

COMPARATIVE ANALYSIS OF PROJECT SCHEDULING TIME WITH PDM AND PERT METHODS (CASE STUDY: REHABILITATION PROJECT OF KIRAM ROAD – MAWAR MOUNTAIN)

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ABSTRACT

A construction project is carried out with careful planning so that the project is completed in accordance with the specified time period. The better the planning of a project, the lower the probability of the emergence of obstacles that will be faced, but not all constraint factors can be controlled. In the Kiram – Gunung Mawar Road Rehabilitation mountain project, there are various obstacles that were not taken into account previously, such as access to locations that are difficult to reach in this project, so there is a high possibility of delays in project completion. Therefore, the project party needs to make another alternative with a schedule that has a clear picture and offers a faster duration of work so that if the project is delayed long enough, there is still time left to complete it before the deadline expires.

PDM (Precedent Diagram Method) and PERT (Project Evaluation Review Technic) are two of several methods used to create project scheduling that offers results by describing a clear sequence of work and generating a critical path. This study will examine how project scheduling can be made on Jalan Kiram – Gunung Mawar Rehabilitation, using the PDM and PERT methods so that it can be seen which method offers a faster total duration of project completion.

Based on the analysis and calculations performed, scheduling with the PDM method produces a total duration of 132 days, while the PERT method produces a total duration of 144 days. The PDM method is recommended because it has a difference of 12 days faster than the PERT method with the same critical path.

Keywords: Scheduling, PDM, PERT, Delay Project

1. INTRODUCTION

In some circumstances the project owner may want the project to be completed earlier than the original plan or due to external factors such as weather factors, the project has poor progress, so that the project progress becomes slower and the project implementation is not as planned. Likewise in the Kiram – Gunung Mawar Rehabilitation project, all work can be completed on time according to the expiration date of the cooperation contract, but the realization in the field experienced a slight delay from the original schedule that had been carried out by the contractor.

The project, which is located in a mountainous area, has a number of complex problems, such as hard-to-reach location access, steep road terrain, lack of a communication network, and requires a long time to meet the various material requirements used in project work. Moreover, the masonry work in the Jalan Kiram – Gunung Mawar Rehabilitation project which uses a lot of aggregate material, and bringing the material from a location far enough away is certainly very worrying that it will affect the duration of project work.

There are three types of scheduling with network methods that are often and easy to use, namely the CPM, PDM, and PERT methods. Since the CPM method is AOA (Activity on Arrow) and cannot do calculations with the constraints on the project, this research is rescheduling and comparing project scheduling with the PDM and PERT methods to find out which of the two methods is more reliable. to plan projects with faster duration.

2. THEORITICAL STUDY

Project management ¹ is an engineering system, in which all resources in the construction process are arranged and organized to form a sequence of activities in a logical framework that will form a project management system. The resources referred to in the construction process are time, funds, equipment, human technology, and project materials².

The PDM method is a network that belongs to the AON (Activity On Node) classification. PDM does not recognize dummy activities, therefore the use of this PDM method is often found in projects that are rich in overlapping work. The room in the node is divided into sections that contain information about the activity, including the time period of the activity (D), the identity of the activity with the symbol number and name, starting and the end of the activity ES (Earliest Start), LS (Latest Start), EF (Earliest Finish), LF (Latest Finish)³.

PERT is an abbreviation of Program Evaluation and Review Technique

¹ Rani, H. 2016. *Manajemen Proyek Konstruksi*. Yogyakarta: Deepublish.

² Herapika, Virginia. *Analisa Perbandingan Waktu Penjadwalan Proyek Dengan Metode CPM (Critical Path Method) dan PERT (Project Evaluation and Review Technique)*. 2017:1

³ Soeharto (1995)

(technique of assessing and reviewing programs or calculations) which is used to schedule, organize and coordinate the work parts of a project. The purpose of this PERT method is to achieve a certain level where time is an important basis for PERT in completing activities for a project.

3. METHOD

The research location is a place or area where the research will be carried out, both to take research samples and data to be used. In this study, data collection was carried out on Jalan Kiram – Gunung Mawar for two months, starting in June until the end of July 2021, but after that, they continued to observe the work in the field until the end of the project on August 26, 2021.

Before analyzing and calculating the data, the data is collected first, then the data processing process is carried out, the results of the processed data will be used in the analysis and calculations using the PDM and PERT methods later. In collecting data in this study, there are three techniques used, namely by field observation techniques to obtain data during direct processing, questionnaire techniques conducted online via google form and distributed to respondents, and the last technique is literature study to study references, literature. , reports on research results and other library sources related to the problems to be observed.

The data collected must go through data processing first to reduce and simplify the data to be used, data processing is carried out by manual calculations using the help of the Microsoft Excel program to facilitate various forms of calculations. The results of this data processing are used for analysis and calculations using the PDM and PERT methods according to the provisions.

4. RESULT AND DISCUSSION

At the data processing stage, the previously collected data are separated and grouped, respectively, to be used in further analysis and calculations. The data processing stage in this research is to make a work symbol assumption, determine the duration of each job based on the existing project s curve, dependencies between

jobs are made by field observations which are then compared with the dependency data on the s curve, and also calculate the average value. the results of the questionnaire data from the two respondents obtained.

