VOLUME 3 | NUMBER 5 | SEPTEMBER 2021
Available online at http://proceedings.worldconference.id.
ISSN: 2656-1174 (online)

Performance Analysis of Working Time And Cost of Rigid Arteries Using Earned Value Analysis (EVA) Method (Case Study: of the construction project of the Becakayu toll access bridge on and off ramp Jatiwaringin)

Famila Hasan and Fahmi
Faculty of Engineering
Mercu Buana University Jakarta, Indonesia
hasanfamiel@gmail.com, fahmidoc.22@yahoo.com

Abstract

Time and cost control is a very important aspect of project management. Poor time control causes the project construction costs to differ from the planned costs. PT Waskita Beton Precast as the main contractor that carries out the construction of the on and off ramp Jatiwaringin arterial and bridge access projects has problems in controlling time and costs which can be seen in minus deviations in the work progress report.
The research method with a quantitative descriptive approach is very supportive in making research by reviewing project performance with the earned value method. The data are processed and analyzed using Earned Value indicators so as to produce a performance index.
The results of the study were seen from the deviation of the project progress of 31.57% so that a calculation analysis was carried out in terms of time. With the results obtained to complete the project it takes an additional 85 days from the end of the project contract. Based on the results of the cost calculation analysis. The total cost needed to complete all the work (EAC) is Rp. 48,402,991,553.33.

Keywords
Cost, Earned Value Analysis, Time.

1. Introduction

Development in Indonesia is growing rapidly along with the progress made by the government aimed at welcoming the era of globalization. The infrastructure project activities have complex, multi-layered and interdependent mechanisms for activities or work. Problems and obstacles often arise in the implementation of a construction project and it is a normal phenomenon, which must be anticipated so that the project goes according to plan.

Time and cost control is a very important aspect of project management. Poor time control, causing project construction costs to differ from planned costs. We can forecast (forecasting) the cost of project completion with the concept of the value of the results (Earned Value Analysis). Earned value analysis (EVA) is a method in project management that is used to determine the status of the project (whether the project exceeds or lags behind a predetermined schedule or whether the actual cost of the project (Susanty, Aries, Adi Luhung Pekerti, 2016)

1.1 Identification of problems

For large-scale project activities, the dependence between jobs is very complex, so it is necessary to control it, especially in terms of time and cost. The rigid arterial work in the Becakayu On and Off Ramp Jatiwaringin Artery & Bridge Access Toll Road Development Project experienced a delay in terms of time by 31.574%, resulting in costs that were over budget due to lack of control. For this reason, it is necessary to develop a system designed to control and minimize deviations from the planned targets.

1.2 Research Purpose and Objectives

The purpose of this study are:

1. To find out the time required to complete the work.
2. Knowing the estimated total cost needed to complete the job.

VOLUME 3 | NUMBER 5 | SEPTEMBER 2021
Available online at http://proceedings.worldconference.id.
ISSN: 2656-1174 (online)

2. Methodology

The research method is the general steps of a method carried out in researching a problem, phenomenon, case or other with a scientific way to produce a rational answer. The method used is descriptive quantitative, research that describes the conditions of a particular project with analysis of existing data.

The research flowchart in this study is as follows:

