

Productivity rate of roof works for project scheduling construction essay



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Abstract: In Malaysia, there is no research done specifically on collecting construction productivity data to serve as a guideline and standards for use by all players in the construction industry. Similar to JKR, as the largest implementers' of government projects, the current practice on approval the schedule of works that submitted by contractors are mostly based on the engineers ' gut' feeling/opinion and past experience. There is no standard procedure and guidelines to review and checking the duration and resources allocation in each activity in contractor's work program. As an effort, this study will start with focusing on the identification of factors that influencing roofing works productivity in construction project. Those factors can be obtained through a series of statistical analysis based on the data collected from questionnaire and interview with the experts. Data from previous projects also very important in order to get the actual productivity rate for roof works. Finally, the expected finding for this study will be: a) List of factors that influence the productivity rate for roof works, b) The critical factors affecting most to productivity rate for roofing works, c) A metrics of productivity rate for roof works as a standard and guideline for improving JKR projects scheduling.

1. 0 INTRODUCTION

Managing construction projects always requires constant monitoring of project performance and the updating on project schedule. Project performance data and productivity data from the construction field is a key role in evaluating and predicting project performance in term of cost and schedule. According to Motwani et al. (1995), the productivity in construction has always been very difficult to measure and control. Even though,

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productivity in construction hard to measure, there is a need to use it for timely decisions and reduce the negative impacts on cost and schedule.

Therefore, the integration of historical productivity data with the on-going performance data in construction field are required (Hwang and Liu, 2005).

Hwang and Liu, (2009) presented that an accurate productivity prediction is important for managing construction projects. In fact, a construction project is commonly to be successful when it is delivering within its budget and timeline. The planning and control process also explains the importance of accurate productivity estimate which first, estimating time and cost of construction activities that inevitably requires productivity estimates (Hinze, 1998), and second, integrated management of time and cost must involved productivity factor (Dawood and Molson, 1997).

There are most previous studies focusing on defining factors influence productivity and measuring limited parts of activities at micro level to investigate the relationship between factors and productivity. A standard construction productivity metric system that more reliable is a critical element in construction productivity performance evaluation and improvement process. There need a tool to drive performance improvement through internal and external benchmarking. Park, et al., (2005) present that nowadays, demand from the construction industry on developing acceptable construction productivity metrics and standardized productivity data are the main issues to focus by the industry players and researches.

Problem Statement

As the main technical agencies for the Government of Malaysia, Public Work Department (PWD) or Jabatan Kerja Raya (JKR) entrusted to implement development projects throughout the country. It is the goal of JKR to ensure that the organization is run efficiently and effectively in order to achieve the vision, mission and objectives of the department. JKR is responsible to ensure that all the projects must be implemented well, complete on time, within the budget and provide quality products. In 9th Malaysian Plan (RMK 9), most of JKR projects cannot be deliver on time. For example, about 41% of projects in JKR Wilayah Persekutuan Kuala Lumpur cannot be delivering on time which is most of it are due to wrongly estimate the duration of the construction activities in project scheduling. It is also regarding to lack of competency of JKR officers in reviewing and giving advice to contractors especially in preparing realistic project's work program. This problem can be categorized as serious matter and give high impact to the overall performance of JKR due to unsatisfaction of client with JKR's reputation. As the biggest technical government agency, there should be a way to solve the problem so that it will improve JKR image and give high reputation to the clients.

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There should be a standard productivity rate of each activity in the project in order to guide the contractor and the JKR supervision team to plan and

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implement the projects successfully. Therefore, the study on productivity rate of roof works for building project scheduling as an effort and starting point to develop the standard productivity rate of project activities for JKR's projects. In fact, this study is consistent with JKR strategies and action plan in achieving Effective Implementation of Malaysia 5 – Years Plan especially to ensure that projects are implemented through appropriate implementation methodologies to meet customer needs and outcomes. One of the action plans stated in JKR Strategic Framework is to establish effective project performance tracking system which is JKR must analyzing all data that related to the project in order to improve JKR project implementation (JKR, 2007).

The Objectives

The aim of this study is to establish the productivity rate of roof works for JKR building projects scheduling. In order to achieve this, the following are the objectives of the study:

To identify the factors that influence the productivity of roof works

To establish the relationship between influence factors and productivity of roof works

To develop a metrics of productivity rate for roof works

Scope of Study

There are certain limitations to be follow to ensure that this study is completed within the time frame given. Firstly, this study only takes into consideration on all projects which implement in central region of Peninsular

Malaysia i. e. projects in JKR Wilayah Persekutuan Kuala Lumpur and JKR Selangor. Second, the sample for this study is concentrate only in school projects which are the most of JKR projects implementation in 9th Malaysian Plan. Since standard design was using in school projects, the area of roof is fixed. This given the standardization to estimate the productivity rate for roofing works referring to the floor area involved.

