

A STUDY OF MANPOWER ISSUES IN PROJECT MANAGEMENT

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ABSTRACT

This article is about factors of manpower issue in project management that affect the project running. Lacking of manpower will delay or suspend the progress of a project. The cause of lacking manpower can be ranged from base workers until the top management board of a company. Thus we need to minimize project delays and make recommendations for effective projects. We distributed 25 sets of survey questionnaires for data collection and do data analysis by calculating Relative Importance Index (RI). The result shown that contractor factor occupied the largest capacity among all factors.

Keywords:

Manpower, Delay, Contractor, Construction Industry

1.0 INTRODUCTION

Construction delay can be observed by several indication factors. Kang Sik Wei (2010) proposed that delay can be defined as the time overrun either beyond achievement date specified in a contract or away from the date that the parties agree leading for delivery of a project where clearly shown in Assaf & Al-Hejji (2006). It is a project slipping over its planned schedule and considered as common problem in the construction projects. Arditi & Pattanakitchamrron (2006) stated that delays in construction can cause a number of changes in a project. Examples of the changes will be occur are late completion, lost productivity, acceleration, increased costs and the contract termination.

Toor and Ogunlana (2008) found in their study that require of resources, poor contractor management, shortages of labour, design delays, planning and scheduling deficiencies, changed orders and contractor's financial difficulties were the main issues that causing delay in major

construction projects. Delays caused by the client such as late compliance of drawing and specifications, frequent change orders and insufficient site information generate claims from both the main contractor and subcontractor which many times require protracted court battles with the huge financial repercussions. Delays caused by contractors usually are attributes to poor professional skills. Lack of planning and poor perceptiveness on the accounting and financial principle have to lead to many contractor's ruin.

As for this project, we are focusing on the aspect of manpower. According to the free online dictionary, manpower is defined as the strength or force of a human or combined strength of a group of people. It can also be the power in terms of the workers available to a particular group or required for a particular task. In a project, manpower plays a vital role in order to make the project a success. Some of the examples are the lack of finance from the top management board which cause the suspension of the whole project, the irresponsible contractors which run away before completing the project which not only cause the developers to lose more money but also cause delaying to the project, or the workers going on a strike due to dissatisfaction from the employer which will ultimately delay the project until the problem brought up by the workers are being solved or agreements made between workers and employers. Like mentioned above, these problems not only delay the progress of the project but can also cause more damage in other aspect such as financial or worst case scenario which is the suspension or cancellation of the entire project.

1.1 Problem Statement

As manpower is very important for a project, lacking of manpower is a very serious issue that will not only delay the progress of a project but might also cause the project to be suspended or cancelled. This is why workforce planning is so important to prevent lacking of manpower. The

cause of lacking manpower in a project can be ranged from the base workers until the top management board of a company.

1.2 Objectives

- To determine the factors relating to manpower issues that affects the running of a project.
- To minimize a project delays that are due to manpower issues.
- To make recommendations for the effective projects by solving manpower issues.

2.0 LITERATURE REVIEW

Reilly (1996) defined workforce planning as a process in which an organization attempts to estimate the demand for labor and evaluate the size, nature and sources of supply which will require meeting that demand. Workforce planning can be segmented into two categories: operational and strategic. Hax and Candea (1984) have counseled some alternative production planning options that managers can use to deal with changing demand patterns where include the use of variable workforce, overtime, subcontracting, seasonal inventory, planned backlogs, or complementary product lines. Silva et al., (2000) stated that an amount production-planning model that considered a stable level of employment. The hypothetical fundamentals of the optimization advance were developed by Holt et al. (1960). Holt develops a cost model that includes both the costs of maintaining and shifting the workforce. Holt uses a quadratic cost model that allows a closed form solution to be developed and finds that optimal recruitment levels are based on the weighted values of forecasted demand. Holt's quadratic cost model is transformed to a linear cost model in Hanssmann and Hess (1960) and solved as a linear programming (LP). The Holt model is also extensive in Ebert (1976) with the enclosure of time varying productivity. Ebert solves this non-linear program using a search heuristic.

