LEAD TIME IN CONSTRUCTION PROCESS

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Dedicated to MY BEST COUNSELLOR AND MY BEST FRIEND,
Abah, Ishak Bin Zakaria
Mak, Mariana Binti Marmun

"Father was Self-Made but Mother was Constructed by Others and Such Edifices are Notoriously Fragile"

My dearest sisters
Kak Ngah, Nur Syahida Binti Ishak
Adik, Norayshah Binti Ishak

Thanks for giving me infinite LOVE, care and blessing...
Thank you from the bottom of my heart for being my inspiration…

To MY MR. DELARED, Anas Bin Abdul Halim
Thanks for your support, understanding, encouraging and love…

Special to MY BEST EVER FRIEND, Noor Hamizah Binti Haji Baharin
Thanks for your support, encouraging, and care…

And lastly to my dear friends,
Thanks for your endless support to me…

"Friend is Hard to Find, Harder to Leave and Impossible to Forget"

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ABSTRACT

This research studies on an improvement of the construction process in term of time consideration. The construction industry was considered fragmented because policy and guideline implementation and practice in the construction are inconsistent among the players involved. Commonly, town planners, architects and designers work independently with little input and communicate with each other. The construction industry is facing increased demands from society. Project are becoming more complex and customer are demanded for high quality building, lower cost and shorter lead-time of completion. Customers are requesting value of the project. Lead time minimization is importance in order to increase the quality of project. IBS is of the technology that is introduced by the government to minimize the lead time in construction process in term of time saving. Eventhough for almost 45 years, IBS were still at introduction step in Malaysian Construction Industry. The implementation of the technology are still far from achieving the 100 points of IBS Score. The main barriers that impede the implementation of IBS are the resistance of the parties involved in construction industry. This research is an effort to contribute academically for better construction management to increase the lead time of the construction process and the quality of the product. The objective of the research is to identify which activity that affecting the most of lead time in construction process and to identify and mitigate the possible cause of the delay that lead to similar completion time. Methods that are used to achieve this objective is by collection, gathering and analyze the data using the Autodesk Naviswork Manage. From the study it was conducted that the lead time can be reduced by studying the ground level of process to mitigate appropriately.

ABSTRAK

Kajian ini dijalankan bertujuan untu mengkaji terhadap peningkatan kualiti proses pembinaan dalam dari aspek masa pembinaan. Industri pembinaan seringakli dianggap sebagai sebuah industri yang berpecah-belah kerana pelaksanaan dasar dan garis panduan serta amalan dalam industri pembinaan adalah tidak konsisten di kalangan pihak-pihak yang terlibat. Biasanya, perancang bandar, arkitek dan pereka bekerja secara bebas dengan sedikit input dan komunikasi antara satu sama lain. Industri pembinaan merupakan sebuah industri yang sedang menghadapi peningkatan permintaan daripada golongan pengguna. Hal ini menyebabkan, peningkatan kepada pembangunan yang melibatkan projek yang lebih kompleks dilaksanakan dengan hasil kualiti yang tinggi dan kadar kos yang lebih murah disamping tempoh pembinaan yang singkat. Pelanggan pada masa kini sangat menitikberatkan perkara yang berkaitan dengan kualiti sesuatu projek. Pengurangan tempoh masa dalam sesuatu aktiviti pembinaan merupakan salah satu faktor yang menyumbang kepada peningkatan kualiti projek. IBS merupakan suatu teknologi yang diperkenalkan oleh kerajaan yang bertujuan bagi meminimumkan tempoh masa utama dalam proses pembinaan bertujaun untuk menjimatkan masa sesuatu aktivit pembinaan. Walaupun telah hampir 45 tahun, IBS telah diperkenalkan dalam Industri Pembinaan Malaysia. Tetapi pelaksanaan teknologi masih tidak dapat mencapai 100 peratus mata Skor IBS. Kajian ini adalah satu usaha yang bertujuan untuk menyumbang idea dalam memastikan pengurusan pembinaan yang lebih baik untuk mengurangkan tempoh masa pembinaan dan sekaligus meningkatkan kualiti produk. Objektif kajian adalah untuk mengenal pasti aktiviti yang

mempunyai tempoh masa yang paling tinggi dalam melaksanakan sesuatu aktiviti dan untuk mengenal pasti dan mengurangkan kemungkinan punca kepada kelewatan yang membawa kepada suatu tempoh masa yang lebih baik. Kaedah-kaedah yang digunakan untuk mencapai matlamat ini adalah melalui pengumpulan dan menganalisis data menggunakan *"Naviswork Autodesk Manage"*. Daripada kajian yang dijalankan, dapat dirumuskan bahawa tindakan awal dalam mengawal sebarang kemungkinan memberikan banyak kelebihan dalam usaha menjimatkan masa dan meningkatkan kualiti projek pembinaan.

