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RESCHEDULING OF THE CONSTRUCTION PROJECT OF THE SYEKH MUHAMMAD ARSYAD AL-BANJARI MOSQUE USING THE FAST TRACK METHOD

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ABSTRACK

The fast track method is an acceleration technique that involves conducting activities in parallel to expedite project completion time. The research on the construction project of the Syekh Muhammad Arsyad Al-Banjari Mosque aims to evaluate the implementation of acceleration through the fast track method. Data collection includes general project data and the time schedule. The results indicate that the duration achieved by scheduling with the fast track method was 539 days. This demonstrates that applying the fast track method in the construction of the Syekh Muhammad Arsyad Al-Banjari Mosque can accelerate work without increasing costs, as the principle of the fast track method is to perform parallel activities or tasks that are on critical paths.

Keywords: Scheduling, WBS, PDM, Critical Path, Fast Track Method

1. INTRODUCTION

With the rapid progress of time, humans need innovations designed to meet life's needs and contribute to ongoing development. Therefore, project after project is created to fulfill and contribute to these objectives. A project is an activity that has been planned to be completed within the allocated timeframe and budget (Suryani, 2016).

Nowadays, construction projects are experiencing rapid development. However, in reality, a project has limited resources. Therefore, project management is needed as a form of solution. According to Chapman in the introductory module of project management, project management is a set of principles, practices, and techniques applied to lead a project team and manage project schedules, costs, and performance risks with the aim of meeting customer satisfaction (Arifin, 2021).

Construction projects are not spared from the problems that occur, one of these problems is the delay in project implementation. To avoid delays, it is necessary to plan for accelerating the completion time of construction projects. One way to accelerate project implementation is to use the fast track method. The fast track method is a technique for accelerating projects by completing activities simultaneously. This method aims to expedite project completion by finding the most feasible schedule to perform

work ahead of the planned timeline. In the Syekh Muhammad Arsyad Al-Banjari Mosque Construction Project, there was a delay during the implementation phase due to an issue that affected the owner. The acceleration of this project is achieved by increasing working hours through overtime and increasing the number of workers. Therefore, in this thesis, the author will reanalyze the project scheduling by planning for rescheduling using the fast track method in the Sheikh Muhammad Arsyad Al-Banjari Mosque Construction Project.

2. THEORETICAL STUDY

Project scheduling is part of the planning process that presents information about the planned schedule as well as the progress of the project in relation to resource performance, including costs, labor, equipment, and materials. In addition, this scheduling also includes the planned project duration and a timeline for its completion (Fazis & Tugiah, 2022). The activity of breaking down project work into smaller parts to facilitate implementation and operations is known as a Work Breakdown Structure (WBS), which is defined as a hierarchical breakdown of activities that focuses on organizing, defining, and graphically presenting the total work that must be completed to achieve the project's final goal (Ardiyansyah, M., 2023)

Precedence Diagram Method (PDM) is a network method known for identifying the critical path, which consists of a series of work components with the longest total duration, indicating the fastest completion time. In PDM, the method used is Activity On Node (AON), where the relationships between tasks are represented by nodes connected by arrows. Critical paths play an important role in a project because the activities on this path are expected not to experience delays in completion. If there are delays, the overall implementation of the project will also be delayed.

The fast track method is an approach to accelerate project implementation by carrying out activities simultaneously in the scheduling process, making completion time and costs more efficient. The basic principle of this method is to plan overlapping tasks by changing the flow of activities on the critical path from finish-to-start to start-to-start, with the aim of speeding up the process and reducing implementation costs (Wardana & Putra, 2023). By applying the fast track method in scheduling for activities that are on the

critical path, it is hoped that, with adequate management capabilities, the duration of the project can be shortened.

3. METHOD

Syekh Muhammad Arsyad Al-Banjari Mosque Construction Project is located at the Jalan Dharma Praja Roundabout. In this research, the project serves as the object of study, which includes both primary and secondary data. Primary data is collected directly from the research subjects through field observations and interviews. Meanwhile, the secondary data in this study consists of general information on construction activities and S-Curves. The variable being evaluated is time.