Besides that, Lagodimos and Leopoulos (2000) proposed a mixed integer programming based on the greedy heuristic for the shift-planning problem. The objective was to establish the minimum number of dependent workers needed to work in each available shift to meet pre-specified production targets. The heuristics techniques demonstrated a satisfactory performance in terms

of the solution time and the quality. But the numbers of occurrence workers were assumed fixed over the planning horizon. This strategy may increase the costs in a company. Croci et al., (2000) establish that even in manufacturing or assembly contexts where workers perform control and support tasks as different to direct production activities, workforce policies are a significant design parameter. Campbell (1999) proposed a three level framework for workforce planning, scheduling and allocation decisions and developed a model for allocating cross-trained workers at the beginning of a shift in a multidepartment service environment. The model was used in a series of experiments to investigate the value of cross utilization as a function of factors such as demand variability and levels of cross training. Nembhard (2001) proposed a heuristic worker-task assignment based on individual worker learning rate for long and short production run and suggested a methodology for identifying and assigning the necessary worker skills in manufacturing cells.

3.0 METHODOLOGY

In the project methodology, it consists of exploration of sources from various resources such as online articles, journals, case studies and so on. Then we will determine the problem identification, objectives of study, aims of study and scope of study. After this we only will find out the title of the research project. Then we will do the data collection by survey questionnaires method. After obtained the data collected from the respondents, data analysis is doing by the certain techniques. We will do the discussions on the project based on the result obtained. Lastly, the recommendations and conclusion are conducted from the overall results and discussions. The *Figure 1* below shows the flow chart of the project methodology.

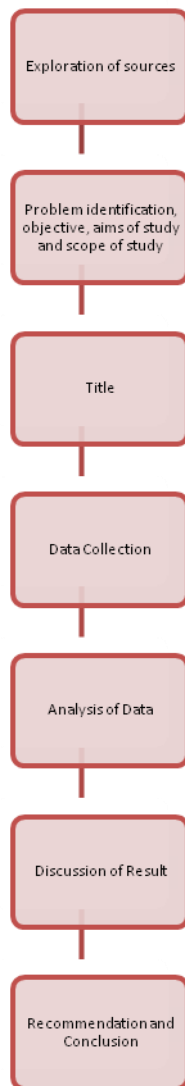


Figure 1: Flow Chart of Project Methodology

3.1 Data Collection

There are in total 25 sets of survey questionnaires was distributes to the targeted respondent in order to recognize the most important factors that cause delays and the common effects of delays. The questionnaires were distributed to the contractors and consultants at Alor Setar. The questionnaire was finished by experienced directors, project managers, projects engineer, site manager and designers. The total number of questionnaire distribution and responses has been analyzed and shown in *Table 1* and *Figure 2* below.

Table1: Percentage of Respondents

Description	Number of respondents	Number of Responses Percentages (%)
Contractor	18	72.00
Consultant	7	28.00
TOTAL	25	100



Figure 2: Total Number of Respondents

3.2 Data Analysis

This data analysis was established the relative significance of the different factors that contributes to causes of construction delays and effects of construction delays. There are consists of 3 steps to analyzing the data:

1. Calculating the Relative Importance Index (RI).
2. Ranking of factors in each category based on Relative Importance Index (RI).
3. Determine degree of correlation on ranking the factors among two groups.

3.2.1 Relative Importance Index (RI)

Odeh and Battaineh (2002), to determine the ranking of different factors from the viewpoint of contractors and consultants, the Relative Importance Index (RI) was computed as:

$$I = \frac{\sum W_i X_i}{\sum X_i} \quad (1)$$

Where:

i = response category index

W_i = the weight assigned to i th response = 1, 2, 3, 4, 5, respectively.

X_i = frequency of the i th response given as the percentages of the total responses for each factors.

