Multidisciplinary Output Research For Actual and International Issue (MORFAI Journal) ISSN (e): 2808-6635
Volumes 5 No. 3 (2025)

FEASIBILITY EVALUATION OF THE RELATIONSHIP BETWEEN BCWS, BCWP AND ACWP IN ROAD CONSTRUCTION PROJECT

Massayu Sekar Bawana[1]*, I Nyoman Dita Pahang Putra[2], Elok Dewi Widowati[3]
[1,2,3]Department of Civil Engineering, Faculty of Engineering and Science,
Universitas Pembangunan Nasional "Veteran" Jawa Timur, Surabaya, Indonesia
Corresponding E-mail: 21035010121@student.upnjatim.ac.id [1]*, putra_indp.ts@upnjatim.ac.id [2], elok.dewi.widowati.ft@upnjatim.ac.id [3]

Received	: 20 March 2025	Published	: 26 May 2025
Revised	: 29 March 2025	DOI	: https://doi.org/10.54443/morfai.v5i3.2991
Accepted	: 17 April 2025	Link Publish	: https://radjapublika.com/index.php/MORFAI/article/view/2991

Abstract

The development of adequate infrastructure, such as roads, bridges, and other public facilities, play a vital role in driving national economic growth. Infrastructure projects require careful planning and controlled execution to ensure effective and efficient outcomes. This study focus on addressing the common issues of delays and cost overruns that frequently occur during project implementation. The objective is to analyze the alignment between planned and actual project performance. Using a quantitative methods, this research integrated the Earned Value Method (EVM) to assess project performance. The results indicate that, between weeks 26 and 39, the project generated performance that was both ahead of schedule and below budget. This is evidenced by positive values in both schedule and cost variance (SV and CV), along with the Schedule and Cost Performance Index (SPI and CPI) values exceeding 1. However in week 40, a decrease in schedule performance was observed, leading to a slight project delay. The project's estimated overall cost is IDR 116.8 billion, representing a decrease from the initial budget allocation, with an estimated delay is only around 18 days.

Keywords: ***infrastructure, delays, earned value method, over budget.***

INTRODUCTION

The development of infrastructure in Indonesia is one of the vital aspects in achieving national economic growth (Arofah, 2021). The sufficient infrastructure, such as roads, bridges, and other public facilities, serves a vital role in improving connectivity between regions, enabling the efficient distribution of goods and services, and sustaining both the social and economic activities of communities (Ghozali, 2022). In this context, road construction projects as part of the transportation infrastructure require careful planning and controlled execution to ensure effective and efficient outcomes. However, here are difficulties in the implementation of construction projects. A major challenge involves managing time and cost as they are pivotal in the project's success (Silalahi, Masthura, & Fahriana, 2023). Delays in project completion can lead to unanticipated cost overruns, while suboptimal cost management may also disrupt the timely completion of the project (Hammadi, Lenggogeni, & Berliana, 2023). Therefore, time and cost control are critical factors in project management to ensure that the established targets are successfully (Sudiantini, Juliansyah, Nugroho, Surachman, & Pakphan, 2024).

The relationship between time and cost in construction projects is dynamic and mutually influential. This is aligns with the research that conducted by (Rozik & Putra, 2024) which indicates that applying cost and time control methods, such as Earned Value Method (EVM), can enhance the accuracy of project performance evaluation and provide early warnings of potential deviations from the planned budget and schedule. Hence, the use of a method that thoroughly evaluates project performance in terms of budget efficiency and adherence to schedule is imperative. The earned value method has gained in project management due to its ability to integrate time and cost into a unified analytical approach (Eriyanti, Kuryanto, & Gunasti, 2024). This method is based on three key indicators: Planned Value (PV) also known as BCWS, Earned Value (EV) or BCWP, and Actual Cost (AC) or ACWP (Wedananta, Tjendani, & Witjaksana, 2025). Analyzing the feasibility of the relationship between among these indicators is essential to determine whether a project is on track, behind schedule, or exceeding planned efficiency (ahead of schedule).