Roof trusses in construction projects can be classified in timber roof trusses, hot rolled roof trusses, cold form roof trusses and etc. The third limitation of this study is only taking into consideration of the cold form roof trusses because most of the school projects are using this type of trusses. In addition, JKR already has a list of 22 names of cold form roof trusses suppliers which their design have been reviewed and approved by the JKR Structure Expert Division. This list is for the JKR officers in state and district office to choose for their projects especially school projects. Forth, part of roof covering for this study only take into consideration one(1) types which is concrete roof tiles including insulations.

2. 0 LITERATURE REVIEW

Recently, construction productivity is on a long-term slide and it is recognized as industry challenge. System, people, materials, information and energy must flow effectively and efficiently to produce its objective at high productivity to complete construction at lowest possible cost with possible shortest timeframe (Picard, 2005). Productivity is critically important in construction industry. Many researchers have expressed their concern over productivity in construction industry. Defining productivity is not a simple task to everybody. Different people will give different definition and <https://assignbuster.com/productivity-rate-of-roof-works-for-project-scheduling-construction-essay/>

understanding. Most of them agreed that marketable output was essentially the main measure used.

Increased productivity was a leading concern to all Committee stakeholders such as users, contractors, and construction labor unions and led by the owner. The construction users emphasized the need of collecting data directly relevant to productivity improvement. The Committee was concluded that the front-line construction foreman/supervisor would be a reliable source of information. These informants would be asked to provide their judgment of the greatest impediments to a productive construction project (Tucker, 2003).

Definition of productivity

Within these several decades, many researchers have defined the productivity term in their studies in a number of ways. The term productivity has different meanings to different people. Many individuals automatically think only of labor unions when the term “ productivity” is mentioned. Others associate capital expenditures with the term. Each of these interpretations is only partly correct (Adrian, 1993). Many researchers have attempted to define precisely the meaning of productivity and below are some of it that referred from their studies:

Oglesby et al. (1989), presented that productivity can be defined as “ in-place value divided by inputs”. Some researchers have defined it as work-hours divided by the equivalent quantity of work. In construction, productivity normally can be understood as work quantity divided by man-hours (or work-hours) consumed to accomplish the work.

Productivity = Work Quantity / Man-hours

According to Dolman, Parham, & Zheng, (2007), productivity is a measure in order to know how much output is produced per unit of input.

Diewert & Lawrence, (2006) presented that productivity can be defined as the level of economic output per unit of input and also per worker.

Productivity is important to the wealth and well-being of a nation and give efforts to improve productivity occur at all levels of society.

Thomas and Mathew, (1986) presented that no standardized productivity definition had been established in the construction industry. It is difficult to define a standard productivity measure because companies use their own systems which are not standardized. Association simply illustrates the productivity between an output and an input. The form has been widely used and existing in literature over the years in construction industry is;

Productivity = Output/Input

2.3 Measurement of productivity

There is controversy surrounding productivity that rooted in the differences in data collection. It is due to incorrect in assuming productivity measured uniformly and that all published productivity values have the same basis (Whiteside, 2006). Overall conception of productivity is difficult to express or to measure. It is sometimes expressed either in terms of output from labor or from services or from capital invested. These parts of expressions often do not give an accurate picture of the overall position. Although, there are measurements of some or all of the inputs and outputs of the industry but they still failed to combine these measurements into any satisfactory

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measure of efficiency. In fact, the ratio is easy to compute if the unit uses a single input to produce a single output (Choy, 2008).

Although there are numbers of publications exist on construction productivity, there is no agreed upon definition of work activities nor a standard productivity measurement system. Most of researchers have concluded that it is difficult to obtain a standard method to measure construction labor productivity because of project complexity and unique characteristics of the construction projects (Oglesby et al. 1989). The uniqueness and non repetitive of operation in construction projects make it is difficult to develop a standard productivity definition and measure (Sweis, 2000).

Factors influence productivity in construction

Lim et al., (1995) has studied that factors affecting productivity in the construction industry in Singapore, indicated the problems affecting productivity were difficulty with recruitment of supervisors, difficulty with recruitment of workers, high rate of labor turnover, absenteeism from the work site and communication problems with the foreign workers. Olomolaiye et al., (1996) also studied that factors affecting productivity of craftsmen in Indonesia show the findings indicating craftsmen in this country spent 75 % of their time working productively. There are five specific productivity problems were identified such as lack of materials, rework, absenteeism, lack of equipment and tools.

