

CHAPTER I

INTRODUCTION

1.1. Background

A project is a unique venture with a beginning and end, conducted by people to meet established goals within parameters of cost, schedule, quality; and all are unique (Pinto, 2009). It is beyond the scope of the normal process-oriented world of firm which is in contrast continually evolving, establishing its own work rules, and functioning as the antithesis of repetition in the workplace. On the other hand, it becomes an exciting alternative business that has a great challenge with great rewards.

The example of project-based company is CV Madya Karya which is engaged in liquid waste disposal installations construction and now developed into building construction. The development in building construction was established in 2007. As time goes by, the business continues to grow from, initially, only managing a single small project and, now, handling multi large projects. However, as a beginner in this sector, of course, the experience gained in this field is not much.

As a project-based company, uncertainty of order becomes the biggest challenge to manage its resources. If it runs one project only, it can be run smoothly. But, what if it receives several project with the adjacent due

date? Of course it would be a problem because the resource availability would not cover the need of the project. To raise the number of available resource is one of options which need a depth calculation. The calculation is necessary to assure the cost of additional resource is feasible due to the fluctuative number of projects.

CV Madya Karya needs to optimize its resource allocation in order to minimize its cost which also minimizes profit loss. Therefore, project planning and management become important to implement in this company. One of the powerful tools to help the implementation is by doing Critical Path Method (abbreviated as CPM).

CPM represents a project plan with a network flow which figures the sequence and dependencies of each process in the whole project. This method also suites the construction project because as the construction proceeds, the diagram provides the project manager with precise information on the effects of each variation or delay in the adopted plan.

A fully developed CPM is based on the optimum time required for each work process and making the most economical use of available resource. CPM is one of methods which used to optimize limited available resource in a project management. There are many types of resource limitation such as labor, expense budget, time, etc.

That is why CPM needs to be implemented to optimize the company's resource allocation. This change in the resources available absolutely will shorten the

completion time of the process. However, how much should the company pay for additional resources? That is the reason we need to conduct Sensitivity Analysis. This also helps to know how sensitive the solutions are to parameter changes.

Both analyses are important for this company to get the best solution to optimize the company's limited resources. To know how to implement these analyses in this company, it is necessary to take a real case as the object of observation. The real case used is the multi-project managed by CV Madya Karya on October 2010 until April 2011. In these months, there are three projects with adjacent due date in April 2011. Of course the processes cannot be arbitrary and must be well planned so that there will be no violation in their due date.

The optimal solutions for these two analyses are used to optimize the resource allocation for these projects. We expect these methods can improve the performance of the company in planning and scheduling projects. Although, the output resulted in this research is based on the multi-project management case in October 2010 until April 2011, a general procedure is developed for other multi-project management in this company.

1.2. Problem Formulation

Based on the background above, the problem formulation in this case study is how to optimize the critical resource allocation using critical path method

and sensitivity analysis in multi-project management of CV Madya Karya?

1.3. Objectives

The objectives in this case study are:

- a. To find critical resources with a network flow construction by using Critical Path Method,
- b. To find the optimal solution (lowest cost) for resource allocation,
- c. To generalize the steps involved in solving resource allocation problem in managing multi-project.

1.4. Scopes and Assumptions

Scopes of this case study are as follow:

- a. The object of the case study is CV Madya Karya Yogyakarta,
- b. The analysis only considers the condition of CV Madya Karya Yogyakarta,
- c. The numerical solutions resulted are only valid for multi-project occurred in the period of October 2010 until April 2011,

Assumptions used during the case study are as follow:

- a. Material resources are always provided on time,
- b. The skill and performance of the labors are uniform,
- c. Additional labors can be provided when needed,
- d. Number of labors worked is linearly proportional to the duration of the project.

1.5. Research Methodology

The methodology used in this research consists of eight stages, namely:

Stage 1: Preliminary Study

The preliminary study includes the search of research topic to conduct and observation in CV Madya Karya Yogyakarta.

Stage 2: Identification and Problem Formulation

This stage is to identify the aspects that shape the problems within the company and to determine the issues to be discussed in more depth in this study. The next step is to formulate the specific problem so that research can be done.

Stage 3: Field Study and Literature Review

Field studies are conducted to observe the issues that have been determined in the previous stage. Literature studies are used to find theories that provide applicable support to obtain solutions to the problem. The results of this literature study are to determine the appropriate method to be used in this study.

Stage 4: Research Objective

After the previous stage accomplished, now the appropriate method for this research is already known. They are Critical Path Method and Sensitivity Analysis. These methods are conducted to achieve the objective of

this research; to optimize the resource allocation in multi-project management by CV Madya Karya.

Stage 5: The determination of data needed

In this stage, the author determines the data needed to identify the constraints of the projects and also the resources available in CV Madya Karya Yogyakarta.

