

**FACTORS AFFECTING IN THE PREPARATION OF CONSTRUCTION  
WORK SCHEDULE**

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WORK SCHEDULE**

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**DEDICATION**

*Especially to my beloved father, mother, brother,*

*and all my friends.*

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I wish to express my sincere appreciation to my supervisor Professor Dr. Muhd Zaimi Abdul Majid for his effort, encouragement and guidance.

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## **ABSTRACT**

Construction scheduling is widely used in many construction projects today but there still exists a large disparity in the proper use of this tool. Many projects schedule is created at the beginning of the project and never reviewed or revised until a problem arises. Besides, contractors lack the skills necessary for preparing good construction schedule. Therefore, the objectives of this study are to investigate the factors affecting the preparation of better construction schedule; establish the severity of these factors; and the methods of improvements for preparing better construction schedule. Comprehensive literature review has been conducted to gather the information on the factors affecting the preparation of construction work schedule followed by structured questionnaire distribution as a main tool to gain data to establish the severity of these factors. The data attained were analyzed using average index and frequency analysis. From the analysis highlighted, there were thirty-five (35) factors where these factors were divided into four (4) main categories which were project specific factors, project management, working condition and external environment related factors. Hence, the results showed the top three factors that have the highest rank were complexity of project, identification of critical activities and type of project involved. In conclusion, the study also identified recommendations that can be used by the project participants in order to prepare effective and good construction work schedule in the local construction industry.

## ABSTRAK

Penjadualan kerja pembinaan digunakan secara meluas dalam banyak projek-projek pembinaan hari ini tetapi cara penggunaannya masih tidak betul dan tepat. Kebanyakan penjadualan projek dihasilkan pada permulaan projek tidak pernah dikaji atau disemak semula sehingga sesuatu masalah muncul. Selain itu, ramai kontraktor tidak mempunyai kemahiran yang mencukupi dalam penjadualan kerja pembinaan. Oleh demikian, objektif kajian merangkumi penyiasatan factor-faktor dalam mempengaruhi persediaan penjadualan kerja pembinaan yang lebih baik, mengenalpasti tahap kritikal setiap faktor dan pengenalpastian kaedah peningkatan penyediaan jadual kerja pembinaan yang lebih berkesan. Kajian literatur secara komprehensif telah dilakukan untuk mengumpul maklumat mengenai faktor-faktor yang menyebabkan kelemahan prestasi projek pembinaan melalui kajian sebelum ini. Seterusnya, kajian soal selidik telah dilakukan untuk mengumpul data bagi mengenalpasti tahap kritikal setiap faktor. Data-data yang diperolehi dianalisis menggunakan index purata dan analisis frekuensi. Keputusan kajian menunjukkan terdapat 35 faktor penyebab dikenalpasti dimana faktor-faktor itu dibahagikan kepada 4 kategori utama iaitu faktor khusus projek; pengurusan projek; keadaan kerja dan faktor luaran. Dari analisis, 3 faktor utama yang mempunyai tahap kritikal tertinggi adalah kerumitan projek, pengenalpastian aktiviti-aktiviti genting dan jenis projek yang terlibat. Kajian ini juga memberi cadangan-cadangan yang boleh digunakan oleh pihak-pihak yang terlibat dalam projek untuk menyediakan jadual kerja pembinaan yang lebih efektif dan berkesan dalam industri pembinaan tempatan.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction**

The construction development projects are vastly increasing in Malaysia as the Government is taking the initiative towards making Malaysia a developed country by 2020. In association to that, the construction arena became the catalyst for this development purpose. Malaysian today is mesmerized by the unique development today namely the Kuala Lumpur Tower, The Petronas Twin Tower, Kuala Lumpur International Airport in Sepang and The North-South Light-Way-Transit. These have become the Malaysian's pride.

Nevertheless, in ensuring these massive projects to be completed and utilized, some important elements must be considered, such as cost, time period and design quality. Thus, in this research, time factor for the completion of a project is crucial.

