CHAPTER 1
PRELIMINARY

I.1 Background

The construction project is a series of sensitive work mechanisms because every aspect of a construction project influences one another. The range of work mechanisms must be arranged in such a way as to be able to achieve maximum results among others must prioritize the selection of proper methods, resources, equipment, and technologies to perform the tasks of a construction project. In addition, the deadline must also be considered, the time limit which means the project must be completed before or right at the appointed time. Therefore, the success of implementing a project on time is an important goal for both project owners and contractors.

In practice, the implementation of construction projects in the field has various possibilities causing delays, such as design changes, weather influences, material supply delays, and inappropriate or less specific planning (Kisworo, et al., 2017). If one of these points occurs, the impact can result in increased implementation time and increased of implementation costs so that the completion of the project is hampered. Besides the project can be said late, the project can also experience on hold. Even if the company and the contractor communicate regularly, a project may be to go on hold. According to Vernon (2017), if there has been no production work on a project for more than 6 weeks, the project is officially "on hold". Besides that, the project can also be said to be on hold if there is a lack of signature with 3rd party on purchase, license, scope of work, or legal document, a bug or issue resolution from a vendor or 3rd party, etc. happen.

If the problem occurs, then the contractor as the executor in the field must deftly provide a solution to the delay in the project, for example by accelerating. Acceleration can be done not only to overcome the problem of delay, if the project has no production work more than 6 weeks or usually named the on hold project, the contractor can create a new schedule and accelerate the critical activities that will occur if the project starts later. Therefore, the acceleration carried out cannot be arbitrary.

Cost factors and quality standards must also be kept in mind so that the contractor does not lose and the results of his work still have good quality.

PT. Bangtelindo founded in Bandung in 1993 that engaged in the planning, construction, installation, and maintenance of telecommunications facilities. PT. Bangtelindo provides construction services and installation, maintenance, and general trading. Construction service and installation are chartering of civil buildings (buildings, bridges, and roads), chartering installations or construction (electricity, water, machinery, pipes, telecommunications and other building facilities). Maintenance is the provision of telecommunications services providers and telecommunications facilities (access providers) as well as maintenance services for Telecommunication Facility Installation and Telecommunications Support Facilities. And general trade is the procurement of equipment needed in the implementation of telecommunication and multimedia development, such as transmission devices, central, cable networks, and other supporting facilities.

One of the projects being undertaken by PT. Bangtelindo has a project called OSP-FO (Outside Plant-Fiber Optic) Granular at STO Cikande. OSP-FO (Outside Plant-Fiber Optic) is an optical fiber planting located in a public area (outside the building/residential area). The OSP network is usually used as a distribution cable or to connect the Central Office with ISP network segment (Inside Plant). For OSP, its deployment can be done either by pole or underground passing (direct planting or by duct legs).

In PT. Bangtelindo they have a website to know the information of the project, such as the development of the schedule, official report, and other information about the project or they named it web service on project management office based. The website is called SMILE (Supply Management Information of Logistic Enhancement). The appearance of the website can be seen according to the picture below.

Activity	Bobot	Durasi	Prede	Lag	Actual		Forecast Smile	
					A-Start	A-Finish	F-Start	F-Finish
1. Preparing	20	5			01/07/2018	05/07/2018	01/07/2018	05/07/2018
[008] 1.1. Kick Off Meeting/Rapat Koordinasi	5	1			01/07/2018	01/07/2018	01/07/2018	01/07/2018
[011] 1.2. Survey	10	2			02/07/2018	03/07/2018	02/07/2018	03/07/2018
[012] 1.3. DRM (Approval Design)	5	2			04/07/2018	05/07/2018	04/07/2018	05/07/2018
2. Material Delivery	30				01/07/2018		01/07/2018	15/05/2019
[009] 2.1. Perizinan Pihak ke-3	4				01/07/2018		01/07/2018	13/05/2019
[015] 2.2. SITAC (ODC)	4				01/07/2018		01/07/2018	08/05/2019
[016] 2.3. Delivery Material HDPE/Subduct	3				01/07/2018		01/07/2018	11/05/2019
[017] 2.4. Delivery Material Sipil (HH/MH/Pondasi)	3	129			01/07/2018	06/11/2018	01/07/2018	06/11/2018
[018] 2.5. Delivery Material FO	4				01/07/2018		01/07/2018	12/05/2019
[019] 2.6. Delivery Material ODC	3				01/07/2018		01/07/2018	08/05/2019
[029] 2.7. Delivery Material Tiang	3				01/07/2018		01/07/2018	06/05/2019
[020] 2.8. Delivery Material ODP	3				01/07/2018		01/07/2018	11/05/2019
[030] 2.9. Delivery Material Aksesoris	3				01/07/2018		01/07/2018	15/05/2019
3. Installasi & Test Comm	40						16/05/2019	04/06/2019
[010] 3.1. Pekerjaan Galian (Trenching/Rodding/Crossing/Borring)	5						16/05/2019	25/05/2019
[021] 3.2. Pekerjaan Sipil (HH/MH/Bridge/Pondasi)	4						16/05/2019	26/05/2019
[022] 3.3. Pekerjaan Duct/Subduct/HDPE	5						16/05/2019	23/05/2019
[023] 3.4. Penarikan FO	5						16/05/2019	04/06/2019
[024] 3.5. Pemasangan ODC	4						16/05/2019	28/05/2019
[025] 3.6. Penanaman Tiang	4						16/05/2019	03/06/2019
[026] 3.7. Pemasangan ODP	4						16/05/2019	23/05/2019
[027] 3.8. Jointing/Terminasi	4						16/05/2019	20/05/2019
[028] 3.9. Commisioning Test	5						16/05/2019	25/05/2019
4. Closing	10						05/06/2019	25/06/2019
[005] 4.1. Pelaksanaan UT	5						05/06/2019	11/06/2019
[007] 4.2. Penerbitan BAST-1	5						12/06/2019	25/06/2019

