

LOGISTIC MANAGEMENT IN INDUSTRIALIZED BUILDING SYSTEM

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DEDICATION

To my beloved son; Muhammad Faris Izzan Firdaus, thank you for your patience and endless support, attend the classes together with your mommy.

To my parents, Mohamed Bin Ali and Che Moh Binti Che Abdullah & and all my families for their constant encouragement and support.

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ABSTRACT

The Industrialized Building System (IBS) is a building technique where the construction date can be shortened because IBS components and framework are made from the factory. Nevertheless, the problem lies in implementing IBS by moving materials and structure to the construction site. The IBS ' concerns focus on issues like size and weight restrictions, trajectory constraints as well as lifting equipment and the availability. In addition, the transport process also has its limits, such as the difficulty of getting to the site and transporting large components from the factory to the construction site. The aim of this study is to identify the actual issue and how excellent logistic management can improve the reliability of IBS implementation. The objectives of this research are divided into three different objectives, which are to define the level of acceptance of IBS among respondents, to differentiate any differences in terms of logistical challenges in IBS and to provide support for the implementation of IBS by local government authorities. Few sets of surveys have been distributed to a number of roles in construction companies to identify issues. Later, an analysis will be carried out using the SPSS program to rectify the data and to produce a characteristic pattern between different data variables. The actual scenario and challenges for the implementation of the Industrialized Buildings System (IBS) are still at an inappropriate level for most construction organizations because most of them are still in their comfort zone by using late conventional methods. Common construction company, especially private businesses, are not persuaded that IBS can result in significant cost savings, especially with the small building volume. Nevertheless, IBS is regarded as an effective way to achieve productivity gains and make new entrants more involved in the production and distribution of building materials on-site, just as it is possible to improve overall construction performance with regard to quality, cost efficiency, occupational safety, waste reduction, identification and security.

ABSTRAK

Sistem Bangunan Perindustrian (IBS) adalah teknik bangunan di mana jangkaan tarikh pembinaan dapat dipendekkan kerana komponen IBS, kerangka dan struktur yang dibuat terus dari kilang. Walau bagaimanapun, terdapat masalah yang terselindung di dalam melaksanakan IBS adalah bagi menghantar bahan dan struktur tersebut ke tapak pembinaan. Kebimbangan mengenai IBS ini diberi tumpuan kepada isu-isu seperti had saiz dan berat struktur, kekangan serta kelengkapan mengangkat dan kebolehpasangan. Di samping itu, proses pengangkutan juga mempunyai had-had tertentu, seperti kesukaran untuk pergi ke tapak pembinaan dan mengangkut komponen besar dari kilang ke tapak pembinaan. Tujuan kajian ini adalah untuk mengenal pasti isu sebenar dan bagaimana pengurusan logistik yang sangat baik boleh meningkatkan kebolehpercayaan pelaksanaan IBS. Objektif kajian ini dibahagikan kepada tiga objektif yang berbeza, iaitu untuk menentukan tahap penerimaan IBS di kalangan responden, untuk membezakan apa-apa perbezaan dari segi cabaran logistik dalam IBS dan untuk memberi sokongan kepada pelaksanaan IBS oleh pihak berkuasa kerajaan tempatan. Beberapa set borang kaji selidik telah diedarkan kepada beberapa peranan dalam syarikat-syarikat pembinaan untuk mengenal pasti isu tersebut. Kemudian, satu analisis akan dijalankan dengan menggunakan program SPSS untuk membetulkan data dan menghasilkan corak ciri-ciri antara pembolehubah data yang berbeza. Senario sebenar dan cabaran bagi pelaksanaan Sistem Bangunan Perindustrian (IBS) ini masih di tahap yang tidak sesuai untuk organisasi pembinaan kerana sebahagian besar daripada mereka masih dalam zon selesa mereka dengan menggunakan kaedah konvensional. Syarikat pembinaan biasa, terutamanya perniagaan swasta, tidak yakin bahawa IBS boleh menghasilkan penjimatan kos yang ketara, terutamanya dengan bagi projek dengan jumlah bangunan yang kecil. Walau bagaimanapun, IBS dianggap sebagai cara yang berkesan untuk mencapai peningkatan produktiviti dan membuat peserta baru lebih terlibat dalam pengeluaran dan pengedaran bahan-bahan bangunan di masa ini, hanya kerana ia memungkinkan dapat meningkatkan prestasi pembinaan secara keseluruhan dengan mengambil kira kualiti, kecekapan kos, keselamatan pekerjaan, pengurangan sisa buangan, identiti dan keselamatan.