Based on the premise, this study aims to analyze the interrelationship among BCWS, BCWP, and ACWP as indicators within the Earned Value Method in order to understand the dynamics of road project performance from both cost and time perspectives. This research also seeks to empirically examine the relationship between budget efficiency and project schedule accuracy, as discussed in various previous studies. In other words, the study aims to evaluate whether project that are under budget consistently demonstrate good performance, or conversely, whether over-budget projects may actually show faster physical progress than initially planned

This research aims to evaluate cost and scheduling performance through the application of the Earned Value Method (EVM) in a road construction project, focusing on the period between weeks 27 and 40 of the overall 77 week project duration. The selection of this period is based on the availability of complete and relevant actual cost and schedule data suitable for analysis. Moreover, this phase represents the mid-stage of the project, which is generally characterized by complex execution dynamics, making it an appropriate period for evaluating the effectiveness of cost and time control. The analysis does not include technical aspects of project execution or risk management, nor does it cover the entire project duration. Additionally, this study does not involve the formulation of improvement strategies or corrective actions for potential delays, but rather focuses on identifying and evaluating performance based on the available actual data.

METHOD

This study was conducted on a road construction project located in one of the city in East Java. The analysis focuses on evaluating the project's cost and schedule performance based on key indicators within the Earned Value Method (EVM). The total planned project duration was 540 days, or 77 weeks with a contract value of IDR 137.425.746.927.42. The analysis utilized project data from week 26 to week 40. Numerical data concerning the performance of the road construction project were examined using a quantitative research approach, with the Earned Value Method (EVM) as the analysis tool. This method aims to represent the actual project conditions by measuring three key indicators of EVM to evaluate cost and schedule deviations. The three indicators used in the analysis are BCWS, BCWP, and ACWP (Verma, Pathak, & Dixit, 2014). Prior to conducting the research, a problem identification phase was carried out, focusing on the evaluation of construction project performance. The required data were obtained directly from primary sources, also referred to as secondary data, collected from the Construction Management team. These data included the Bill of Quantity (BOQ), Time schedule, and weekly progress. Additionally, profit percentage data were gathered through discussion with the contractor.

The calculation were carried out using the aforementioned data to develop the Budget Plan (RAB) and to perform analytical computations based on the Earned Value Method (EVM), including the calculation of the BCWS, BCWP, ACWP, Schedule Variance (SV), Cost Variance (CV), Schedule Performance Index (SPI), Cost Performance Index (CPI), as well as the Estimate at Completion (EAC) and Time Estimate (TE).

The analysis began with the calculation of the three key indicators of this method: BCWS, BCWP, and ACWP. The calculation of the BCWS value was carried out using the following formula (Warka, Handayani, & Asmina, 2015):

$$\text{BCWS} = \%\text{Planned Work Progress} \times \text{BAC} \quad (1)$$

To find the BCWP value, can use the formula as follows:

$$\text{BCWP} = \%\text{Actual Work Progress} \times \text{BAC} \quad (2)$$

To calculate ACWP can be found the formula below:

$$\text{ACWP} = \%\text{Actual Work Progress} \times \text{Actual Cost} \quad (3)$$

From those data above, the calculation of the SV and CV values will be continued. The formula that used for calculate SV is as follows (Nabil, Furuhitho, Setiawan, Susanto, & Slameto, 2023):

$$\text{SV} = \text{BCWP} - \text{ACWP} \quad (4)$$

To calculate cost variance, it is used the indicators above. The formula below is used (Hasan, Chowdhury, & Akter, 2021):

$$\text{CV} = \text{BCWP} - \text{BCWS} \quad (5)$$

The result derived from the SV and CV calculations provide insights into the current condition of the project. When the SV value is positive (> 0), it means the project is either on time or surpassing the schedule timeline. Similarly, a positive CV value reflects a cost advantage, indicating that the actual spending is below than the project budget planned (Suksmono & Sari, 2024). In contrast, negative SV and CV values point to delays in the project timeline and costs that exceed the budget. The SV and CV results are presented through a graph that illustrates the weekly correlation between cost and time. Following this, the Schedule Performance Index (SPI) and the Cost

Performance Index (CPI) are calculated to further evaluate schedule and cost efficiency. The calculation for SPI is performed using the following formula (Proaño-Narváez, Flores-Vázquez, Vásquez Quiroz, & Avila-Calle, 2022):

$$\text{SPI} = \frac{BCWP}{BCWS} \quad (6)$$

Meanwhile, for calculate CPI is using the formula as follows:

$$\text{CPI} = \frac{BCWP}{ACWP} \quad (7)$$

The result obtained from the SPI and CPI calculations indicate the schedule and cost performance index of the project. If the SPI value is greater than 1, it means the project is progressing faster than panned. As well as the CPI value, when CPI exceeding 1 implies that the project is being executed more cost effectively, with actual expenditures falling below the budget estimates. Otherwise, if both SPI and CPI values are less than 1, the performance index reflect a project that is behind schedule or over budget (Jatnika & Johari, 2021).