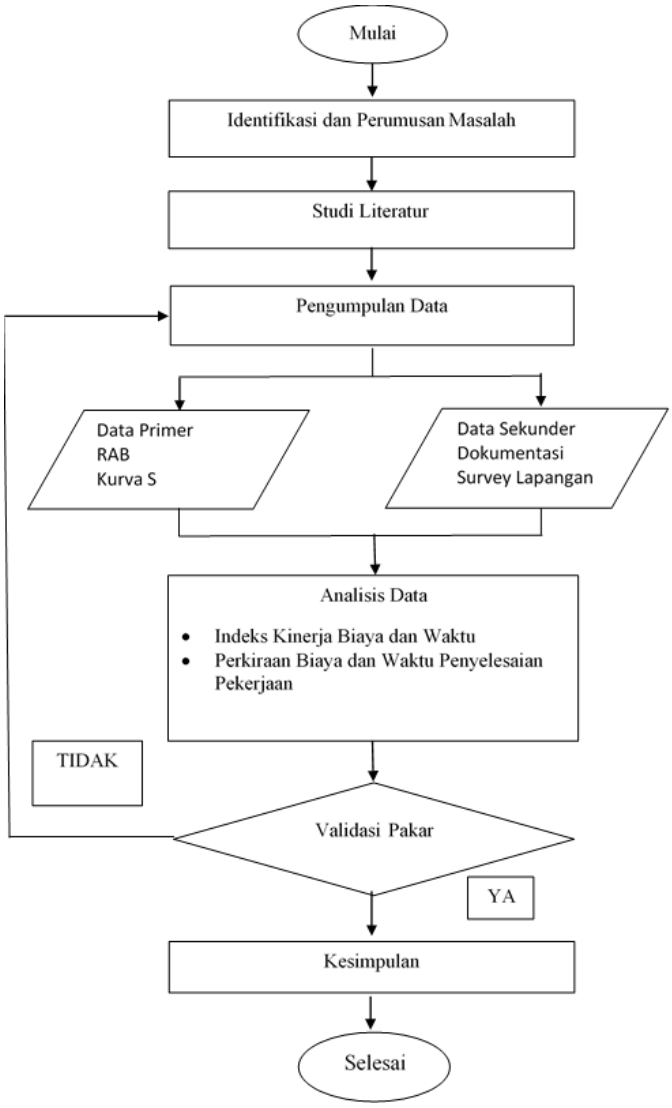

Figure 1.

3. Result and Discussion

3.1. Data

In the concept of result value, 3 (three) indicators/parameters are used to analyze job achievement and estimate target achievement, namely: (Bakhtiar, 2018)

BCWS (Budgeted Cost Work Schedule) is the budget value for a work package that is combined from the costs, schedule and scope of work with the implementation schedule:

BCWS = (Total plan budget) x (% Plan completion)

BCWP (Budgeted Cost Work Performed) is the value of the results from the point of view of the value of the work that has been completed against the budget provided to carry out the work;

BCWP = (Total planned budget) (%x Completion of realization)

ACWP (Actual Cost Work Permormed) is the actual amount of expenditure or funds used to carry out work in a certain period of time;

ACWP = % Completion realization

3.2 Performance Index Analysis

Analysis of the performance index consisting of the Time Performance Index (Schedule Performance Index) and the Cost Performance Index (Cost Performance Index) can be used to see the progress of time and costs that have occurred. Each of them can be calculated using the following formula

1. Calculation of Schedule Performance Index (SPI) SPI= BCWP/BCWS
2. Calculation of Cost Performance Index (CPI) CPI= BCWP/ACWP

BAC	Rp. 50.916.422.833
BCWP	Rp. 34.839.889.808
ACWP	Rp. 33.092.007.720
CPI	1,05
SPI	0,68
Sisa Waktu	26
Waktu Total	52

Table 1. Performance Index Analysis

3.3 Final Project Analysis

The result value analysis method is used to determine the extent to which the project implemented is in accordance with the plan or not, one of which is estimating the time and cost. With the following formula Calculation of the estimated cost of completing the entire work:

a. Calculation of the estimated cost of completing the entire work
   ETC=(BAC-BCWP)/CPI EAC=ACWP+ETC
   b. Calculation of the completion time of all work:
   ETS= (remaining time)/SPI EAS= Time finish +ETS

4. Conclusion

From the results of data analysis and processing in the previous chapter, several conclusions can be drawn in this final project as follows:

a. Judging from the deviation of the project progress of 31.57% so that the calculation analysis in terms of time. With the results obtained to complete the project it takes as much as 85 days from the end of the project contract.
b. Results Based on cost analysis. The total cost needed to complete all the work (EAC) is Rp. 48,402,991,553.33.
c. Judging from the calculation above, the profit that can be obtained by the contractor is Rp. 2,513,431,279.65

References

Bakhtiar, A. (2018). “Proyek Peningkatan Jalan Menggunakan Metode Earned Value.” *Teras Jurnal*, *8*(2), 401–8.

Susanty, Aries, Adi Luhung Pekerti, and D. P. S. (2016). “Analisis Kinerja Proyek Pembangunan Rumah Sakit Banyumanik Ii Dengan Menggunakan Earned Value Analysis (Eva) Dan Project Evaluation Review Technique (Pert).” *Jurnal Teknik Industri*, *11*(2), 61.

Biography / Biographies

Fahmi. Born in Jakarta, February 22, 1978. Lecturer in Civil Engineering, Universitas Mercubuana. He holds a bachelor's degree in Civil Engineering from the National Institut sains dan Teknologi Nasional. Then obtained a Master's degree in Civil Engineering with a concentration in Construction Management from Universitas Pelita Harapan in 2016, with the thesis title Analysis of Delays in Budget Hotel Construction Projects in Jakarta. He teaches Soil Mechanics 1, Soil Mechanics 2, Prestressed Concrete Structures, Concrete Structures 2, Construction Methods and Heavy Equipment and Construction Management. Worked on construction projects since 2002 until now, as a contractor, consultant and developer

Famila Hasan was born in Grobogan on June 30, 1997. Completed her undergraduate education at the Semarang State Polytechnic in 2019. She continued her undergraduate education at Mercu Buana University with the Civil Engineering study program in 2020-2021. level. He works at PT. Waskita Beton Precast – Artery & Bridge Construction Project Area Becakayu On and Off Ramp Jatiwaringin (Jakarta) Toll Road.