Kane et al., (cited in Herbsman et al., 1990) has classified the factors affecting construction productivity into two main groups which is

technological factors and administrative factors. The technological factors involved those related to the design of the project and the administrative group factors are related to the management and construction of the project. Technological factors are comprises of sub-groups such as design factors, material factors and location factors. Administrative factors are comprises of sub-groups, such as construction methods and procedural factors, equipment factors, labor factors and social factors. Based on Heizer and Render (1990), they classified that factors influencing site productivity into 3 groups which are labour characteristic factors, project work conditions factors and non-productive activities. Olomolaiye et al., (1998) also stated that factors affecting construction productivity are rarely constant and may vary from country to country, from project to project and even within the same project which are depending on circumstances. They classified the factors influencing construction productivity into 2 categories which are external and internal. That means its representing those outside the control of the firm's management and those originating within the firm. The external factors included the nature of the industry, construction client knowledge of construction procedure, weather and level of economic development. The internal factors included management, technology, labor and labor unions. Choi, (2007), stated that based on his finding, weather and poor communication prove to be the greatest impediment to roofing productivity, whereas the field workers pointed out that roof pitch, height and age of the roof along weather were major causes for lack of productivity in their job at site. He also stressed that roofing contractor generally not consider safety as a high priority in their business.

Metrics – an overview

According to Melnyk et al., (2004), they stated that metrics are fulfill with the fundamental activities measuring (evaluating how we are doing), educating (communicating what is important and how we intend to deliver value to our customers) and directing (flagging potential problems by size of gap between the metrics and standards). Ideally, metrics are consistent with the way operation delivers value to the customers. Based on Melnyk et al., (2005), they presented that metric is a verifiable measure which consists of three elements such as; a) the specific measure, b) the standard (the numerical values that identifies the minimum threshold of performance, and c) the environment which the activity or person being measured operates.

RESEARCH METHODOLOGY

In order to achieve the objectives, Figure 1. 1 illustrated the schematic of research methodology for this study. Generally, it consists of four distinct phases, which are phase 1, phase 2, phase 3 and phase 4.

3. 1 Phase 1

Selection of the topic has been done after gone through JKR listing of significance topics that can contribute to department as a whole. Topic of the study and proposed productivity rate of roof works is important to JKR building project scheduling to ensure all project can be completed on time with good quality. Based on previous researchers, there are several measurements on productivity rate in construction. This study will be focusing on the identification of factors that influencing roofing works productivity in JKR projects. From this scenario, the objectives of this study

has been identified which are identifying of factors influence, the relationship and the establishing productivity rate of roof works. In such way, the focus of this topic must be in line with study limitation.

In order to strengthen knowledge and ideas in this research area, extensive reading from journals and books must be thoroughly done. Besides that, preliminary site observation has been conducted to the selected site. Furthermore, the preliminary interview was conducted to get overview information about productivity rate of roof works. Due to time constraint, the observation has been done only for school projects.

3. 2 Phase 2

A few samples of studies will be identifying purposely for running through the method of productivity measurement for getting accurate and practical data. Observation on quantity of roof works per man hours should be performing at site. During observation at site, interview with the expert is use as a tool to collect information data on how the productivity rate of roof works can be estimate and what are the factors influences the productivity rate

Several interviewees will be selected based on qualification and experienced more than 10 years especially contractors and suppliers. Beside that, questionnaire will be distributed to technical person such as supervisor, engineer, manager and contractors to obtain their opinion in term of productivity rate of roof works.

3. 3 Phase 3

In this stage, all the data from the questionnaires and interviews will compile. The data will be analyze accordingly and transform into productivity rate. Data analyzing, there will be a confirmation on what are the factors influence productivity rate of roof works will be getting through data analyzing, while standard productivity rate metrics of roof works will be producing after transform all the data into productivity rate by using appropriate statistical analysis.

3. 4 Phase 4

Extract from data obtained in Phase 3, some proposal or recommendation will be highlighted in order to enhance a metrics of standard productivity rate for future building project scheduling.

EXPECTED RESULTS

The expected results of this study in next semester are:

- a) List of factors that influence the productivity rate for roof works,
- b) The critical factors affecting most to productivity rate for roofing works,
- c) A metrics of productivity rate for roof works as a standard and guideline for improving JKR projects scheduling.

Selection of Topic

Identify the Objective and Scope

Phase 1

Preliminary Site Observation

Literature Review

Preliminary Interview

Objective.(c)

Objective.(b)

Objective.(a)

Case Studies

Identify the factors influence

Observation on quantity of works/ man hours

DATA COLLECTION

Interview with Experts

Selecting several experts with experience more than 10 years

Phase 2

DATA ANALYSIS

Figure 1. 1: Schematic of Research Methodology

TENTATIVE SCHEDULE

The following table is the tentative schedule for final project in next semester: