Analysis Of Project Time Control for the Batulicin Port Road Using the Earned Value Concept Method

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Abstract: The implementation of the Batulicin Port Road Project is an important project because the current access road to Batulicin Port is inadequate. The project execution faced obstacles, including delays in the availability of skilled workers and construction laborers/workers at the project site, delays in the arrival of materials due to required pre-order (indent) and a relatively long manufacturing process at the factory. In the first week up to the third week, the achieved progress was above the planned schedule, and in the fourth week, the achieved progress was below the expected plan. In the fifth week, the achieved progress was above the expected schedule, but in the sixth week up to the tenth week, the achievement progress was again below the planned progress. The fluctuations in progress must be monitored comprehensively in terms of time to estimate the time required for project completion. To resolve these problems, a method used for project control is the Earned Value Analysis (EVA) method. Earned Value Analysis is a tool used in project management that integrates cost and time. The earned value concept presents three dimensions: the physical completion of the project (the percent complete), which reflects the budgeted cost absorption, the actual costs incurred or what is called the actual cost, and what is obtained from the costs incurred or what is called the earned value. The research results show that for time performance (Schedule Performance Index), the value is less than 1, indicating that the project's performance is slower than the planned schedule. The Estimate All Schedule (EAS) value shows a value of 277 days, which is 37 days lon earned value method, time control, and road ger than the planned schedule.

Keywords: earned value method, time control, and road

INTRODUCTION

Infrastructure development must be managed properly and correctly because the larger the scale of development, the greater the dependence between work items within the infrastructure construction project. The level of complexity of a construction project will influence the work managerial aspects of that project. Construction management needs to be carried out to gain work effectiveness from the limited resources possessed by the contractor executing the project. These resources include man (labor), money (cost), machine (equipment), method, and materials. (Rompas, 2022).

To support industrial development, infrastructure development is needed, which plays an important role in encouraging economic growth, both national and regional, as well as reducing unemployment, alleviating poverty, and certainly improving public welfare. Therefore, the government is committed to continuously improving infrastructure development because the availability of reliable infrastructure is very important to support economic activities and business growth.

There was a discrepancy between the planning time and the execution time because there were obstacles that caused problems in the execution of the project. In the first week up to the third week, the achieved progress was above the planned schedule, and in the fourth week, the achieved progress was below the expected plan. In the fifth week, the achieved progress was above the expected schedule, but in the sixth week up to the tenth week, the achievement progress was again below the

planned progress. The fluctuations in progress must be monitored comprehensively in terms of time to estimate the time required for project completion. Based on this time performance, one is expected to identify the overall performance of the project and work packages and predict the time performance for project completion. The results of the project performance evaluation can be used as an early warning if there is inefficient performance in project completion, so that changes in the implementation method can be made to prevent delays in project completion. Control needs to be carried out on this work because the project execution experienced delays. Time control is carried out to prevent delays in the final execution time.

A project can be defined as an activity that has a certain time frame, with limited resource allocation, to carry out an agreed-upon task. Thus, project management is widely applied to all stages of the project, starting from the planning, design, procurement, and execution stages, so its application will be more complicated and complex, because the existing resources are different and varied and have intermediate goals, according to the project stages. The goal of project management itself is to achieve proper control of a project to ensure that its completion can be in accordance with the established schedule and quality.

In a construction project, many problems are found, such as wasteful use of materials, less skilled labor, and untimely project completion, which is not in accordance with the plan. In planning, time control is part of the overall construction project management. Besides evaluation from the aspect of quality, the achievement of a project can also be assessed from the aspect of time. The time used to complete a job must be continuously measured for deviation from the plan. A significant time deviation indicates poor project management. With indicators of project achievement based on time, preventive action is possible so that project execution proceeds according to plan. Based on this description, it is necessary to conduct a study of project control using the earned value concept method, which integrates the time aspect. As mentioned above, in field execution, problems inevitably arise, especially in the realization of progress achievement against the work plan. To determine the achievement of realization progress and the governance of the job management, good management governance is necessary. Project management is applied in an effort to achieve a more systematic scheduling of activities. This includes all project stages, starting from planning, material procurement, and work execution.