4. RESULTS AND DISCUSSION

This project began implementation on July 11, 2023, and is planned to be completed within 540 calendar days. The scheduling for this project uses the S-Curve. Below are the WBS (Work Breakdown Structure) for the Syekh Muhammad Arsyad Al-Banjari Mosque Construction Project, as shown in Figure 4. 1 and Figure 4. 2.

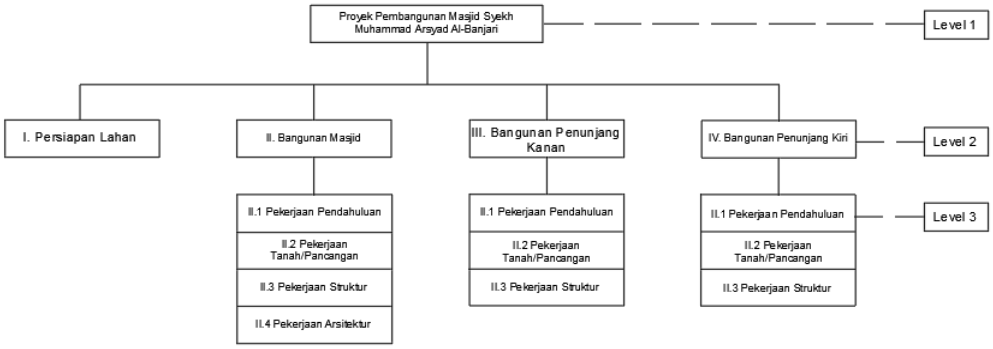

Figure 4. 1 WBS Syekh Muhammad Arsyad Al-Banjari Mosque Construction Project

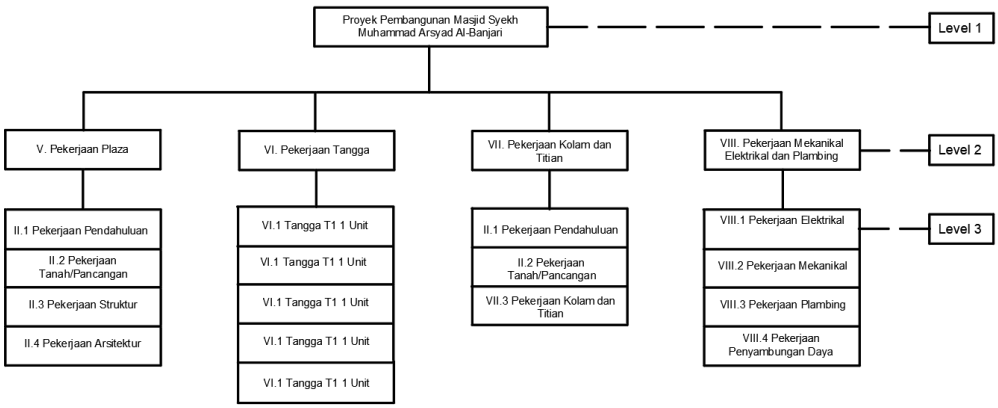

Figure 4. 2 Continuation of WBS Construction Project of Syekh Muhammad Arsyad Al-Banjari Mosque

Project scheduling using the Precedence Diagram Method (PDM) begins by determining the dependency relationships between tasks and their predecessors. This process aims to identify methods and efficiencies within a project, allowing for effective scheduling to be developed. In the PDM method, overlap is permitted, meaning that subsequent tasks can begin without waiting for the previous tasks to be fully completed. Therefore, in PDM, the term "dummy" is not applicable. Below is a table containing the dependency relationships between the tasks that can be referenced in Table 4. 1.

