.

Panel system compared to frame system has one advantage which is able enclose internal and external space of the building unlike the framing system which can only be adopted solely to form the skeleton frame of the building. The panel system can be fabricated offsite incorporated with much amount of finishing work such as external finishes, electrical wiring, plumbing, window frames, etc. With this, the number of skilled labours required to work on site can be reduced significantly with the labours limited to works of positioning and erecting the panels on site. For this, it is largely adopted in construction of buildings such as schools, offices, residential units of condominium and flats, etc. Figure 2.4 shows the erection and installation of concrete panels on construction site.

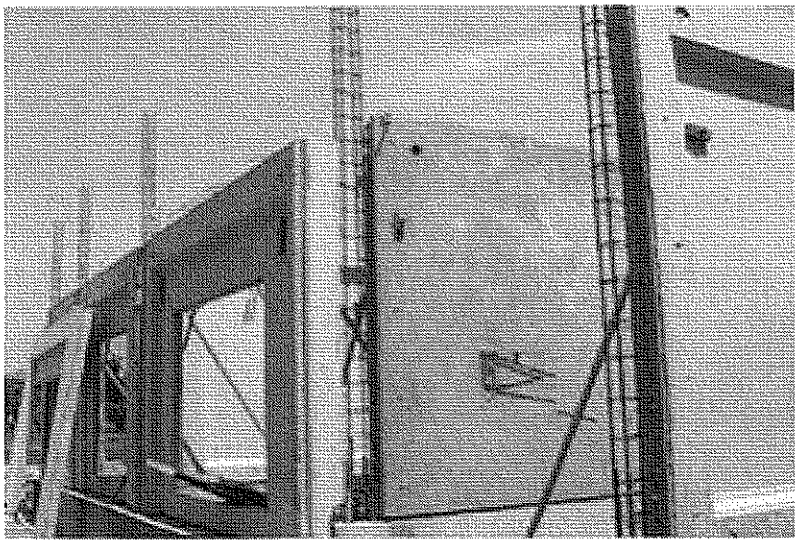

Figure 2.4 Concrete panel system installations on site (Nagahama, 2000)

Junid (1986) explained that panels manufactured at fabrication factory can be in various forms and of materials depending on the specifications required for the construction project. Certain panels might be fabricated on site for ease of transportation of components which largely depends the scale or size of the construction projects. Over the years in Malaysia, the panel system is gaining popularity and being implemented by engineers for construction of both high and low rise buildings. Other than concrete panel, wood or other light weight material can be fabricated into panel if client requires.

2.3.3 Box System

Box system is the systems which adopts three dimensional building blocks for units fabrication purposes (Junid, 1986). This system is much preferable than the other systems and useful in such that degree of finish is of high and compatible in a controlled environment for highest

quality of work which can be achieved. The advantage of adopting this system is that it has high stability internally which can withstand load of all directions.

The box system can adopt and made into box-like mould and usually this system is manufactured in the factory by using panel to form it. This system has a high degree of finishing works depending on the specification required for the project. The finishing works contains works such as sanitary wares and fittings, plumbing pipes, wall and floor finishes, wiring for electrical, kitchen wares, and in some cases air-conditioner are installed as well. With this system being implemented, there is no doubt that construction time to complete the project can be shorten. This system can be very useful and helpful in high rise or low rise building construction. Depending on the design specification, the box system can either be load bearing or supporting the weight on its own. The box can either be manufactured into a form of monolithic or joined together of various sections of components in the fabrication factory.

