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SCHEDULING STUDY USING THE PDM METHOD IN THE PIANGGU-LALAP ROAD RECONSTRUCTION PROJECT (SUPPORTING THE FOOD ESTATE - DAK) IN AWANG DISTRICT, EAST BARITO REGENCY, CENTRAL KALIMANTAN

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ABSTRACT

The Pianggu-Lalap Road Reconstruction Project in Awang District, East Barito Regency, is a district road project by the PUPR Office. Initially, scheduling only used the S-curve without considering the relationship between activities, which caused delays. This research reconstructs the schedule using the Precedence Diagram Method (PDM) through the stages of WBS, duration determination, activity linkage analysis, and scheduling with Microsoft Project 2019. The results are displayed in Gantt Chart and Network Diagram, with a total duration of 142 days, from July 4 to November 19, 2024

Keywords: Scheduling, Precedence Diagram Method (PDM), Microsoft Project 2019

1. INTRODUCTION

Scheduling is a crucial component of project planning as it provides an overview of the implementation time and monitors the progress of activities. This process involves evaluating the utilization of resources, including costs, labor, tools, and materials, along with estimating the duration and monitoring from the start to the completion of the work. In the implementation of construction projects, various scheduling techniques are used to manage time and resources more efficiently (Fahrian et al., 2021).

In the Pianggu-Lalap Road reconstruction project in Awang Subdistrict, East Hamlet, East Barito Regency, which is managed by the PUPR Office, the scheduling system is still based on the S-curve and has not considered the dependency between jobs and the critical path. Based on interviews with Ir. Agus Sugian Noor, managerial obstacles that caused delays were identified. Improvement efforts are made after obstacles arise, including adjustments to the implementation time to accelerate completion and reduce potential risks. Timely project completion is expected to accelerate the distribution of benefits to the community as the main recipient of development results.

The purpose of this research is to develop a project implementation schedule using the Precedence Diagram Method (PDM), which is able to represent relationships between activities systematically and adaptively. Using the Activity on Node (AON) approach, this method allows the establishment of relationships such as Finish to Start and Start to Start without the need for dummy activities. PDM supports the identification of the critical path as well as inactive time, and provides flexibility for adjustments in the event of delays or accelerations. In addition, this method can be integrated through software such as Microsoft Project or Primavera to improve the quality of planning and control (Pinanggi et al., 2025).

Scheduling is done using Microsoft Project 2019, which serves to optimize time management and activity processes. This application can calculate working hours, implementation duration, cost estimates, arrange work sequences, and recognize important activities on the critical path. With flexible data processing features, this software supports planning and controlling costs and time quickly and efficiently (Satriani et al., 2024).

2. THEORETICAL FOUNDATION

2.1 Project Management

According to Darmawan and Ratnasari (2020), project management includes activities to design, organize, and manage various resources to realize predetermined goals. Its application needs to be adjusted to the characteristics and level of complexity of the project, with an emphasis on achieving results according to the planned time and

2.2 Work Breakdown Structure (WBS)

Gazalba et al. (2022) state that the Work Breakdown Structure (WBS) is a hierarchical structure that structures project activities in a systematic and organized manner. WBS preparation can be done based on project goals or the order of implementation time. Its function is to divide work into smaller and more manageable components, including main tasks, subactivities, milestones, and deliverables.

2.3 Project Scheduling

Muhammad et al. (2021) suggest that time management plays a crucial role in project implementation to ensure that each activity takes place according to plan. The

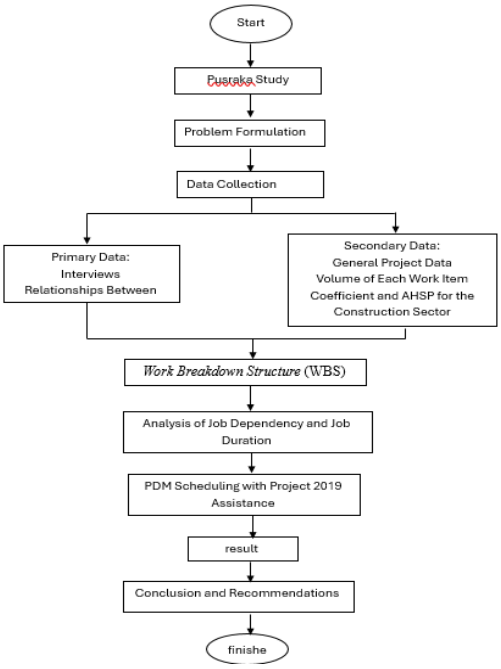
work schedule acts as a reference for implementation as well as a control tool to prevent delays. By analyzing the duration of each activity, the project can be arranged systematically, displaying an efficient work order and information related to the start, delay, and completion time of each task.