Table 4. 1 Dependency Relationship Between Jobs

No.	Job Description	Code	Duration (Days)	Dependency	Konstrain	Slack Time
I	**LAND PREPARATION**					
1	Land Preparation	A	91			
II	**MOSQUE BUILDING**					
1	Preliminary Work and Earthworks/Stakes	B	126	A	SS	7
				E	SS	0
				G	SS	0
2	Structural Work	C	140	B	SS	21
3	Architectural Jobs	D	133	C	SS	49
III	**RIGHT SUPPORT BUILDING**					
1	Preliminary Work and Earthworks/Stakes	E	112	B	SS	0
				G	SS	0

No.	Job Description	Code	Duration (Days)	Dependency	Konstrain	Slack Time
2	Structural Work	F	77	E	SS	21
IV	**LEFT SUPPORT BUILDING**					
1	Preliminary Work and Earthworks/Stakes	G	105	B	SS	0
				E	SS	0
2	Structural Work	H	84	G	SS	42
V	**PLAZA WORKS**					
1	Preliminary Work and Earthworks/Stakes	I	91	A	SS	28
2	Structural Work	J	63	I	SS	70
3	Architectural Jobs	K	147	J	FS	77
WE	**LADDER WORK**					
1	Ladder Work	L	210	D	FS	35
				F	FS	140
				H	FS	112
				K	SS	7
VII	**POND AND WALKWAY WORK**					
1	Preliminary Work and Earthworks/Stakes	M	56	A	SS	63
2	Pond and Walkway Work	N	63	M	FS	28
VIII	**MECHANICAL, ELECTRICAL, AND PLUMBING WORK**					
1	MEP Jobs	O	112	L	SS	84
				N	FS	126
2	Power Connection Work	P	28	O	FS	77

The data results are entered into each node of each task, including their corresponding connections, to facilitate reading the project flow, dependency outcomes, and critical paths. In this analysis, the calculated duration totals 553 days, exceeding the

originally planned duration of 540 days. The critical path consists of activities labeled M, N, O, and P.

The critical path is to find the values of ES, EF, LS, and LF through manual calculations using the Precedence Diagram Method (PDM) to determine where the work path is experiencing a critical trajectory. A task is considered critical if the ES and LS values are the same, and if the EF and LF values are also the same. The results of the PDM analysis can be seen in Figure 4. 3 below.

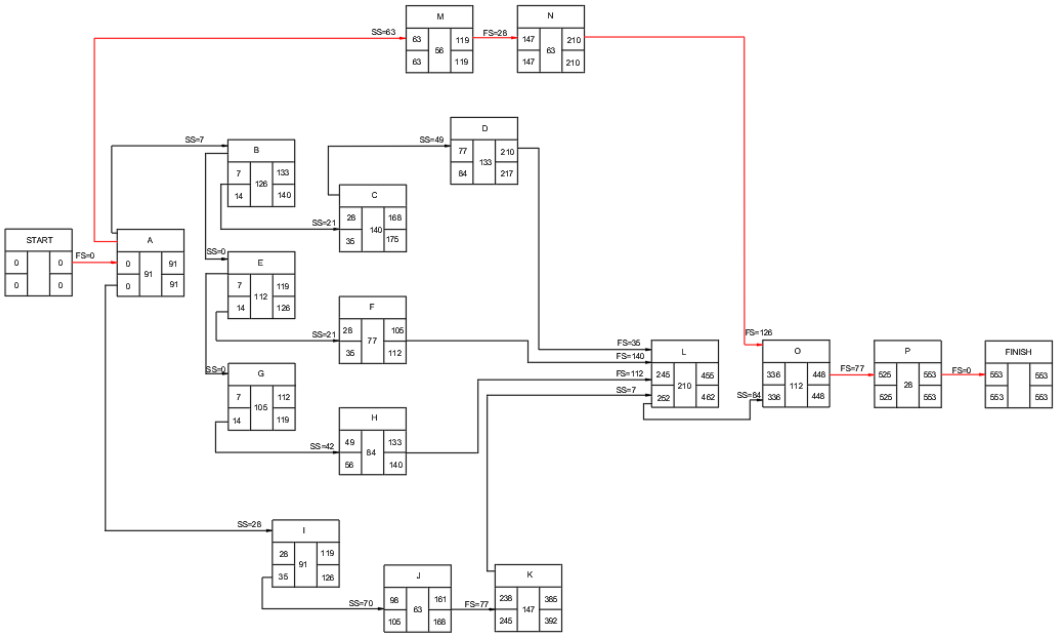

Figure 4. 1 PDM Analysis Results

Through scheduling the plan, it is determined that the planned project duration is 540 calendar days, with a contract date of July 11, 2023. After calculations using the Precedence Diagram Method (PDM), it was found that the schedule has a delay of 13 days and critical paths were identified in work activities M, N, O, and P. The activities listed on the critical path can be seen in Table 4.2 below.