4.0 FINDINGS

4.1 Finding of Contractors Factor That Affect the Running of a Project

As shown in *Table 2* below, both group of respondent agreed on the ranking of the factors based on relative important index. As referring to the table, contractors ranked inadequate contractor's work as top of all the contractors related factors while consultants give the ineffective planning and scheduling of project factor as the first. Besides that, the contractors choose inadequate contractor's work as the less contributing in affecting a project among all the contractor related factors while consultants prefer the improper construction method apply as the lowest mark among the factors. Although contractors and consultants are working in the same sector, but their working responsibility are totally different. This is the main reason that both contractors and consultants have different point of view of this manpower factor which is contractor that affect the running of a project.

In overall, ineffective planning and scheduling of project was ranked top while inadequate contractor's work and rework due to error during construction were ranked second and third. Effective planning and scheduling of project is very important, otherwise all the works cannot move smoothly and stuck at half way. Inadequate contractor's work will cause the time overrun and also cost overrun. Furthermore, rework due to error during construction is wasting time and also the cost.

Table 2: Results of Contractor Factor that Affect the Running of Project

Factors	Contractors		Consultants		Overall	
	Index	Rank	Index	Rank	Index	Rank
Ineffective planning and scheduling of project	3.03	2	3.76	1	3.40	1
Inadequate contractor's work	3.12	1	3.56	4	3.34	2
Rework due to errors during construction	2.87	6	3.74	2	3.31	3

Delays in site employment	3.00	3	3.46	7	3.23	4
Frequent change of sub-contractors	2.79	7	3.66	3	3.23	4
Conflicts between contractor and other parties	3.00	3	3.45	8	3.23	4
Poor qualification of the contractor's technical staff	2.99	5	3.28	10	3.14	7
Poor communication and coordination	2.67	9	3.56	4	3.12	8
Delays in sub-contractors work	2.77	8	3.45	8	3.11	9
Conflicts in sub-contractors schedule in execution of project	2.11	12	3.55	6	2.83	10
Difficulties in financing project	2.34	11	3.23	11	2.79	11
Improper construction methods apply	2.39	10	3.11	12	2.75	12

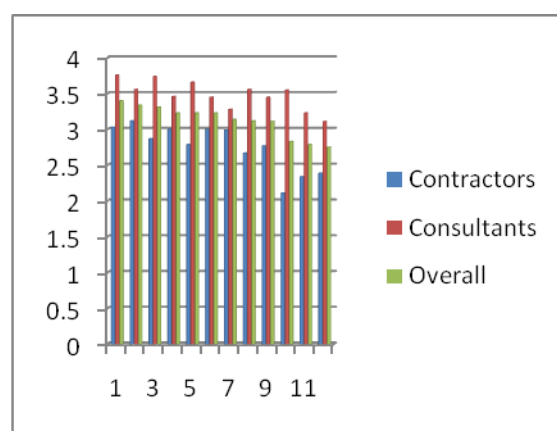


Figure 3: Graph of Contractor Factor that Affect the Running of Project

Where

- 1 Ineffective planning and scheduling of project
- 2 Inadequate contractor's work
- 3 Rework due to errors during construction
- 4 Delays in site employment

- 5 Frequent change of sub-contractors
- 6 Conflicts between contractor and other parties
- 7 Poor qualification of the contractor's technical staff
- 8 Poor communication and coordination
- 9 Delays in sub-contractors work
- 10 Conflicts in sub-contractors schedule in execution of project
- 11 Difficulties in financing project
- 12 Improper construction methods apply

labours						
Shortage of labours	3.54	2	3.33	3	3.44	2
Low productivity level of labours	3.23	3	3.43	2	3.33	3
Working permit of labours	2.66	4	2.89	4	2.78	4

4.2 Finding of Labour Factor That Affect the Running of a Project

As shown in *Table 3* below, there are four factors of labour which affect the running of a project were ranked based on relative important index from the perspective of contractors and consultants. Personal conflict among labours was ranked in first for contractor and consultants. At the same time, working permit of labours was ranked fourth for both contractors and consultants. Personal conflicts among labours should avoid during the construction of a project. With heart feeling among the labours will make them do not give a perfect performance in the work. Sometimes even they will go on strike.