After obtaining the variance values and performance index, further analysis can be conducted to estimate the total cost and time required to complete the project. This analysis is derived from the calculation of the formula used to calculate EAC (Messah, Lona, & Sina, 2013):

$$\text{EAC} = \text{ACWP} + \text{ETC} \quad (8)$$

Where, EAC is estimate at completion and ETC is Estimate to Complete. The ETC value is obtained from the formula as follows:

$$\text{ETC} = \frac{(BAC - BCWP)}{CPI} \quad (9)$$

For calculate the ECD value we can use the formula as follows:

$$\text{ECD} = \text{TE} + \text{ATE} \quad (10)$$

Where the ECD is Estimate Completion Date and ATE is Actual Time Expanded and TE is Time Estimate that obtained from the formula below:

$$\text{TE} = \frac{(OD - (ATE \times SPI))}{SPI} \quad (10)$$

Where the OD is Original Duration which means, the planned duration for the whole project.

RESULTS AND DISCUSSION

Data Analysis

This study focuses on the cost and time aspects to the project, beginning with the weekly progress. Further detail of weekly progress can be found in Table 1.

Table 1. Weekly Progress

Week	Weekly Progress Plan (%)	Cumulative Weekly Progress Plan (%)	Weekly Actual Work Progress (%)	Cumulative Weekly Actual Progress (%)	Deviation
26	1,36	1,36	2,14	2,14	0,78
27	1,36	2,72	4,27	6,41	3,69
28	1,36	4,08	1,3	7,71	3,63
29	1,36	5,44	2,06	9,77	4,33
30	1,92	7,36	2,29	12,06	4,7
31	1,92	9,28	5,5	17,56	8,28
32	1,92	11,2	3,06	20,62	9,42
33	1,92	13,12	0,93	21,55	8,43
34	1,68	14,8	0,97	22,52	7,72
35	1,68	16,48	0,39	22,91	6,43
36	1,68	18,16	0,19	23,1	4,94
37	1,68	19,84	0,51	23,61	3,77
38	1,68	21,52	0,68	24,29	2,77
39	2,53	24,05	0,68	24,97	0,92
40	2,53	26,58	0,72	25,69	-0,89

Table 1 represent a comparison between planned and actual weekly progress from week 26 to week 40. The cumulative actual progress consistently exceeds the planned values, resulting in positive deviations throughout the period. This indicates that the project progressed ahead of schedule during these weeks.

Calculation Analysis

The results of the calculation of Budgeted Cost of Work Schedule (BCWS), Budgeted Cost of Work Performed (BCWP) and Actual Cost of Work Performed (ACWP) will be displayed in the Table 2.