Table 4. 2 Activities on Critical Tracks

No.	Activity	ES (Day)	LS (Day)	EF (Day)	LF (Hari)
1	M	63	63	119	119
2	N	147	147	210	210
3	Or	336	336	448	448
4	P	525	525	553	553

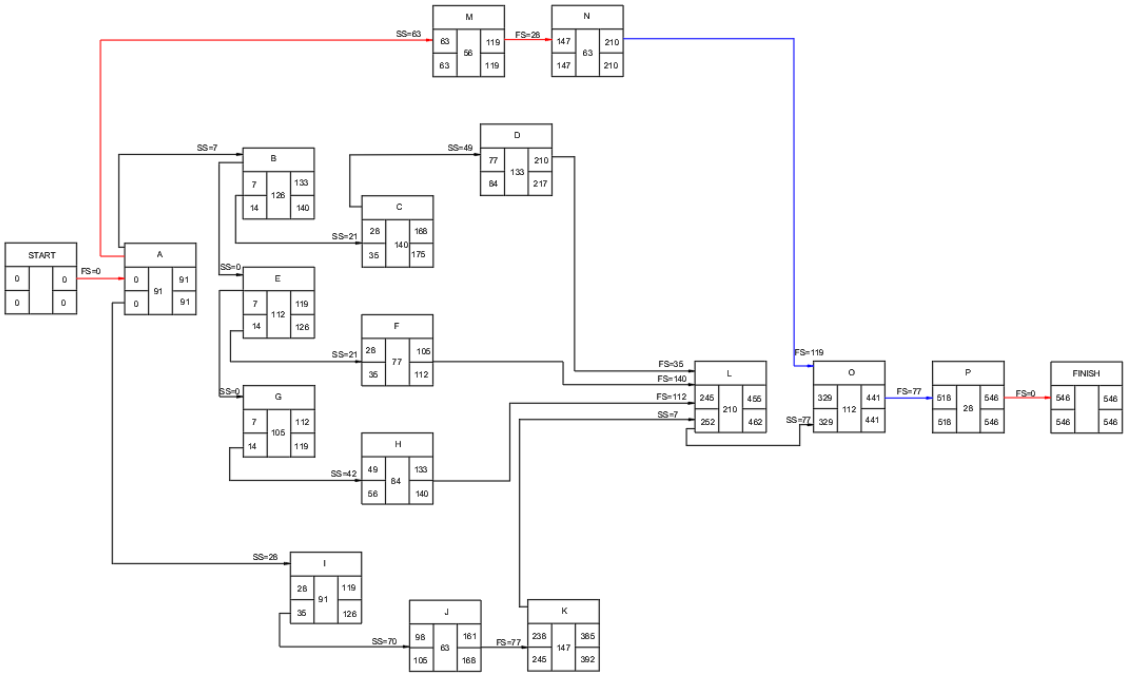

Figure 4. 2 Fast Track Phase I Analysis

From Figure 4.4, it is explained that the time acceleration carried out in activities O and P on the critical path still does not meet the planned target. Therefore, a Phase II fast track analysis is needed with the goal of achieving the final duration in accordance with the planned duration target. In this Phase I, the O task, whose original dependency relationship was N FS+126, has changed to N FS+119, and the P task has changed to O

FS+77. Since Phase I has not met the target, it is necessary to analyze the next stage of the fast track. The fast track analysis in Phase II can be seen in Figure 4. 5.