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INTRODUCTION

1.1 Introduction

The term of conventional work process can be defined as the common practice inherited from the long established custom of delivering the construction project based on fragmented work process (Tahrina Taib, 2010). Generally, this practiced has dominated the industry with the separation between design and construction process. Shortest lead time in construction can be defined as the efficiency of the process in construction project. Efficiency in construction process can be defined as the project constructed within time schedule and cost budgeted. Shortest lead time also based on the two item; time schedule and cost budget. Conventional construction process always be indicated as poor in management such as resources and material management, waste management, quality management, communication management and personnel management left unattended.

Conventional construction process always been connected with the inefficiencies in term of project time. The development of Industrialised Building System (IBS) is not new and it is a new innovative construction method in the construction industry. The history of precast in UK housing dates from the mid 1900's, when this and other forms of industrialised (prefabricated) construction were used to address the problem of widespread destruction of housing stock during the Second World War (Chong, 2006).

In United States, the use of precast in the construction industry began with the construction of General House in 1930, using of prefabricated steel house. However the early efforts of rationalising and implementation faded quickly due to price incompetitiveness, high capital and inconsistent local codes. The use of precast increased sharply after the Second World War due to the need to resolve critical shortage of houses (Chong, 2006).

The implementation of the precast concept in Malaysia began on 1966. When the goverment launched two precest project of housing which is located at Kuala Lumpur, Tuanku Abdul Rahman Flats and the Rifle range Road Flats in Penang. The first precast technology that implement at Malaysia are brought from Germany by Perbadanan Kemajuan Negeri Selangor (PKNS). The technology are use for the construction ranging from low cost housing until luxurious housing such as terrace house, banglows and semi detached house. Today, many private companies in Malaysia have teamed up with foreign experts to offer precast solutions to their project such as from United States, Netherlands, Japans and Australia. The precast component that used in many project in Malaysia usually are use in the construction of goverment building such as school, apartment, hospital, roads, quarters and other infrastructures.

Eventhough for almost 45 years, IBS are introduce in Malaysian Construction Industry, but the implementation of the technology are still not achieve the 100 points of IBS Score. The main barriers that impede the implementation of IBS are

the resistance of the parties involved in construction industry. For the developer, they have to plan a larger project scheme in order to reduce the costs of houses for economic viability. Beside that, contractor also will relatively play less important role because most of the responsibilities will take over by the precast manufacturer. Furthermore, the subcontractor may face of problem, out of business due to the fact that the prefabrication will reduce the number of worker and by replacing them with the machines. It is important to the Malaysian construction industry to involve and enter in the globalization industry to increase the productivity, quality and safety. The lesson from the established manufacturing industry should be learn in construction. Rather than build a greater intervention from the goverment linked companies (GLCs) for a mega housing projects or endless supply of building ready-made components by multiple vendors and suppliers is something shall be studied in detail.

1.2 Problem Statement

Many issues were raised in traditional construction process due to its in efficiency that can causing of a delay. People are aware about the issues and problems in conventional construction process but they do could not try to find the right preventive solution beside corrective actions. The problem of delay and low project quality has been the consistent bad image to the construction industry. A process improvement need to be taken with indicator that can be used to measure the shortest lead time of construction project.

The Industrialised Building System (IBS) has been introduced in Malaysia since 1966. It was implemented for speed and accuracy for a work that involves a lot of repetition. Above all effort by the early effort by the govermement seems to be vain because most of the local contractor is still practising the conventional method of construction. The annotation that IBS system are more effective, can reduce the

waste, safer working environment in construction site and the construction period compared to the conventional method are already well known. Accordingt to the Construction Industry Development Board (CIDB) of Malaysia roadmap in 2011-2015, the level usage of IBS in the local construction industry is at 75%. The main barrier on the implimentation of IBS is the contractor it self.

The construction industry is considered as fragmented because policy and guideline implementation and practice in the construction are inconsistent among the players involved. Commonly, town planners, architects and designers work independently with little input and less communication with each other. Their medium of communication using contract document lead to delays in revision of plans and problem of constructability. The material supplier and transporters have their own agenda causing interruptions and abandoned schedules. The consequences will affect the quality, efficiency and time in the conventional construction. The current IBS initiatives still inherit these problem due to partial implementation of IBS type of construction.

1.3 Aim of Study

The main aim of this study is to model the shortest lead time in construction process that can be use in increasing the quality and completion time of project. From that aim, two objectives are studied.

1.4 Objective Study

From this study, there are two objectives are created :

1. To identify which activity that affect the most of the lead time in construction process either IBS or conventional process.

2. To identify and mitigate the possible cause of the delay that will minimize the lead time through simulation.

1.5 Scope and Limitation

The scope will be limited to project schedule time and cost of project. The case study implementing one a sample of IBS project. The building selected is one a school project owned by Public Work Department (PWD). School building is a repetitive project that has consistent process and that can be improved by simulation.

1.6 Expected Results

The project will identify the issues in traditional construction process that causing of delay of construction. IBS is the method of construction that will help to resolve the issues. It will give a comparison of the cause of delay and to reduce a simulation modeling of both IBS and conventional projects. The detailed of the study about the conventional construction process and IBS, the others model that will

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