METHODS

The research design is a comprehensive plan that includes all stages that the researcher will undertake. This process begins with problem identification, which is then formulated into the research objectives to be achieved. The data used in this study is data obtained from the Executing Contractor CV. Sumber Rezeki, namely project execution (time schedule), Planned Project Execution S-Curve, and Weekly Work Reports. The research results are obtained through data analysis using the Earned Value Method. After that, the research results are analyzed, and conclusions are drawn. Quantitative research is used in cases where it is important for the researcher to draw conclusions from the management of statistical data to gather applicable insights. In descriptive research design, the researcher focuses on describing the situation or case being studied. This design is theory-based, formed by collecting, analyzing, and presenting the data obtained. By applying an in-depth research design like this, the researcher can provide insight into the reasons and manner in which the research was conducted. The location of this research is the Road Project work at Batulicin Port, South Kalimantan
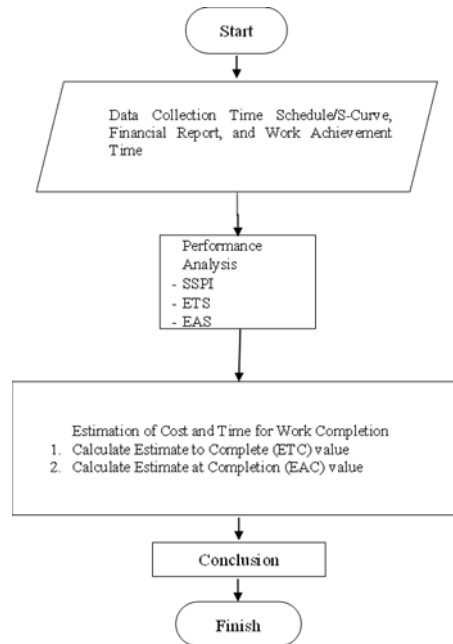
Figure 1. Research Flow Chart

RESULT AND DISCUSSION

Calculation Based on Time Aspect

In the earned value concept method by integrating the time aspect, Schedule Variance (SV), Schedule Performance Index (SPI), Estimate All Schedule (EAS). The details of the calculation for these parameters are as follows :

Calculation of SV value in the 10th week is as follows:

SV = BCWP – BCWS

= 1.384.893.248 – 1.687.091.545

= - 302.198.298

From the calculation results, the SV value obtained is -Rp 302,198,298. An SV with a negative value indicates that the project is experiencing delays from the planned schedule; the realized work progress is less than planned.

Table 1. Recapitulation of Schedule Variance (SV) Values

Week	Cumulative BCWP (Rp)	Cumulative BCWS (Rp)	SV
1	9.081.267	8.814.583	266.684
2	48.811.811	39.629.166	9.182.645
3	77.190.771	68.411.309	8.779.462
4	111.245.523	112.824.358	-1.578.834
5	179.355.027	170.404.073	8.950.954
6	254.275.482	298.421.126	-44.145.645
7	430.225.034	603.784.321	-173.559.287
8	822.989.840	971.240.706	-148.250.866
9	1.118.131.024	1.323.848.705	-205.717.681
10	1.384.893.248	1.687.091.545	-302.198.297

Source: Researcher's Processing, 2024

Schedule Performance Index (SPI)

Calculation of SPI value in the 10th week is as follows:

SPI   = BCWP / BCWS

          = 1.384.893.248 / 1.687.091.545

          = 0,821 < 1

From the calculation results, the SPI value obtained is 0.821. This SPI value indicates that the project is experiencing delays. The performance of work realization is not in accordance with what was planned.

Table 2. Recapitulation of Schedule Performance Index (SPI) Values

Week	Cumulative BCWP (Rp)	Cumulative BCWS (Rp)	SPI
1	9.081.267	8.814.583	1,030
2	48.811.811	39.629.166	1,232
3	77.190.771	68.411.309	1,128
4	111.245.523	112.824.358	0,986
5	179.355.027	170.404.073	1,053
6	254.275.482	298.421.126	0,852
7	430.225.034	603.784.321	0,713
8	822.989.840	971.240.706	0,847
9	1.118.131.024	1.323.848.705	0,845
10	1.384.893.248	1.687.091.545	0,821

Source: Researcher's Processing, 2024

Project Completion Time

In the 10th week, Estimate Temporary Schedule (ETS):

ETS   = remaining time/SPI

          = (240-70) / 0,821

          = 207 calendar days

Estimated time for the completion of all work, Estimate All Schedule (EAS):

EAS   = time elapsed + ETS

          = 70 + 207

          = 277 calendar days

From the calculations above, the project completion time is 37 days longer than the planned schedule of 240 days. To anticipate the 37 calendar day delay, an increase in working hours and an increase in labor are necessary. With this activity, it is hoped that the work execution time will return to being in accordance with what was planned.

