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SCHEDULING STUDY USING THE PDM METHOD IN THE CONSTRUCTION PROJECT OF JALAN SIMPANG 4 ISLAMIC CENTER – TANJUNG SELATAN WITH THE HELP OF PROJECT 2019

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ABSTRACT

Project scheduling is a method to measure the duration required by an activity to be completed, scheduling in construction projects is also used to determine the start and finish times of each activity in the project. *The Precedence Diagram Method* (PDM) is a network with the Activity on Node (AON) model, usually depicted as of a square with arrows that connect between activities that are the link between project activities. Through the results of the analysis in this study, it was found that the duration of the Simpang Islamic Center – Tanjung Selatan Road Construction project, Tabalong Regency, was 214 working days or 259 calendar days and the total normal duration reached 300 calendar days, starting on January 6, 2022 and ending on September 22, 2022.

Keywords: Scheduling, Precedence Diagram Method, Project 2019

1. INTRODUCTION

Planning, control, and project schedules are needed to realizing good project management. With such rapid technological development, the ongoing development is expected to be completed properly and on time. Quoted by Siswanto who stated that determining the time for the completion of activities is one of the crucial first steps in planning, because the decision on time will be the basis for planning the next stages. (Novitasari, 2014).

The Simpang 4 Islamic Center Road Construction Project located in Murung Pudak District, Tabalong Regency is a district road project that is carried out by the Tabalong Regency PUPR Office. Based on the contract, it is stated that the road construction is carried out for 300 calendar days. In its implementation, of course, it is expected that the completion will be faster, so scheduling analysis is carried out with other methods, one of which is the PDM method.

Proper scheduling in the execution of a project has a huge impact on avoiding losses. Well-designed scheduling will ensure the execution of construction projects takes

place efficiently and effectively. One of the methods used in scheduling is the Precedence Diagram Method (PDM).

The project scheduling process can be easier to do by using several *software,* one of which is *Microsoft Project Software. Microsoft Project* software is a computer program used to support the preparation and supervision of the scheduling of a detailed project (Hia and Nusa, 2024)

2. THEORITICAL STUDY

Definition of Management

Management is a scheme to use the minds and energy of others in carrying out an activity to achieve a goal that has been designed previously. There are several techniques in management such as directing, influencing and supervising, as well as organizing components that support each other to achieve a goal (Sutisna and Effane, 2022).

Project Definition

Wijaya (2020) revealed that what is meant by a project is an activity or effort designed to achieve a certain goal. However, it has limitations on its time and resources.

Project Management

Project management is an approach or plan that is applied to realize efficiency and effectiveness in a company. The purpose of project management is to manage various managerial functions to obtain optimal results, in accordance with the standards and provisions that have been set. Project management also aims to create efficient and effective resource management (Suwandy et al., 2022).

Network Analysis

Generally, the linkages that make up the network describe a series of activities carried out to achieve the goals of the project. The analysis carried out on the network is useful for managing the project execution time by determining the critical path of a series of activities in the project. (Muhammad et al., 2021).

Project Scheduling

Project scheduling is a process to determine the length of time required for each activity in the project to be completed, including raw materials, labor, and time required for each activity. Scheduling is the division of available time to complete each work on a

project until it reaches maximum results, taking into account the limitations that exist (Husein, 2009).

PDM Method

The Precedence Diagram method depicts a job with a square-shaped Node, while the arrow lines indicate the relationship between related jobs. In PDM, no *dummy* is required. A job can be started without waiting for the previous work to be fully completed, which is possible by applying the *overlapping* method. (Hendriputri, 2018).

Project

Project is an application to manage project. The advantage of the Project application lies in its ability to plan, organize, and control time and cost, which converts input data into an output that fits the purpose. The advantage of a project is its ability to schedule production in an effective and efficient manner.

3. METHOD

Research Location

This study was carried out on the Simpang 4 Islamic Center – Tanjung Selatan Road Construction Project which has a length of 4200 m.

Figure 1. Location Map

Research Procedure

The initial stage in this study is the process of collecting primary and secondary data in the form of general project data, work lists, S-curves and work processes in the field. Furthermore, an analysis of dependencies between works will be carried out which will be included in *Project* 2019 to obtain the results of scheduling with the PDM method and the total duration of the entire project.

4. RESULT AND DISCUSSION

In the Simpang 4 Islamic Road Construction Project – Tanjung Selatan Center, the PDM scheduling carried out only concerns physical work without paying attention to the non-physical work. Therefore, Traffic Management and Safety and Occupational Safety and Health are not included in the PDM analysis, but will still be included in the results of the scheduling analysis.

Duration of Each Job

What needs to be done to find out the duration of each work is to prepare the S-curve data that has been obtained from the project. Then the duration was simplified from the duration per week to per day.

Job Code Assumptions

In giving the assumption code, chapters and subchapters are observed in the job description, then a numerical code is given to each division and subdivision. For example, in the General division, a number code (1) is given, and in the Mobilization sub-chapter, a number code (2) is given, and so on in the next work.