Stage 6: Data Generation

This is the stage where the author collects the data of constraint and resources available in CV Madya Karya. To generate the data, the interviews are conducted with the director of the company to know the number of permanent labors worked, salary for permanent labors, and also the method used to overcome resource shortage in project management; and with the site foreman to generate the data of utility data for each project. Besides, the data of projects description which includes the starting and due dates for each project, and the value and the penalty of each project are taken from the archive of CV Madya Karya.

Stage 7 : Analysis and Data Processing

At this stage, an analysis of research and also the data processing are conducted. The first step in analyzing the data is to determine the activities needed to compress and the resources needed to do the compression. The next steps are scheduling, simulation network, and compression of simulation network for each project. Afterwards, the optimal solution can be

calculated as the final result of data analysis. If the data available are not sufficient then stage goes back to the data generation (Stage 6).

Stage 8 : Conclusion and Recommendation

At this stage conclusion is made based on the discussion to answer the problem, and to provide suggestions for improvement and to recommend several suggestions for the company further development.

1.6. Flowchart of Research Methodology

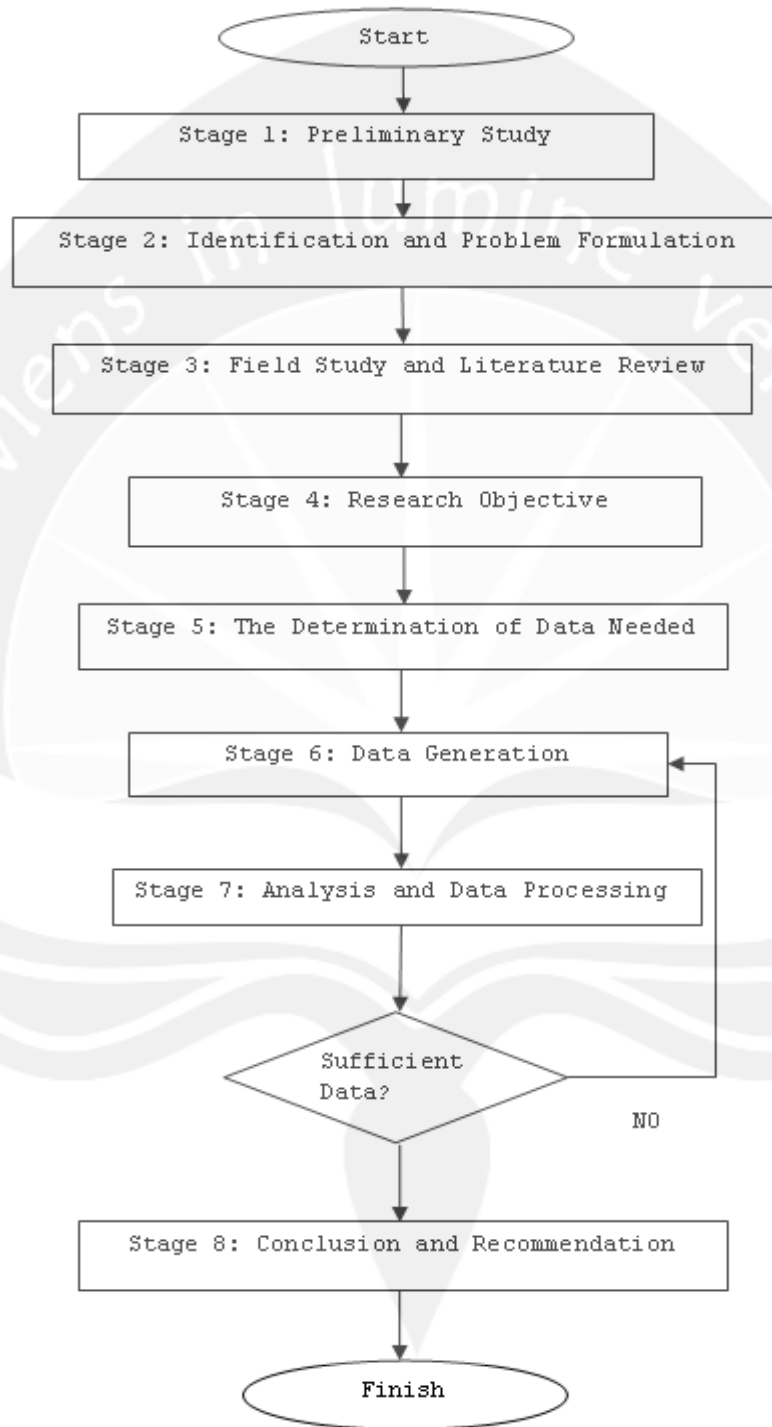


Figure 1.1. Flowchart of Research Methodology