2.4 Microsoft Project

According to Gazalba et al. (2022), Microsoft Project is a software designed to support the process of planning, managing, and monitoring projects effectively. This application has features that are comprehensive and adaptive to project needs, so that it can speed up the implementation of administrative tasks and facilitate the preparation of work progress reports.

3. RESEARCH METHOD

This study is a road reconstruction project in Pianggu-Lalap village, Awang sub-district, East Barito district, Central Kalimantan. The analyzed road section has a total length of 4,635 meters, with the implementation of the work starting from STA 0+000 to STA 4+635. Based on the soil characteristics at the location, it is known that the soil condition is classified as soft with a California Bearing Ratio (CBR) value of less than 5%.



4. RESULT AND DISCUSSION

4.1 General Data

The object studied in this research is the Road Reconstruction Project located in Pianggu-Lalap Village, Awang Sub-district, East Barito Regency, Central Kalimantan Province. This project is a road infrastructure development activity carried out by CV Bagasnusa Konsultan, headquartered in Palangkaraya. Based on the contract document, the value of the work is recorded at Rp 11,597,694,425.50. The construction is scheduled to start on July 4, 2024 and planned to be completed on December 1, 2024.

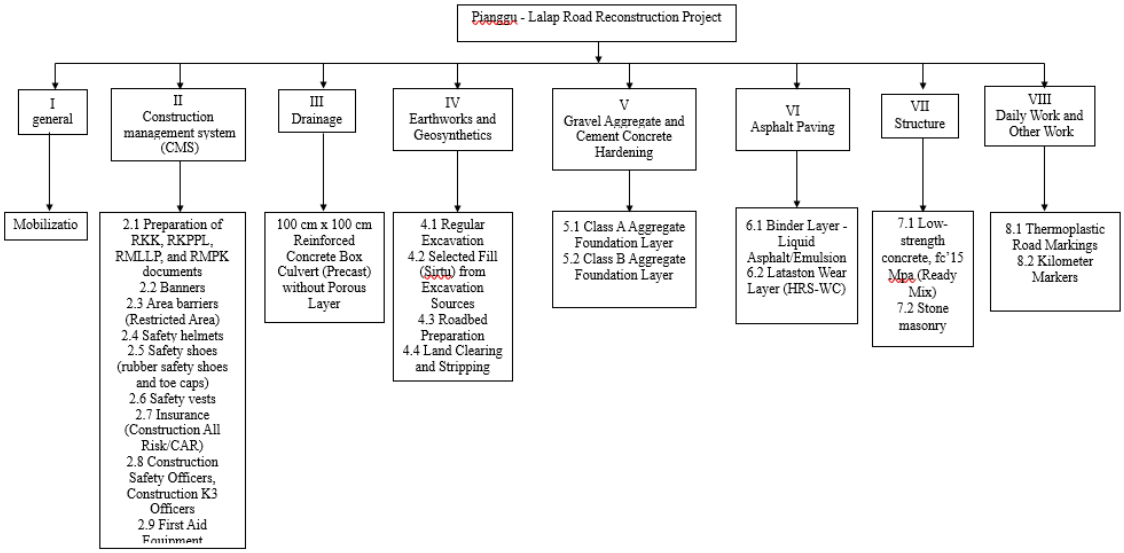
4.2 Volume Of Each Work Item

No	Urain	Satuan	Volume
A	**Improvement of Public Roads**		
I	**General**		
1	Mobilization	Ls	1
II	**Construction Safety Management System (CSMS)**		
1	Traffic Safety Management	Ls	1
2	Occupational Safety and Health	Ls	1
III	**Drainage**		
1	Reinforced Concrete Box Culvert 100 cm x 100 cm (Precast) without Porous Layer	M3	12.00
IV	**Soil and Geosynthetic Works**		
1	Standard Excavation	M^3	14.54
2	Selected Fill (Gravel) from excavation source	M^3	1.339.49
3	Roadbed Preparation	M^2	23.679.63
4	Land Clearing and Stripping	M^2	320.37
VI	**Gravel Aggregate and Cement Concrete Aggregate**		
1	Class A Aggregate Base Layer	M^3	2.100.00
2	Class B Aggregate Base Layer	M^3	2.100.00
VII	**Asphalt Paving**		
1	Binder Course - Liquid Asphalt/Emulsio	Liter	11.900.00
2	Wear Course (HRS-WC)	Ton	1.561.00
VIII	**Structure**		