Figure I. 1 Actual Schedule on website SMILE of OSP-FO Granular at STO Cikande

Based on Figure I. 1, it can be seen the actual schedule on website SMILE of OSP-FO Granular at STO Cikande. There are seven columns of the actual schedule. The first one is Activity, it shows what activities exist in this project. The second one is *Bobot* or Weight, its shows the weight of the activity, the denomination is in percent. The third one is *Durasi* or Duration, it shows the duration of the activity. The fourth one is *Prede* or Predecessor, it shows the relationship between activities in project. The fifth one is Lag, it shows the delay of a successor activity and represents time that must pass before the second activity can begin. The sixth one is Actual, it shows the actual progress of the project. The last one is Forecast Smile, it shows the schedule baseline of the project. So, it can be seen from Actual column that the last activity in this project is on 6th November, 2018, the name of the activity is civil material delivery (HH/MH/Foundation), and the other activity that have been done are kick off meeting, survey, and DRM (Design Review Meeting). The last activity on the project makes the status of the project become on hold because of there is no production work for more than 6 weeks. This happened because the 3rd license party from city service is not

released yet, but there is a material that has been ordered and has arrived at the project location. Then, PT. Bangtelindo moved that material to another STO of OSP-FO Granular Project. So, PT. Bangtelindo and PT. Telkom has made a Forecast Smile to forecast the schedule if the 3rd license is release.

Therefore, it is necessary to make a new schedule and accelerate the project. In planning construction projects, optimized time and costs are very important to be known (Priyo and Aulia, 2015). In order to avoid delays or projects that do not go according to plan, then planning in the project is something that really needs to be considered. In the initial planning of a project, the cost, time, and quality factors form a relationship that is interdependent and has a very strong influence, and the important thing is accelerating the completion of the project must be done with good planning. One of alternative form of optimization for overcome time delay the project that can be done is make additional working hours, addition of material, additions heavy equipment, and additional power work. Things related with those, namely time project completion and worker costs on the project, as well as supporting activities have close relationship because of things it is very decisive the success of a project (Buluatie, et al., 2013). With limited resources, then the alternative commonly used to support the acceleration of activities is by increasing working hours, so that affect the total cost of the project. To find out this needs to be learned about the existing network, and the relationship between time and cost, this referred to as the Time Cost Trade Off Analysis (Frederika, 2010).

The purpose of this method is to accelerate the time of project implementation and analyze the extent to which time can be shortened by adding minimum costs to activities that can accelerate the implementation period so that the maximum acceleration can be known and the minimum costs. The Time Cost Trade Off (TCTO) method provides an alternative to the project planner to be able to arrange the best planning so that efforts to optimize the time and cost of completing a project can be done. With the minimum cost increment, the overall project cost due to the acceleration of the settlement can be controlled so that the owner and the implementing contactor can get their own benefits. Based on these considerations, in this final project the author

believes this is the right method to solve OSP-FO Granular STO Cikande problem in PT. Bangtelindo and will be discusses in this final project.

I.2 Problem Formulation

Based on the background of the problems described previously, then as follows the formulation of the problem that must be answered in this study are:

1. What is the optimum cost and time of project implementation after acceleration?
2. What is the comparison of time and cost of the project before and after acceleration with efficiency?

I.3 Research Objective

Based on problem formulation, this research objective are:

1. To find the optimum time and cost using the Time Cost Trade Off (TCTO) method with the addition of additional working hour.
2. Compare project time and costs before and after acceleration with efficiency.

I.4 Research Boundary

This research was carried out by considering the limitations and assumptions to focus attention on the object of the case study, the boundaries are:

1. Data and discussion were only carried out on the Outside Plant (OSP-FO) Granular STO Cikande Project in PT. Bangtelindo.
2. The calculation of Time Cost Trade Off in this final project uses an alternative to adding optimum working hours, for 3 hours.
3. The application of precedence diagram method with Microsoft Project in preparing network planning and determining critical paths.

I.5 Research Benefit

The research benefits that are expected for this research are:

1. As a recommendation for construction projects to accelerate the project, especially for OSP-FO Granular Project in PT. Bangtelindo.
2. As learning material in construction work projects to find out more about how to optimize implementation time and costs.
3. As a reference for the next research for project management.

I.6 Writing Systematic

This research is described in the systematic writing as follows:

Chapter I Preliminary

This chapter contains a description of the information and the background of the importance of this research. The author provides a summary of the problems that occur in the topics discussed, the methods used, and the research objectives. To deepen this study, an overview of case studies is explained.

Chapter II Literature Review

This chapter contains literature that is relevant to the problem investigated, explanation of methods used, and related ones with Outside Plant-Fiber Optic (OSP-FO) Granular STO Cikande Project in PT. Bangtelindo.

Chapter III Research Methodology

In this chapter detailed steps of the study are explained includes a conceptual and systematic problem solving model includes the determination of the initial stages of research, the collection process data, and data processing processes to achieve research objectives.

Chapter IV Data Collection and Processing

This chapter describes the process that is carried out for collecting data, processing data, and processing results the data needed to complete the problem formulation research.

Chapter V Result Analysis

In this chapter an analysis of the results is explained processing data that has been obtained in the previous chapter then it can be used as a company recommendation.

Chapter VI Conclusion and Suggestion

In this chapter a conclusion is drawn from the results of research and suggestions given to projects, companies, and further research.