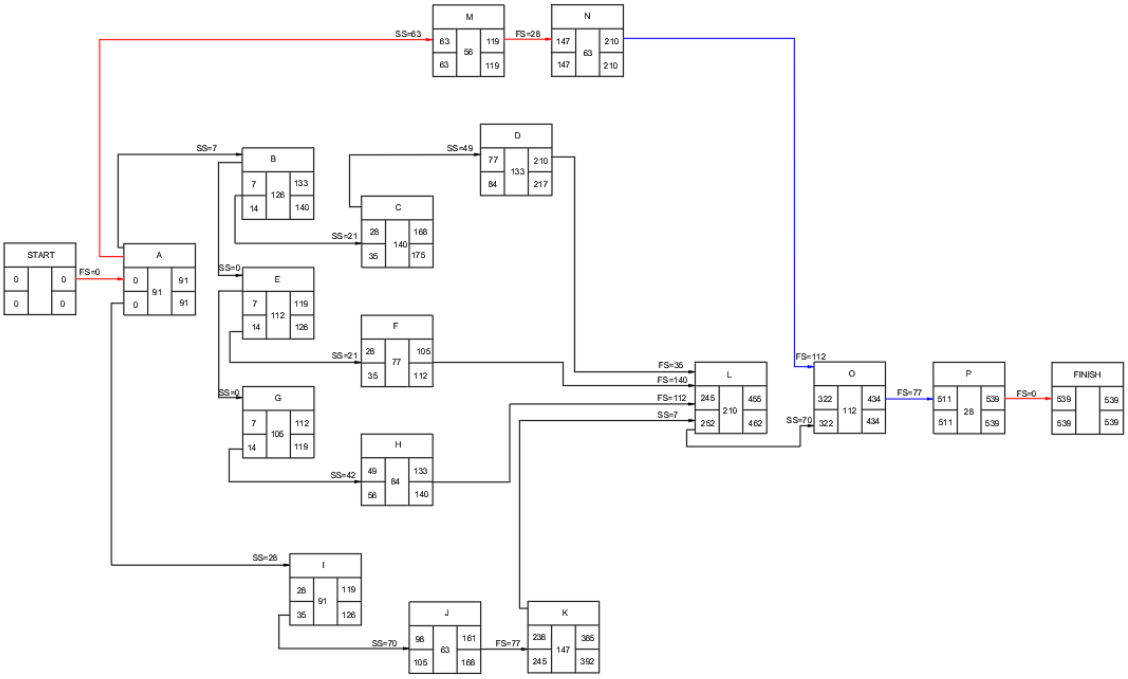

Figure 4. 3 Fast Track Phase II Analysis

From Figure 4.5, it is explained that the time acceleration applied to activities O and P on the critical path has met the planned target. Therefore, there is no need for the next stage of fast track analysis, as the final duration aligns with the planned duration target of 539 days. In Stage II, the O task, which was originally dependent on Stage I, is now N FS+119 to N FS+112, and the P task is related to O FS+77.

The calculation using the fast track method on critical paths occurs in two stages. In the first stage, the duration obtained is 546 days. This does not meet the target duration of the plan, so the second phase of fast tracking is carried out again. In the second stage, the duration obtained is 539 days, which means this duration meets the targeted duration, and there is no need to fast track the next stage. This duration has been accelerated by 14 days after scheduling with the precedence diagram method (PDM) and is one day faster than the planned schedule.

5. CONCLUSION

It can be observed from the analysis results that by applying the fast track method to the scheduling of the Syekh Muhammad Arsyad Al-Banjari Mosque Construction Project, it can be concluded that using the Precedence Diagram Method (PDM), a duration

of 553 calendar days was obtained, which was 13 calendar days longer than the planned duration. Therefore, acceleration was implemented using the fast track method. The acceleration using the fast track method occurs in two stages. In the first stage, a duration of 546 calendar days is achieved, indicating a delay of 6 days from the planned duration. Consequently, acceleration continued with the fast track method in Phase II, where the duration obtained was 539 calendar days, meaning that at this stage, there was a time saving of 1 day compared to the initial planned duration of 540 calendar days.

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