Table 2. BCWS, BCWP, and ACWP

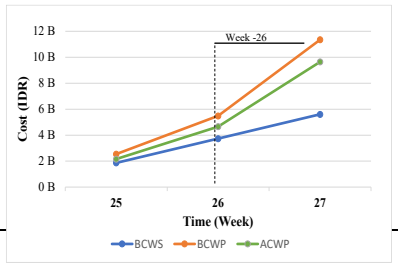
Week	Budgeted Cost of Work Schedule / BCWS (IDR)	Budgeted Cost of Work Performed / BCWP (IDR)	Actual Cost of Work Performed / ACWP (IDR)
26	IDR 1.868.990.158,21	IDR 2.940.910.984,25	IDR 2.499.774.336,61
27	IDR 3.737.980.316,43	IDR 8.808.990.378,05	IDR 7.487.641.821,34
28	IDR 5.606.970.474,64	IDR 10.595.525.088,10	IDR 9.006.196.324,89
Week	**Budgeted Cost of Work Schedule / BCWS (IDR)**	**Budgeted Cost of Work Performed / BCWP (IDR)**	**Actual Cost of Work Performed / ACWP (IDR)**
29	IDR 7.475.960.632,85	IDR13.426.495.474,81	IDR 11.412.521.153,59
30	IDR 10.114.534.973,86	IDR 16.573.545.079,45	IDR 14.087.513.317,53
31	IDR 12.753.109.314,86	IDR 24.131.961.160,46	IDR 20.512.166.986,39
32	IDR 15.391.683.655,87	IDR 28.337.189.016,43	IDR 24.086.610.663,97
33	IDR 18.030.257.996,88	IDR 29.615.248.462,86	IDR 25.172.961.193,43
34	IDR 20.339.010.545,26	IDR 30.948.278.208,06	IDR 26.306.036.476,85
35	IDR 22.647.763.093,64	IDR 31.484.238.621,07	IDR 26.761.602.827,91
36	IDR 24.956.515.642,02	IDR 31.745.347.540,23	IDR 26.983.545.409,20
37	IDR 27.265.268.190,40	IDR 32.446.218.849,56	IDR 27.579.286.022,13
38	IDR 29.574.020.738,78	IDR 33.380.713.928,67	IDR 28.373.606.839,37
39	IDR 33.050.892.136,04	IDR 34.315.209.007,78	IDR 29.167.927.656,61
40	IDR 36.527.763.533,31	IDR 35.304.674.385,65	IDR 30.008.973.227,81

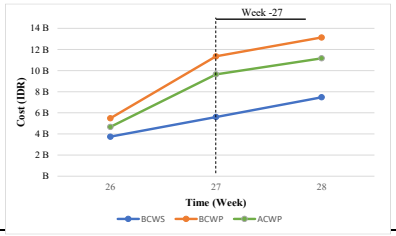
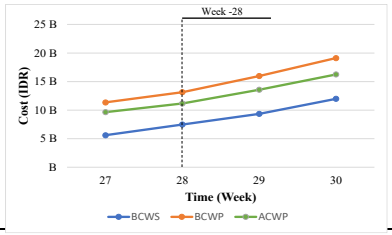
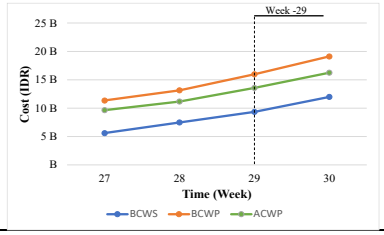
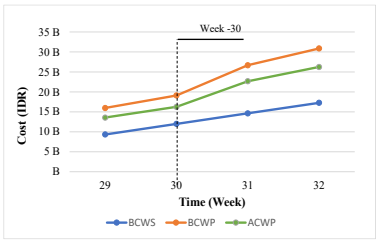
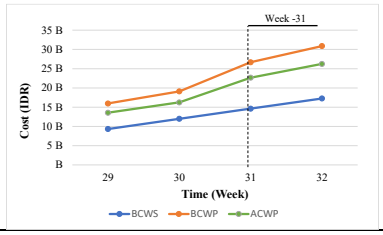
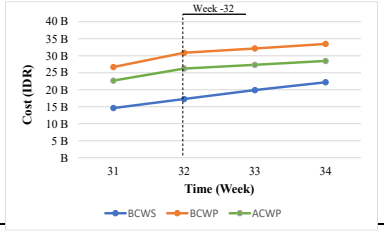
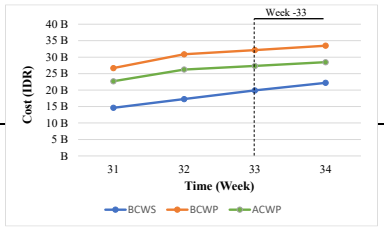
This table presents the weekly data from week 26 to week 40 on three earned value indicators, which is BCWS, BCWP, and ACWP. The required data were collected using a previously formula in equation 1, equation 2, and equation 3.