CONCLUSION

Based on the analysis in this research that has been conducted, it can be concluded that the Schedule Performance Index (SPI) value shows a value of 0.82 < 1, which indicates that the project performance is slower than the planned schedule, and the Estimate All Schedule (EAS) value shows a value of 277 calendar days to complete the project.

Based on the research results and conclusions, the researcher suggests that future research can include non-technical factors on the influence of project time performance, plan for time performance control at the beginning of the project to find out the effects that occur, and in future research, the aid of Microsoft Project software can be used in analyzing the time of the project object.

REFERENCES

Cahyono, B., and R. Marleno. (2023). "Cost and Time Analysis Using the Earned Value Method in the Construction Project of the Bpbd Building Complex in Pasuruan." … Journal on Advanced … 2(4):400–411.

Desmi, Adzuha. (2016). "Studi Pengendalian Waktu Dan Biaya Pada Pelaksanaan Pemeliharaan Jalan Simpang Raja Bakong - Tanah Pasir Dengan Menggunakan Konsep Nilai Hasil." Teras Jurnal 2(4):272–80. doi: 10.29103/tj.v2i4.53.

Ervianto, Wulfram I. (2004). "Manajemen Proyek Konstruksi (Edisi Revisi)." in Andi.

Fathurrahman. (2011). "'Analisis Kinerja Biaya Dan Waktu Dengan Metode Earned Value Pada Proyek Pembangunan Gedung Intensip Terpadu RSU Dr Syauful Anwar – Malang '.'"

Harris, Oscar, Risma Marleno, and Wateno Oetomo. (2023). "Evaluation of Cost and Time Performance of Karetan - Sambimulyo Road Maintenance Project In." 2(4):433–42.

Hidayat, Aris. (2017). "Analisa Kinerja Biaya Dan Waktu Pada Pelaksanaan Proyek Konstruksi Dengan Metode Earned Value (Studi Kasus Proyek Konstruksi Mall Dan Hotel X Di Pekanbaru)." Jurnal Ilmu Teknik Dan Komputer 1(1).

Indramanik, Ida Bagus Gede. (1994). "Earned Value Management System Oleh Kontraktor Kecil Di Bali." 51–66.

Irniawan, Dodik, Wateno Oetomo, and Risma Marleno. (2023). "Cost and Time Analysis Using Earned Value Method In Administration Building Contruction Project At Polije Campus." International Journal on Advanced Technology 2(4):423–32.

Juliana. (2016). "Analisis Pengendalian Biaya Dan Waktu Pada Proyek Konstruksi Dengan Metode Earned Value Management (EVM)."

Ramdhani, Fitra. (2016). "Analisis Bi Aya Dan Waktu Dengan Metode Earned Value Concept Pada Proyek Bjdm Area Rl Construction At Well 3S-21B Area 9 Pt. Adhi Karya Cs Work Unit Rate Packagea – Duri."

Soeharto, Iman. (1995). Manajemen Proyek Dari Konseptual Sampai Operasional. Jakarta : Erlangga.

Soeharto, Iman. (1997). Manajemen Proyek Jilid 2 : Dari Konseptual Sampai Operasional. Jakarta : Erlangga.

Soemardi, B.W., R.D. Wirahadikusumah, M. Abduh dan N. Pujoartanto. (2007). "Konsep Earned Value Untuk Pengelolaan Proyek Konstruksi." Laporan Hasil Riset, ITB.

Sudarsana, Dewa Ketut. (2008). "Pengendalian Biaya Dan Jadwal Terpadu Pada Proyek Konstruksi."

Wahab, B. (2019). "Aplikasi Penilaian Pengendalian Biaya Dan Waktu Pada Proyek Peningkatan Jalan Menggunakan Metode Earned Value."