1	Low-strength concrete, fc'15 Mpa (Ready Mix)	M^3	600
2	Stone Masonry	M^3	26.45
X	**Daily Work & Other Work**		
1	Thermoplastic Road Markings	M^2	480.00
2	Kilometer Posts	Fruit	2.00

4.3 Work Breakdown Structure (WBS)

The implementation of a Work Breakdown Structure (WBS) allows for more structured project management, as each activity is classified under a specific

category.For example, components related to work safety are compiled in the Construction Safety Management System (CSMS), white structural work, such as casting and masonry, is placed in a different group. This approach supports the monitoring of project quality, schedule, and budget in a more effective and organized manner.



4.4 Work Relationships and work duration

The preparation of the work network for the Road Improvement Project in Mangkarap-Gumpa Village, Awang Sub-district, East Barito District, Central Kalimantan, involved six main work categories. These categories included drainage works; earthworks and geosynthetic installation; graded pavement and cement concrete; asphalt pavement; structural works; and daily activities and other supporting works.

No	Activities	Predecessors	Duration (Days)	Employment Relationship	Time Gap
1	Start		0		
2	Reinforced Concrete Box Culvert 100 cm x 100 cm (Precast) without Porous Layer	3	7	FS	
3	Standard Excavation	1	8	FS	53
4	Selected Fill (Gravel) from excavation source	6	38	FS	
5	Roadbed Preparation	1	22	SS	
6	Land Clearing and Stripping	5	22	SS	
7	Class A Aggregate Base Layer	8	52	FS	49
8	Class B Aggregate Base Layer	7	22	SS	
9	Binder Course - Liquid Asphalt/Emulsion	7	22	SS	
10	Wear Course (HRS-WC)	9	22	FS	
11	Low-strength concrete, fc'15 MPa (Ready Mix)	12	37	FS	76
12	Stone Masonry	2	7	SS	35
13	Thermoplastic Road Markings	9:10	7	FS	
14	Kilometer Posts	9:10	7	FS	
Total			142		

4.5 Data input with Project 2019 Program

The estimated duration for each activity was entered as shown in Figure 1, which in turn generated the total execution time for each of the major work groups. The relationship between activities was then determined through the entries in the *Predecessors* column. The critical path identification process was carried out as shown in Figure 2, while the results of the critical path analysis can be seen in Figure 3.