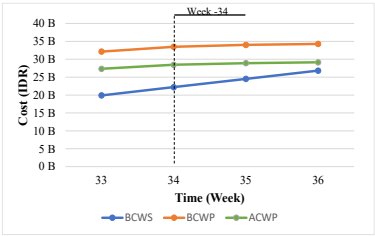
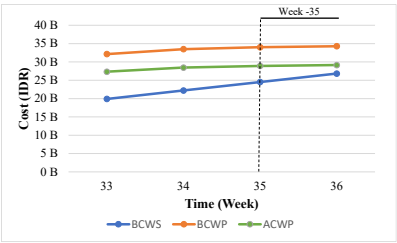
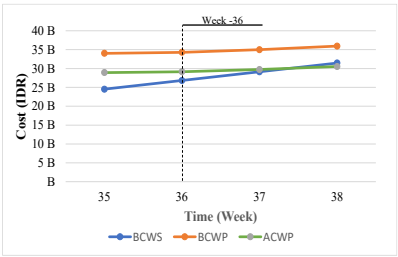
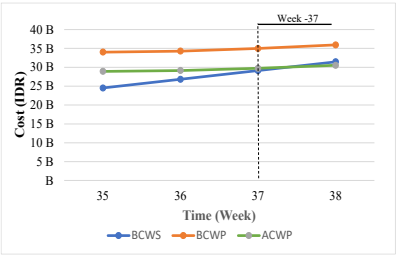
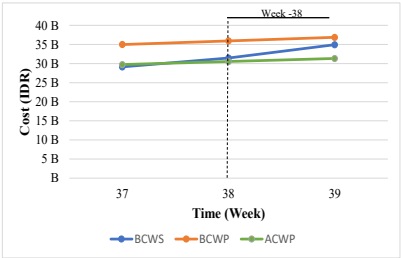
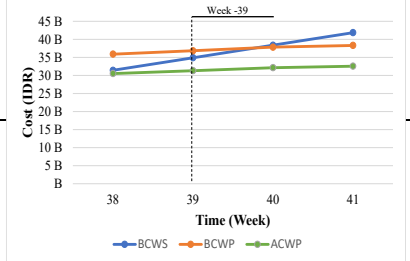
Feasibility Analysis of BCWS, BCWP and ACWP

Feasibility analysis primarly seeks to ensure that a project is achievable within the plan schedule, within an efficient budget, and in accordance with established standards. Using the integrated variance analysis theory (Soeharto, 1994), the feasibility analysis of the three indicators in the Earnd Value Method (EVM) is presented in Table 3.

Table 3. BCWS, BCWP, and ACWP

Week	Schedule Variance	Cost Variance	Description	S Curve Earned Value
26	Positive	Positive	The work is complete ahead of schedule and at a lower cost than the value of work (efficient).	

Week	Schedule Variance	Cost Variance	Description	S Curve Earned Value
27	Positive	Positive	The work is complete ahead of schedule and at a lower cost than the value of work (efficient).	
28	Positive	Positive	The work is complete ahead of schedule and at a lower cost than the value of work (efficient).	
29	Positive	Positive	The work is complete ahead of schedule and at a lower cost than the value of work (efficient).	
30	Positive	Positive	The work is complete ahead of schedule and at a lower cost than the value of work (efficient).	
31	Positive	Positive	The work is complete ahead of schedule and at a lower cost than the value of work (efficient).	
32	Positive	Positive	The work is complete ahead of schedule and at a lower cost than the value of work (efficient).	
33	Positive	Positive	The work is complete ahead of schedule and at a lower cost than the value of work (efficient).	

Week	Schedule Variance	Cost Variance	Description	S Curve Earned Value
34	Positive	Positive	The work still complete ahead of schedule. However, the BCWS is starting to approach the BCWP. The SV value is beginning decreased, while CV is still positive (cost efficient).	
35	Positive	Positive	The work still complete ahead of schedule. However, the BCWS is starting to approach the BCWP. The SV value is beginning decreased, while CV is still positive (cost efficient).	
36	Positive	Positive	The project is on track to finish earlier than planned, with costs staying efficient. However, BCWS is slowly approaching BCWP, leading to a gradual decreased in the SV value.	
37	Positive	Positive	The project is on track to finish earlier than planned, with costs staying efficient. However, BCWS is slowly approaching BCWP, leading to a gradual decreased in the SV value.	
38	Positive	Positive	The BCWP is increasingly slower and it approaching the BCWS value. The SV value is also increasingly decrease, meanwhile the CV value is still positive and efficient.	
39	Positive	Positive	The work is still progressing ahead of schedule although the BCWP value has	