The construction development projects in Malaysia have adopted several scheduling and monitoring techniques to handle similar projects using manual or computer software operations. The clients monitor and check progress evaluations of work at site through his representative, the Superintending Officer or nominate other consultants.

Generally, the site supervisor will prepare scheduling reports to be evaluated and recommended by the client. The scheduling technique used will be the Precedence Diagram presented in the form of Microsoft Project or Primavera computer software.

This methods of scheduling is becoming more widely used in most of the construction projects especially Government projects. Thus, with this new technique, the process of construction in future can be identified and understood.

Therefore, research is done to identify factors affecting the preparation of a workable schedule of using Gantt chart, critical path method and other elements in the development projects in Malaysia. The usage of this method is predicted to reduce the problem of late possession of site and ensure that optimum cost, completion time and highest quality throughout the project.

## **1.2 Background of Study**

Construction scheduling has come a long way in the last 25 years. Unfortunately, despite the widespread use of computerized scheduling on construction projects today, there still exists a large disparity in the level of understanding in the proper use of this powerful tool. According to Frank (2004), some even say there is a crisis in the construction industry because they believe scheduling software is being misused to assert delay claims and there is, in their view, a predominance of poor quality schedules.

The monitoring and control for construction projects sometimes cannot be seen on the whole and it takes a long time to reach a solution for any problem. The planning which is drafted together with current needs at that time will also give rise to late possession of sites and other problems regarding to site possession.



In association to that, the clients and contractors should be exposed to the importance and benefits of using work scheduling as an effective way to plan future work. The concept of work scheduling technique using critical path and Gantt chart gives a great impact on a project by assimilating every party involved in the construction project in reducing cost, shorten the time period and increase the quality of construction productivity.

Glenwright (2008) also stated that a characteristic of contemporary project scheduling is the over-simplification which stems from the inability of unaided human beings to cope with sheer complexity. Even though a detailed plan is necessary, the management also need only act when deviations from the plan occur. A technique can be developed to resolve this situation that would be very simple but yet rigorous in application. One of the difficulties in the traditional approach is that planning and scheduling are carried on simultaneously.

Besides that, according to Twomey (2006), delivering a project on time relies on managing the development process, choosing experienced professionals, assessing timeframes realistically, and anticipating that some unforeseen problems are likely to come up. Aggressive management of typical scheduling issues that occur throughout construction can help ensure that projects are completed within the intended timeframe.

Hendrikson (2008) mentioned that in developing a construction plan, it is common to adopt a primary emphasis on either cost control or on schedule control. Some projects are primarily divided into expense categories with associated costs. In these cases, construction planning is cost or expense oriented. Within the categories of expenditure, a distinction is made between costs incurred directly in the performance of an activity and indirectly for the accomplishment of the project. For other projects, scheduling of work activities over time is critical and is emphasized in the planning process.

Traditional scheduling procedures emphasize the maintenance of task precedences (resulting in *critical path scheduling* procedures) or efficient use of

resources over time (resulting in *job shop scheduling* procedures). Finally, most complex projects require consideration of both, cost and scheduling over time, so that planning, monitoring and record keeping must consider both dimensions. In these cases, the integration of schedule and budget information is a major concern.

According to Glenwright (2008), the first step was to separate the functions of planning from scheduling. The basic elements of a project are activities and resource expenditures and execution times are associated with each activity in the project. These factors, combined with technological relations, produce schedules proposing varying completion dates. Management comes into possession of a spectrum of possible schedules, each having an engineered sequence, a known elapsed time span, a known expenditure function, and a calendar fit.

In fact, Twomey (2006) stated that the key factors in keeping a project on track are to understand what causes delays and then to properly plan and manage schedule issues before they become problems. Delays of individual construction tasks may not be preventable. However, those that can't be avoided do not necessarily have to hold up the entire project. The success of any construction project is based on balancing the resources of cost, quality, and schedule. All three of these issues are important. On many projects, however, time is the most critical issue for the overall success of the plan.