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LIST OF ABBREVIATIONS

IBS	-	Industrialized Building System
CIDB	-	Construction Industry Development Board
JKR	-	Jabatan Kerja Raya
SPSS	-	Statistic Package for Social Science
RII	-	Relative Importance Index

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CHAPTER 1

INTRODUCTION

1.1 Introduction of Industrialized Buildings System (IBS)

The Vision 2020 addresses Malaysia's society's growth in all aspects of life. This is aimed at creating a united nation in Malaysia with a culture with strong moral principles and ethical values. Therefore, the government of Malaysia has established the National Housing Policy to ensure a better-quality lifestyle for all Malaysian people. This policy is helping Malaysians to have adequate and proper shelter and facilities, particularly those with low incomes.

As Malaysia's development improved, higher demand in construction activities, especially in the housing industry, has been generated by economic growth. The developer of the housing industry must therefore implement a modern technology to deal with this situation without losing the economies of scale in order to meet the needs of the customer. Therefore, the Industrialized Building System (IBS) has been adopted.

The definition of prefabrication and building industrialization in Malaysia is represented by the Industrialized Building System (IBS). The design was created to move away from the traditional paradigm of prefabricated structures. IBS has been used as a tool for enhancing efficiency, quality and safety. In brief, though, the words used in the industrialization of building are defined, sometimes colloquially with other concepts, and their exact meaning depends heavily on the knowledge and understanding of the individual, which differs from country to country. The lack of consistent definition and explanation of boundaries and confusion contributed to prejudices and misunderstanding.



Figure 1.1 : Type of IBS Construction

Many modern construction methods coexist with on-site hybrid construction work, making differentiating what constitutes off-site practice difficult. It is important to develop and combine description and classification with global views and understanding.

While many prefabrication and industrialization terms are still in use, the Industrialized Building System (IBS) represents such terminologies in the Malaysian construction sector. The term IBS is used by professionals, researchers and the government of this country to describe industrialization in building. The word, however, covers a very broad scope including the use of on-site systems and cannot be properly differentiated from traditional practice.

Although innovative solutions are often correlated with other concepts used to describe construction industrialization. CIDB's current definition includes low-tech approaches and other common methods that do not replace conventional practices. CIDB's terms and classifications were also misinterpreted as a system limited to building construction only, while IBS can be perceived as an approach or procedure used to make building less labor-oriented and faster and resolve quality concerns.

The Malaysian Government has adopted the integrated building method since the 1960s and made major efforts in this region. The first in 1964 was Pekeliling Flats in Kuala Lumpur and the second in 1965 was Taman Tun Sardon, Gelugor, Penang. The two pilot projects were the first in Malaysia to incorporate IBS.



Figure 1.2 : Pekeliling Flat, IBS First Project

Following the development of prefabricated concrete and steel technology, several successful ventures have been witnessed by the Malaysian construction industry such as the Petronas Twin Towers, the Bukit Jalil Sports Complex, the Games Village and the LRT lines and tunnels.

Nevertheless, the players in the construction sector often lack awareness of the advantages of the automated building system. A questionnaire survey was therefore carried out to test the advantages of the modern building method collected in literature reviews and determine the advantages for Malaysian society. The result shows that the five first advantages of the modern construction method are the total construction time, reducing the use of on-site fabrication, increasing building efficiency, reducing solid waste, reducing the number of staff onsite and air pollution at the building site.

The IBS method is well established to ensure consistent compliance with the appropriate criteria. This is due to the circumstances in which most IBS program

participants in the production line of the plant work. At present, many construction teams are hardly debating the principles of the Industrialized Building System (IBS). Nevertheless, they are fully understood as an innovative technique applied in order to improve project efficiency, quality and productivity on pre-fabrication, offsite construction, manufacturing and mass production of building components, Industrialized Construction System (IBS). Nonetheless, these benefits are mainly known for projects in urban areas. In rural projects, IBS is not a normal practice. Thus IBS studies in Malaysia have focused only on projects located in urban areas in West Malaysia with regard to its advantages and disadvantages.

Therefore, this paper aims to bridge the gap by examining IBS implementation pros and cons in Ipoh, Perak. The results are expected to improve the implementation of IBS, in particular in rural areas such as Sarawak, eastern Malaysia, where urbanization rates remain low. A qualitative framework with a case study approach has been introduced. This paper shows that the benefits of IBS are quicker completion of the plant safer, more efficient and more stable construction sites and growing foreign workers. Nonetheless, there are not many advantages, i.e. high quality of work and lower overall construction costs. This paper shows, by comparison, that there are no significant differences in the setbacks in IBS in rural areas or other urban areas in Malaysia.

These disadvantages are resistance to change, negative views of IBS designs from stakeholders, high overall construction costs, lack of awareness and exposure of IBS technology, and lack of industrial IBS manufacturers. Two significant drawbacks include the absence of local IBS services and the high overall costs of the building. This paper provides insight to construction firms and policymakers, who are implementing IBS projects in their rural areas, particularly in developing countries.