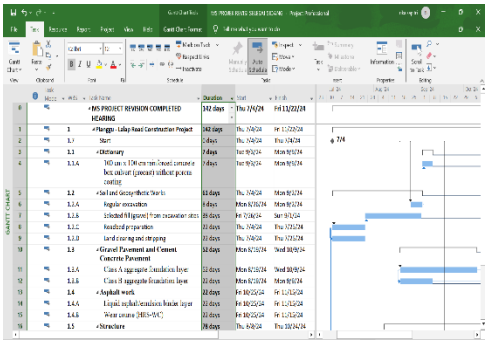


Figure 1

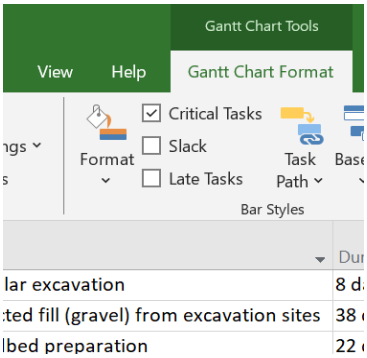


Figure 2

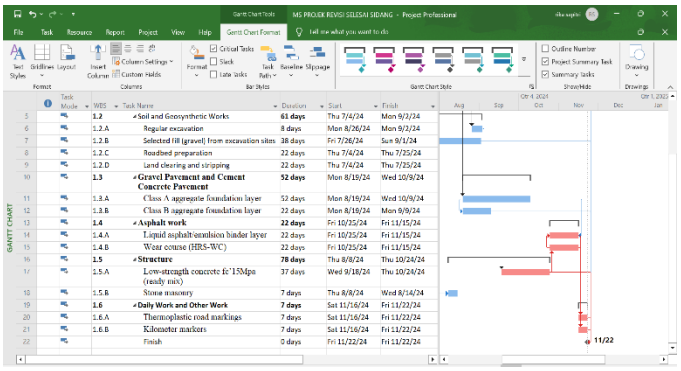


Figure 3

4.6 Example of Nekwork Diagram in PDM Method

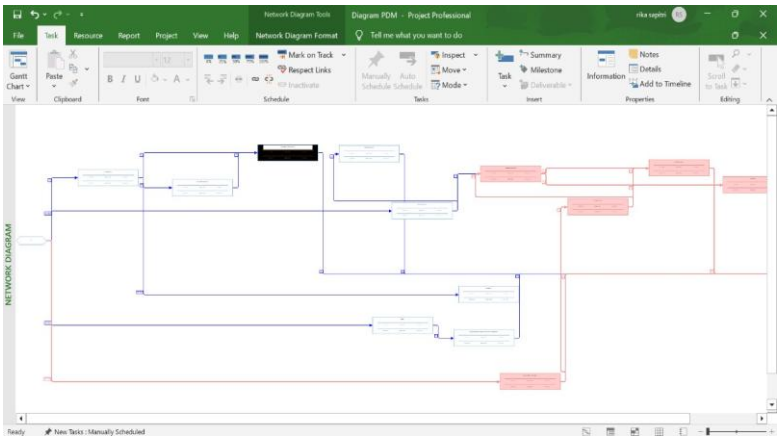


Figure 4

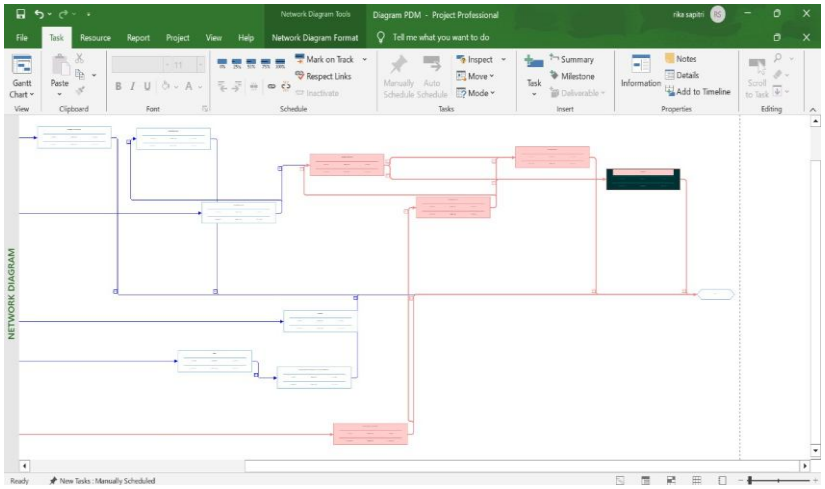


Figure 5

5. CONCLUSIONS AND SUGGESTIONS

5.1 Conclusion

The scheduling of the Pianggu-Lalap Road Reconstruction Project located in East Dusun District, East Barito Regency, Central Kalimantan, was analyzed using Microsoft Project 2019 software with the Precedence Diagram Method (PDM) approach. The scheduling results showed that the project was designed to be completed within 142 calendar days, starting on July 4 and planned for completion on November 19, 2024. However, the realization in the field recorded that the implementation duration reached 150 days. The critical path in this project consists of a number of key activities, such as binder layer work (liquid asphalt/emulsion), Lataston paving (HRS-WC), low-grade concrete casting (fc' 15 MPa), masonry, installation of thermoplastic road markings, and kilometer peg work.

5.2 Suggestions

In preparing the project schedule, the use of the S curve alone is considered insufficient. It is also necessary to include a work network diagram as a tool for controlling activities in the field. Scheduling will be more effective if it is prepared by considering the relationship between activities as a whole, and is supported by the use of software such as Microsoft Project to improve planning accuracy and efficiency.

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