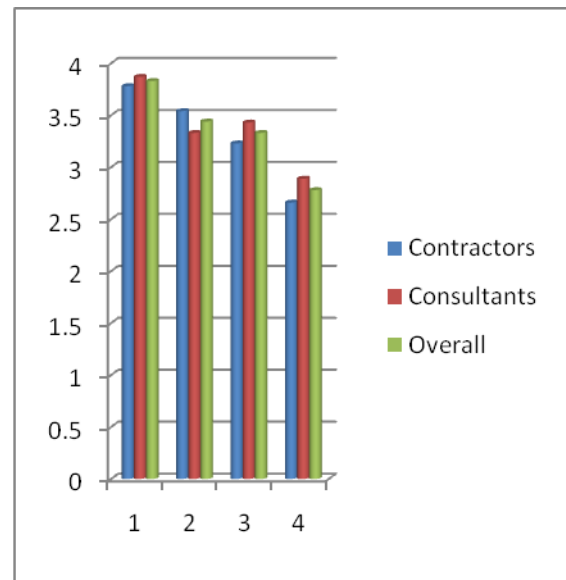


Figure 4: Graph of Labour Factor that Affect the Running of Project

Table 3: Results of Labour Factor that Affect the Running of Project

Factors	Contractors		Consultants		Overall	
	Index	Rank	Index	Rank	Index	Rank
Personal conflicts among	3.78	1	3.87	1	3.83	1

Where

- 1 Personal conflicts among labours
- 2 Shortage of labours
- 3 Low productivity level of labours
- 4 Working permit of labours

4.3 Finding of Client Factor That Affect the Running of a Project

Table 4 below shows the result of survey analysis of factors of client affect the running of a project.

Factors that related were ranked based on relative important index between group of respondent of contractors and consultants. Delay in approving shop drawing and sample materials was contribute the most in affecting the running of a project by contractors and consultants. Besides that, changing orders by client during construction was ranked last by contractors and also consultants. In overall, delay in approving shop drawing and sample materials remain the first rank, continue with delay to supply and deliver the site and poor communication and coordination which ranked second and third. Without the shop drawing and sample materials, means all the construction work cannot start. Besides that, communication and coordination also play an important role.

Table 4: Results of Client Factor that Affect the Running of Project

Factors	Contractors		Consultants		Overall	
	Index	Rank	Index	Rank	Index	Rank
Delay in approving shop drawing and sample materials	3.67	1	3.78	1	3.73	1
Delay to supply and deliver the site	3.22	2	3.12	3	3.17	2
Poor communication and coordination	3.00	4	3.24	2	3.12	3
Postponement of work by client	2.43	6	3.11	4	2.77	4
Slowness in decision making process	3.11	3	2.42	7	2.77	5
Delay in progress payments	2.34	7	2.78	5	2.56	6
Late in revising and approving	2.59	5	2.45	6	2.52	7

design documents						
Change orders by client during construction	2.31	8	2.34	8	2.33	8

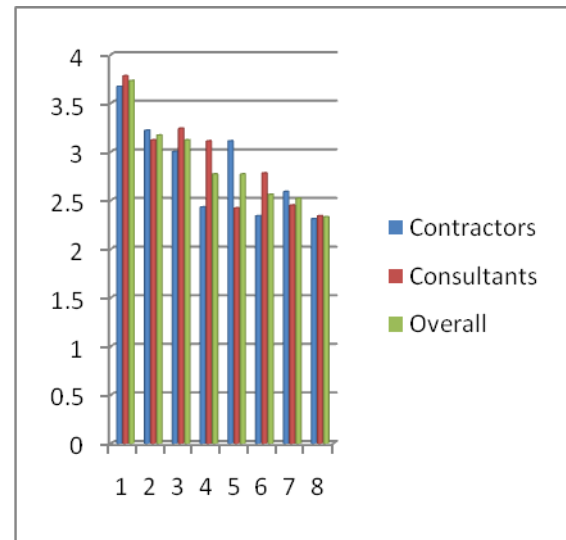


Figure 5: Graph of Client Factor that Affect the Running of Project

Where

- 1 Delay in approving shop drawing and sample materials
- 2 Delay to supply and deliver the site
- 3 Poor communication and coordination
- 4 Postponement of work by client
- 5 Slowness in decision making process
- 6 Delay in progress payments
- 7 Late in revising and approving design documents
- 8 Change orders by client during construction