Logistics management can be characterized as a supply chain management that is used to satisfy customer requirements by planning and implementing successful transportation and storage of related information, goods and services from the sender to the destination. Proper management of logistics can help companies minimize costs

and improve customer service. The process of logistics management begins with the accumulation of raw materials to the final stage of delivery to the destination.



Figure 1.3 : Basic Concept of Logistic Management

Applying IBS Logistic Management will easily increase the potential for IBS to be fully implemented across the country.

1.2 Background of Study

Building and technology must be strengthened together because between them there are requirements for design and technology. IBS is one of the world's construction technologies. Industrialized construction system (IBS) was implemented as early as the 1960s in the construction industry. Our construction industry's challenges are due to lack of skill labor and high construction costs. The construction principle using IBS is therefore proposed to reduce our reliance on intensive labor works and to reduce construction costs.

In practice, logistics management is to satisfy a customer request by a series of points starting with receiving, managing, processing and transporting to their desired destination. The secret to logistics management's success is to provide customer value-adding goods, services and information. The goal is to improve productivity and

performance across the entire supply chain network by recognizing any construction problems such as when servicing the consumer, demands emerged when dealing with the quality, quantity and price of the product with the correct and happy customer necessary. This research would logistically incorporate the breakthrough in building.

Control of logistics is a good way to improve productivity and reduce costs. In turn, it will help improve delivery times and meet the demands of the customer. To meet customer requirements, it is necessary to ensure that the products are delivered on time and as soon as possible. Logistic management will also raise business revenue by attracting more companies to deliver great services.

Through participating in comprehensive logistics management for the introduction of IBS, many construction companies will benefit from time and money savings and superior customer service. Management of logistics is extremely important to be effective in the implementation of IBS. It requires careful monitoring of the raw materials supplied on time to any construction area, allowing any construction work without delay.

1.3 Problem Statement

Industrialized Building System (IBS) is a building technique where the construction date can be shortened as IBS components and structure are manufactured from the factory. Therefore, transportation of parts and structure to the site is the issue in IBS. The challenges in handling IBS construction are transportation problems, which address issues related to size and weight limits, route constraints, licensing and lifting equipment availability. When the components enter the building site, additional lift preparation is needed. The lift complexity normally increases as the level of IBS use increases. Consideration of transportation can influence construction plans, site design, the cost of cranes and the quality of the plan itself.

In IBS logistics, the contractor is typically expected to save costs by own transportation and shorter construction time. But the producer has their own transport

because they want the price of the goods to be taken care of. The big problem between supplier and contractors is always this problem.

In addition, some manufacturer's mentality that always chooses the contractor to order more products than the contractor that orders the item in small quantities because it wants to make a bigger and faster profit. Such mentality of the supplier would make the contractors who will take risks in the time of construction and loss in financial order with small quantities.

However, lack of knowledge and exposure to IBS technology is one of the factors contributing to inadequate structural analysis and prefabricated part design, resulting in incorrect assembly due to installation problems. Lack of industry knowledge of IBS is one of the reasons why IBS take-up is slow.

Then there is a high cost of production. Originally, there is a need for large investment to set up the plant, supply machinery and mould, consideration of engineering in dealing with the complexities of interfaces and transport process expenses. Adopters also need a significant amount of work to break even on the investment, which means that IBS needs a large production volume to achieve economic viability.

1.4 Objectives

The aim of this study is to identify the effectiveness of logistic management in IBS at Ipoh, Perak. To achieve the aim, the following objectives are set as:

- i. To identify the level of acceptance of IBS among respondents.
- ii. To differentiate any discrepancy towards the logistic challenges in IBS.
- iii. To propose the support from the local government authorities for IBS implementation.

1.5 Scope of Study

The focus of the study area will be in Ipoh, Perak, Malaysia. The aim of this project is to concentrate on cost and time management using IBS for the purpose of this research, the constraint was made to focus and narrow the topic down to the specific area and study subject. The reach of this case study can be as follows:

- i. This study area is in Ipoh, Perak, Malaysia.
- ii. This study is focus about effectiveness of IBS in logistic management.
- iii. This study also focusses about quality of IBS during transportation.
- iv. The respondents are registered as contractors, consultants, clients, suppliers and also construction worker's

This research would concentrate on the overall concept of logistic management in order to improve the implementation of IBS across the nation in general and in particular in the study area in Ipoh, Perak. The reason for this is to try best practices and approaches in the application of IBS through the best overall logistics management.

It is important to note that caution should be exercised in applying the results to organizations elsewhere because of the small sample size findings from this analysis. In addition, since this research focuses only on Ipoh, Perak, generalizing the results obtained should be carried out with caution to other institutions. This is because other higher institution's facilities function would not be the same.

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