Next is the analysis and calculation phase using the results of the previous data processing, the analysis and calculation phase is carried out on both methods, namely the PDM calculation and PERT calculation. In the PDM calculation, forward and backward calculations are carried out with the duration used is the original duration of the existing s curve. So from these calculations, the following results can be obtained.

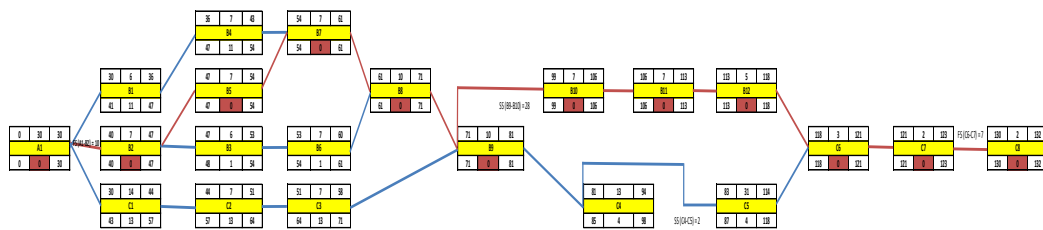


Figure 1 PDM Network Diagram

Critical Path = A1 – B2 – B5 – B7 – B8 – B9 – B10 – B11 – B12 – C6 – C7 – C8

Project duration with PDM method = 132 days.

After the PDM calculation is complete, the next step is the PERT calculation. In this method, forward and backward calculations are also carried out, but before that, three work durations must be calculated first consisting of (optimistic duration, normal duration and pessimistic duration), after obtaining the three durations, the T_e value is calculated for each work to get the actual PERT duration that will be used in forward and backward calculations on the PERT method. This is one of the differences between the calculation using the PDM method and the PERT method, namely in the PDM method the calculation directly uses the original duration according to the duration value on the project s curve, while the PERT method in the calculation must first find the PERT duration to be used. , namely by calculating the three durations of work and the T_e value, the T_e value will be used in the next PERT calculation. After performing forward and backward calculations on PERT, the following results were obtained.

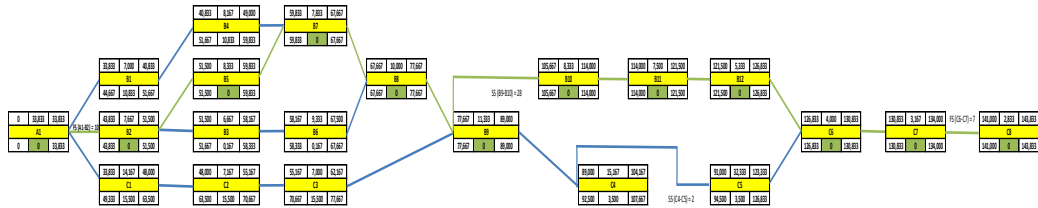


Figure 2 PERT . Network Diagram

Critical Path = A1 – B2 – B5 – B7 – B8 – B9 – B10 – B11 – B12 – C6 – C7 – C8

Project duration with PERT method = 143.83 = 144 days.

Table 1 Value of Variation and Standard Deviation

JOB DESCRIPTION	SYMBOL	a	b	V (te)
		(DAY)	(DAY)	$[(b-a) / 6]^2$
Project Prep Work	A1	28	55	20.25
Foundation work	B2	7	11	0.44
Concrete Floor Work	B5	7	15	1.78
Wing Formwork Pekerjaan	B7	7	12	0.69
Wing Concrete Works	B8	8	12	0.44
Upstairs Work	B9	10	18	1.78
Formwork Removal Work	B10	7	15	1.78
Back Up Work (Retailing)	B11	7	10	0.25
Backrest Painting Job	B12	5	7	0.11
Class B . Foundation Work	C6	3	9	1.00
Class A . Foundation Work	C7	2	9	1.36
Paving Works	C8	2	7	0.69
TOTAL V (te)		30.58		
Standard Deviation		5.53		

Table 2 Probability of Desired Working Duration

No.	Tx (days)	the value of Z	Probability (%)
1	132	-2.16	1.54
2	145	0.18	57.14
3	152	1.44	92.51

5. CONCLUSION

Based on the results of the case study research on the Kiram – Gunung Mawar Rehabilitation project, regarding the comparison of project scheduling time with the PDM and PERT methods, the following conclusions can be drawn.

1. Calculation using the PDM method obtained a total duration of 132 days (30 March – 8 August 2021).
2. Calculation using the PERT method obtained a total duration of 144 days with a standard deviation of 5.53, the probability of the project achievement target is 50% (30 March – 20 August 2021).
3. In this calculation, the critical path is the same between the PDM and PERT methods, namely project preparation work (A1), foundation work (B2), floor concrete work (B5), wing formwork work (B7), wing concrete work (B8), top floor work (B9), formwork removal work (B10), backing work (B11), backrest painting work (B12), class B foundation layer work (C6), class A foundation layer work (C7), and class A foundation work. asphaltting (C8). In this study, the PDM method is recommended for project scheduling by producing a faster and clearer total time duration.

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