4.3 Ranking of Manpower Factors That Affect the Running of A Project

Based on the result of analysis of the factors in each group, as discussed above, the overall ranking of factors that causes project delays has been established as shown in Table 5 below.

Table 5: Overall Ranking of Factors that Causes Project Delay

Factors	Contractors		Consultants		Overall	
	Index	Rank	Index	Rank	Index	Rank
Personal conflicts among labours	3.78	1	3.87	1	3.83	1
Delay in approving shop drawing and sample materials	3.67	2	3.78	2	3.73	2
Shortage of labours	3.54	3	3.33	3	3.44	3
Ineffective planning and scheduling of project	3.03	8	3.76	3	3.40	4
Inadequate contractor's work	3.12	6	3.56	6	3.34	5
Low productivity level of labours	3.23	4	3.43	2	3.33	6
Rework due to errors during construction	2.87	3	3.74	4	3.31	7
Delays in site employment	3.00	9	3.46	9	3.23	8
Frequent change of sub-contractors	2.79	4	3.66	5	3.23	8
Conflicts between contractor and	3.00	9	3.45	0	3.23	8

other parties						
Delay to supply and deliver the site	3.22	5	3.12	7	3.17	1
Poor qualification of the contractor's technical staff	2.99	2	3.28	4	3.14	2
Poor communication and coordination	2.67	6	3.56	7	3.12	3
Poor communication and coordination	3.00	9	3.24	5	3.12	3
Delays in sub-contractors work	2.77	5	3.45	0	3.11	5
Conflicts in sub-contractors schedule in execution of project	2.11	2	3.55	8	2.83	6
Difficulties in financing project	2.34	1	3.23	6	2.79	7
Working permit of labours	2.66	7	2.89	2	2.78	8
Postponement of work by client	2.43	9	3.11	8	2.77	9
Slowness in decision making process	3.11	7	2.42	3	2.77	9
Improper construction methods apply	2.39	2	3.11	8	2.75	2
Delay in progress payments	2.34	1	2.78	1	2.56	2
Late in revising and approving design documents	2.59	8	2.45	2	2.52	3

Change orders by client during construction	2.31	2 3	2.34	2 4	2.33	2 4
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4.4 GROUP ANALYSIS

Based on the data given, a total of twenty four manpower factors that affect the running of a project were identified, ranked and analyzed. The top five most important factors that contribute are personal conflicts among labours, delay in approving shop drawing and sample materials, shortage of labours, ineffective planning and scheduling of project and inadequate contractor's work.

From the top ten factors, there are six factors of contractor affect the running of a project, three factors of labour and follow by one factor of client. This means that the manpower factor of contractor occupy sixty percent of the top ten factors while thirty percent is belong to labour and ten percent is client factor.

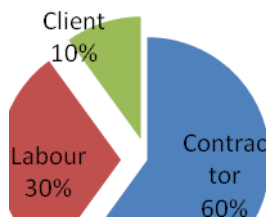


Figure 6: Percentage of Manpower Factors

5.0 DISCUSSION AND CONCLUSION

Manpower issues indeed play an important role in project management. Without sufficient manpower, the progress of a project definitely will be affected and interrupted, in worst case scenario, might cause to total suspension of the entire project. Not only that, proper management and handling contract will be able to prevent any loss in managing a project. Besides that, more communication sessions should be prepared by companies in order to listen to the problems faced by their workers in order to bring out the full potential of the workers which will promote the progress of a project, not forgetting to ensure the safety of the workers no matter in the working place or construction site. Thus in

conclusion, manpower and workforce planning is vital in project management.

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