Dependency between Jobs

The first thing done in analyzing job dependency is to analyze the relationship between jobs based on the S curve and conduct interviews with supervisors in the field. then compare the results of the interview with the S-curve data. The results of the dependency and *its predecessors* are shown in Table 1. below:

Table 1. Analysis of Job Dependency Relationship Based on PDM Method

Code	Job Description	Duration (days)	Dependency	*Relationship*	*Lag Time*	*Lead Time*
1	**Road Construction of Junction 4 Islamic Center - South Tanjung**					
2	**DIVISION. 1 : GENERAL**					
3	Mobilization	14	Start			
4	Contactor Facilities	28	3	SS		1
5	**DIVISION. 2 : DRAINAGE**					
6	Excavations for Sewers, Drainage and Waterways	42	21	SS		
7	Pair of Stone with Mortar	105	6	SS		1
8	**DIVISION. 3 : EARTHWORKS**					

9	Land Clearing and Peeling	42	3	FS		
10	Common Mines	63	9	SS		2
11	Selected Piles from Mineral Sources	140	13	SS		2
12	Road Body Preparation	98	4; 10; 11	SS		21; 7; 7
13	Geotextile Stabilizer (Class 1) Non-Woven 220 gsm	140	9	SS		2
14	**DIVISION. 5 : GRANULAR PAVEMENT AND CEMENT CONCRETE PAVEMENT**					
15	Grade B Aggregate Foundation Layer	112	12	SS		7
16	Grade A Aggregate Foundation Layer	49	15	SS		70
17	**DIVISION. 6 : ASPHALT PAVEMENT**					
18	Absorbent Layer Fasteners – Liquid Asphalt	56	7;16; 23; 28	FS	0; 7; 0; 0	
19	Lataston Layer Foundation (HRS-Base) (Gap gradation/semi gap)	56	18	SS		
20	**DIVISION. 7 : STRUCTURE**					
21	Piling Foundation Preparation and Piling	105	9	SS		14
22	U 24 Plain Reinforcement Steel-BjTP 280	112	21	SS		
23	Low-Quality Concrete with fc'= 10 Mpa	98	24; 25	FF; SS		
24	Low-Quality Concrete with fc'= 15 Mpa	98	11; 22	SS		2; 2
25	Stone Pair	161	21; 26	SS; FF		1

26	4" diameter PVC Drainage Pipe	154	21	SS		
27	**DIVISION. 9 : DAILY WORK AND MISCELLANEOUS WORK**					
28	Type 1 Precast Kreb (Elevator Mountable)	35	16	SS		1

Entering data into Project 2019 Program

The data input process can be carried out through several stages, including: the preparation stage which is the stage of inputting general information about the start time of the project, the number of working days, the determination of holidays and workers' working hours; data input stage for the PDM scheduling process. The data entered is a list of jobs, duration and dependencies that have been created; Output results that will provide multiple views of scheduling results and critical trajectories on the project being worked on. The results of the overall project duration can be seen in *Project Information* in the Project 2019 program.

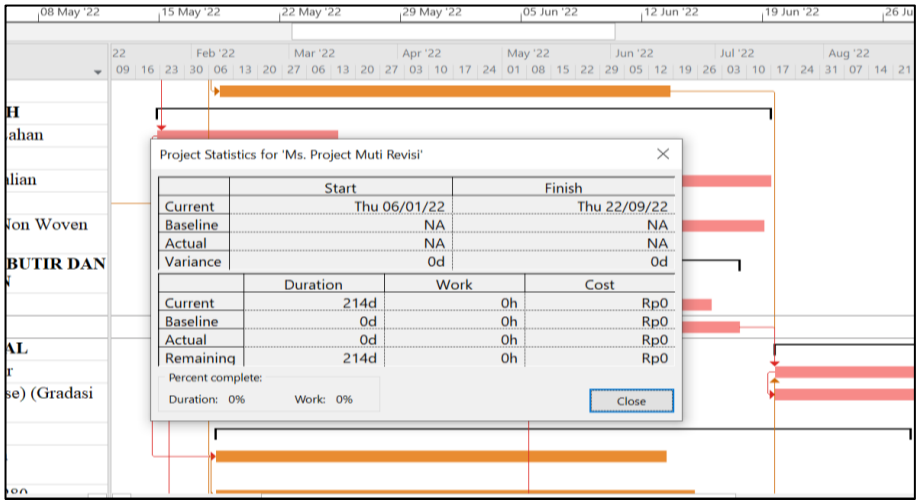

Figure 2. Overall Duration Results

5. CONCLUSION

From the results of the dependency analysis, there is not only a Finish to Start dependency relationship, but there is also a Start to Start dependency relationship. In this final project research, there are 17 jobs that have a Start to Start dependency relationship with several lead times, 2 jobs that have a Finish to Start dependency relationship and 2 jobs that have a Finish to Finish (FF) relationship.

The results of the scheduling analysis of the Simpang 4 Islamic-Center Tanjung Selatan Development Project with the help of *the Project 2019* application, namely the project was carried out for 214 working days or 259 calendar days starting on January 6, 2022 and ending on September 22, 2022. By comparison, the project duration on the S-Curve is 300 calendar days.

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