### **1.3 Problem Statement**

Some project participants care more about their schedules than others. Some contractors prepare schedules only because it is a contract requirement. On far too many projects schedule is created at the beginning of the project and never reviewed or revised until a problem develops. The best approach is for all project participants to join in the scheduling process and develop a meaningful schedule, and then use it

throughout the duration of the project. This is most likely to happen when the schedule is realistic, useable, and understood by all of the project participants.

Besides, Harban Singh (2004) mentioned that work schedule submitted by the contractor should contain the main activities, sequence of activities, timing of activities, critical activities and critical path, and important milestones. Since there are no clear guidelines for the application of project scheduling in project management the current practice is entirely depending on the experience of the project manager. This has resulted in a lot of time wasting effort before parties involved in the project accept any work schedule.

Nevertheless, there are still weaknesses in term of formal guidelines for the preparation and submission of work schedule. Several problems associated with project scheduling are the inability to fully utilize the schedule, lack of understanding of scheduling techniques, and unable to see the importance of work schedule as stated by Mohamad Ibrahim *et al* (2006).

Furthermore, Jon *et. al.*(2002) said that as many contractors lack the skills necessary for successful scheduling, an owner may choose instead to provide to the contractor for successful scheduling consultant and may even pay for this service.

The participation of key subcontractors and suppliers to the development of a workable plan (detailed activity plans) is emphasized by Clough and Sears (2000) and Walker (1996) who argues that construction planning and scheduling must be done by participation of people who are experienced in and familiar with the type of field work involved.

A similar idea is advocated by Ballard (1997) who emphasizes the idea of enabling what he calls the “Last Planner” participation in producing directives to drive direct work processes “assignments”. He thinks that failing to prepare good assignments by planning at crew level, will prevent plans from being realized even if the upstream planning was good. The “last planner” principle requires selecting assignments from activities that are known to can be done. Without this has caused the uncertainty and variation of work flow, which results in less percentage of non-

productive time. Problems will arise in sequencing decisions which was made by last planners based on their knowledge of working conditions and constructability issues, as well as, selecting the right amount of work which will use the labor and equipment capacity as directed by the schedule.

However, it appears that it is not how often the network is recalculated or updated but instead it is how well the plan and schedule continue to fit the actual conduct of the work. As many of the key problems of implementation lie in the general environment of the project and not under the direct control of the project, project managers must look outside the project and ahead to anticipate problems and develop contingency plans. Kiiras (2001) stated that this can only be achieved by means of continuous planning and steering during project life instead of the traditional detailed project planning before the start and reporting during execution.

#### **1.4 Aim and Objectives of the Study**

The aim of this study is to identify the factors affecting in the preparation of construction work schedule.

To achieve the aim, the main objectives of this study are outlined as follows:

- (1) To investigate the factors affecting in the preparation of better construction work schedule;
- (2) To establish the severity of these factors; and
- (3) To identify improvement methods in preparing better construction work schedule.

## **1.5 Scope of the Study**

The scope of study is confined to building projects undertaken by contractors registered with class G5 to G7 under Construction Industry Development Board (CIDB) in the locality of Johor.

## **1.6 Significance of the Study**

The study intends to analyze and promote a better understanding and recognition of the complexities of the performance of contractors in completing projects. This study will offer some practical ideas, based on actual construction experience, to assist contractors in developing realistic construction schedules. It is intended to make the reader aware of certain aspects that frequently seem to be ignored and to alert owners to potential problems as well as possible courses of action to avert problems. The points outlined in the paper will also assist owners in evaluating the qualifications of potential contractors who may propose on building development projects.

## **1.7 Research Methodology**

In achieving the results of this study, a pilot study is done to obtain opinion from various parties involved in the construction projects. From this study, a hypothesis shows that the schedules normally given to clients from the contractors are done using the critical path method or precedence diagram method rather than bar charts.

The approach for implementing this research is divided into a few categories. The purpose of this methodology is to simplify the process of data collection and other relevant information which is obtained throughout this research. The research framework flow chart is illustrated as show in *Figure 1.1*.

## **1.8 Summary**

This research is a descriptive research and the type of research method used is questionnaire survey. The method of data collection is through questionnaire forms. The respondents are randomly selected from Classes G5 to G7 registered under the CIDB. After the primary data are sufficiently obtained, the data will then be collected to achieve the objective of this study.