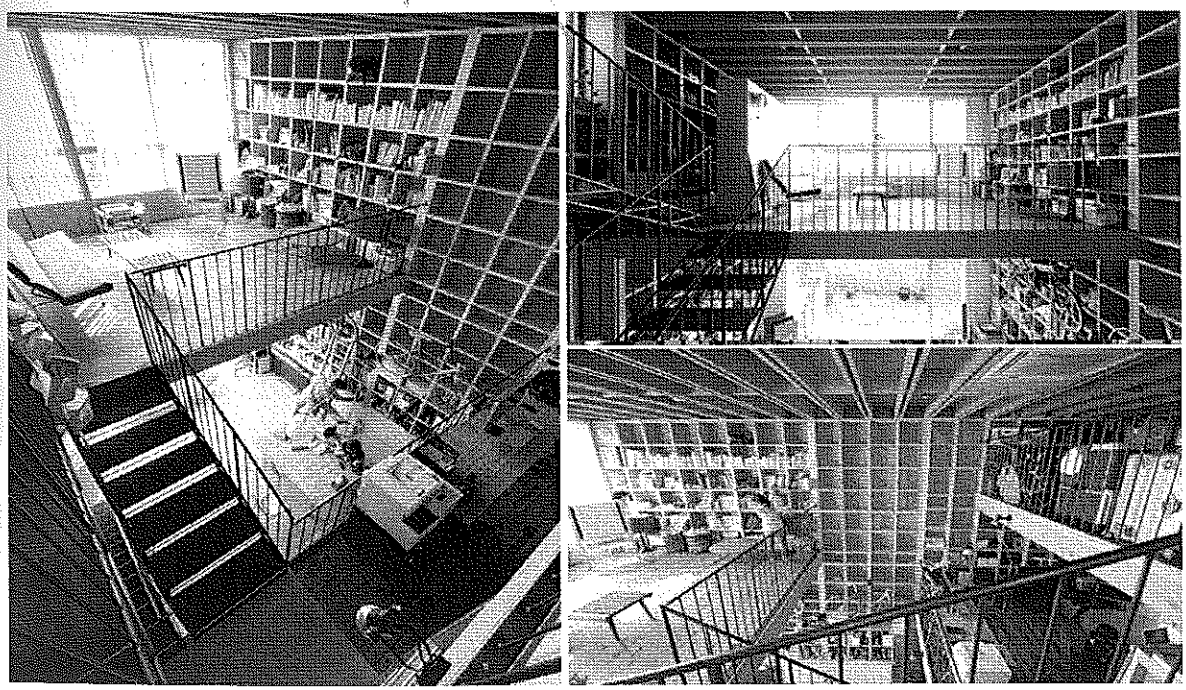

Figure 2.5 Implementation of box system construction of a building (Kiyoshi, 2013)

2.4 Characteristics of IBS

Due to urge by CIDB and Malaysia government to actively or widely adopt IBS for construction industry, numerous characteristics of the IBS are recognized by the researcher who are studying and investigating related to IBS topic. As the research and study has done, it is found out that the among the accepted characteristic perceived by the researchers are such as transportation, coordination of modular, integration, organization which are good, production services, production to be in bulk, open system and closed system, etc. (Thanoon et al 2003)

Warszawski, (1999) explained that the IBS main feature of it is the building element whereby many of the elements are manufactured offsite at a prefabrication factory, with specialized machinery and equipment for fabrication. Prefabricated components can be assembled on site with minimum erection, finishing and jointing needed. Where most of the building construction works on site can be incorporated into a large prefabricated component, positioning and handling of the components and materials are handled mechanized with minimum work and therefore decreasing the need of labour. Design, fabrication and onsite assembly of these three elements are interrelated sturdily. Planning and coordination must be done accordingly for the process to be successful.

CIDB (2003) summed up that there are five characteristics of IBS, which are:-

- Numbers of labours needed for components fabrication and working on site can be greatly reduced.
- A control of quality which of systematic, for example like ISO 9000
- In-situ method which are extensively mechanized and/or prefabrication of components or products through production by manufacturers

- Manufacturing and design methods for IBS construction or components are of state of art technology by using CAD and CAM software aided.
- Building concept which are open type- application can be of hybrid, coordinate modularly and flexible.

2.5 Classification of IBS

CIDB (2003) has classified IBS into five categories based on structural aspect of the system. The five systems are:-

i. Pre-cast Concrete Framing and Box System - Precast concrete products or elements of beam, walls(load bearing wall), columns, "3D" components, etc.

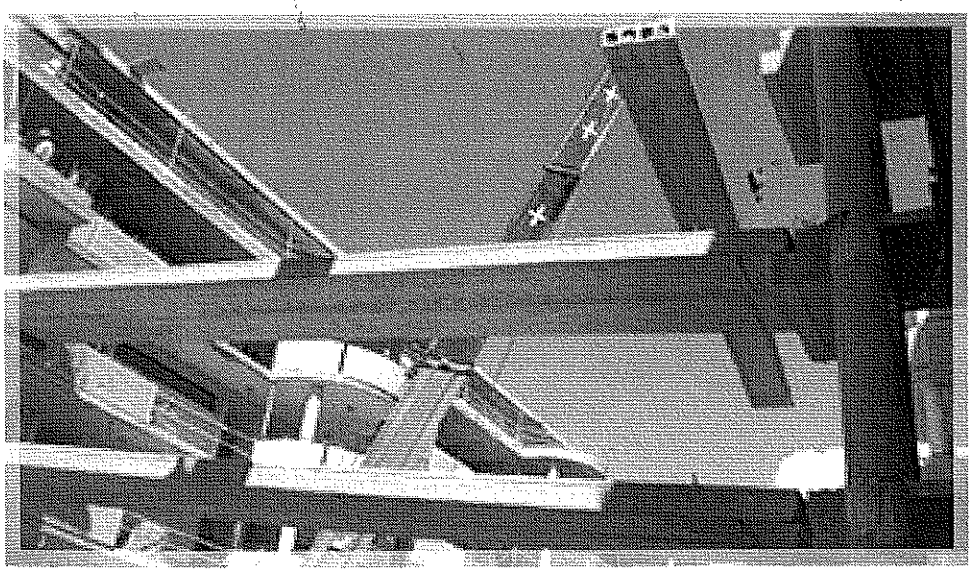

Figure 2.6 Erection of precast beam of a structure (CIDB, 2003)

ii. Formwork System – Includes mild steel mould system, tunnel formwork, flying formwork, column, beam, slabs and wall form, jump form, table form, etc.