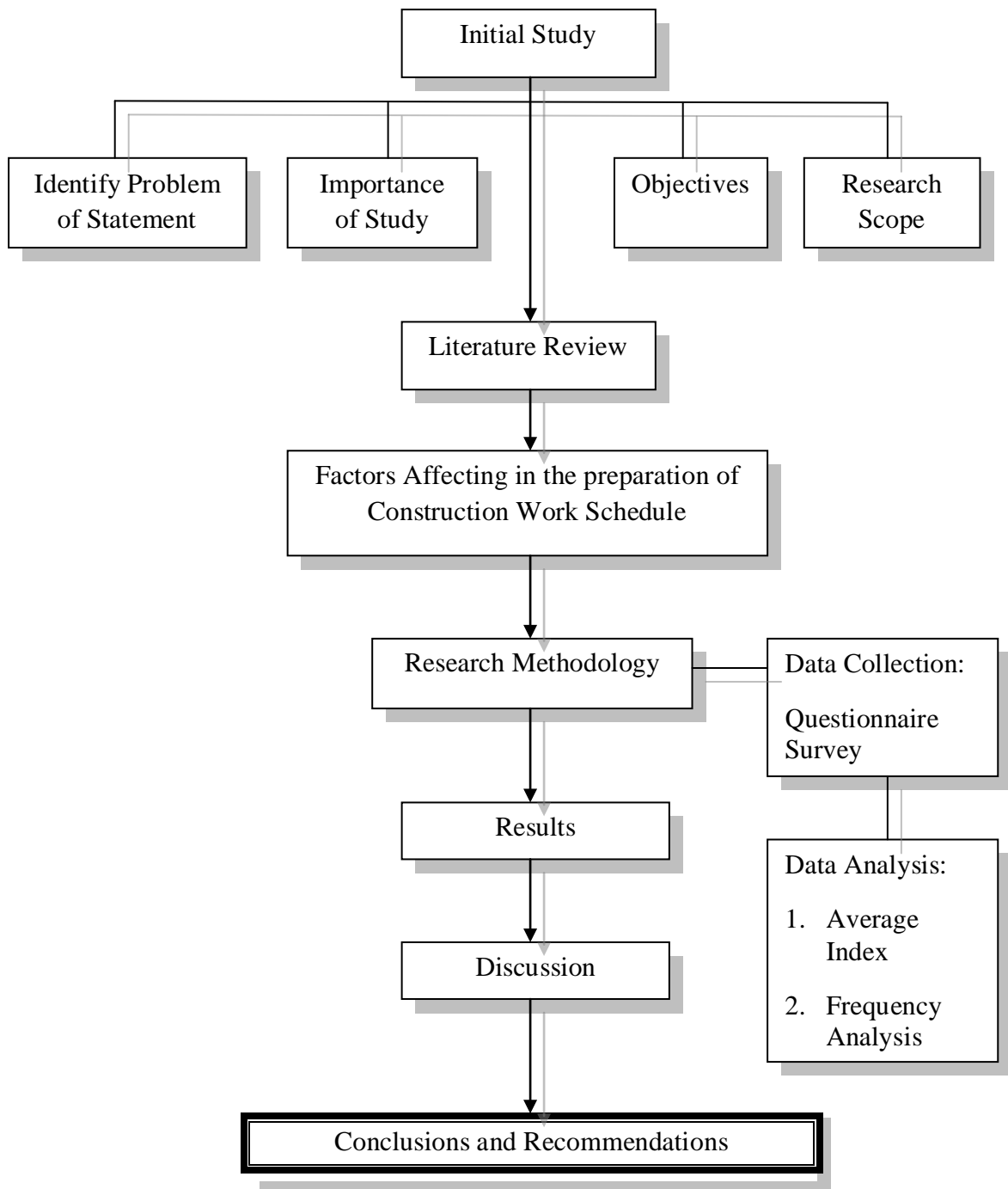


Figure 1.1: Research Framework Flow Chart