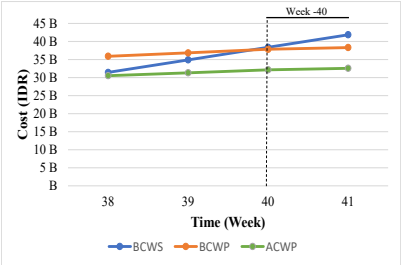
Week	Schedule Variance	Cost Variance	Description	S Curve Earned Value
			stagnated and is not showing significant growth. The BCWS value is nearly equal to the BCWP, is indicating that the SV value is approaching to zero. The CV value indicates more cost savings.	
40	Negative	Positive	On the week 40 shows that the condition of BCWS> BCWP > ACWP. This is reflected by the BCWP value decreasing and dropping below the BCWS. The negative SV value signifies that the project has started to fall behind schedule. However, the CV remains positive indicating cost savings.	

Table 3 is provides the feasibility analysis of three indicators of Earned Value Method (EVM). The result of this analysis is using the equation number 4 and 5 which means the equation of Schedule Variance and Cost Variance. From the result above, we can concluded if there are 2 conditions in this project for along 14 weeks on the mid-stage. The first condition is the positive-positive phase is on week 26-35, and the other one is the negative-positive phase is on week 40. The index performance of schedule and cost of two condition above can be found in Table 4.

Table 4. Schedule and Cost Performance Index

Earned Value Method	Result	Description	S Curve Earned Value
Performance Index for week 35			

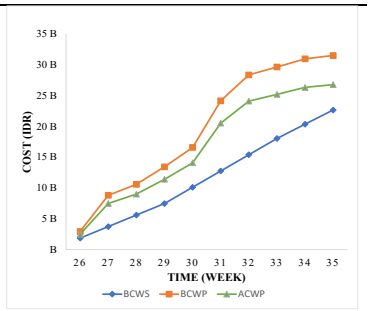
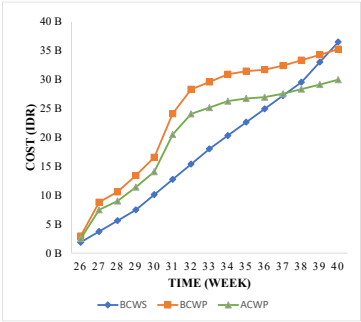
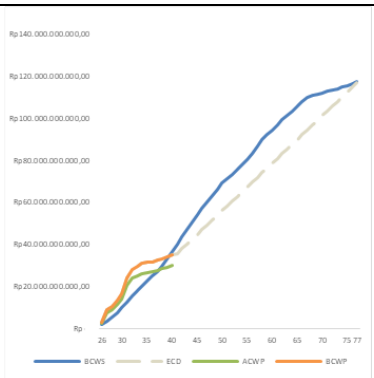
I.	**Cost Parameter**			
1.	Cost Variance (CV)	Positive	The cost is lower than the planned budget (efficient).	
2.	Cost Performance Index (CPI)	CPI > 1 Cost Underrun		
II.	**Time Parameter**			
1.	Schedule Variance (SV)	Positive	The work progressing ahead of schedule than the plan schedule.	
2.	Schedule Performance Index (SPI)	SPI > 1 Schedule Underrun		
	Performance Index for week 40			
I.	**Cost Parameter**			
1.	Cost Variance (CV)	Positive	The cost is lower than the planned budget (efficient).	
2.	Cost Performance Index (CPI)	CPI > 1 Cost Underrun		
II.	**Time Parameter**			
1.	Schedule Variance (SV)	Negative	The work progressing ahead of schedule than the plan schedule.	
2.	Schedule Performance Index (SPI)	SPI < 1 Schedule Overrun		

Table 4 above is provides the performance index of two condition before. On the week 35, the work is progressing ahead of schedule. It shows in the curve when the BCWP curve appears the highest curve among the others. Meanwhile, on the week 40, the BCWS value is above the BCWP, which means, the work progress on this week is behind schedule. The project estimated cost and timeline are detailed in Table 5.

Table 5. Schedule and Cost Project Estimated

	Earned Value Method	Result	Description	S Curve Earned Value
1.	Estimate at Completion (EAC)	IDR 116.811.884.888	The estimate total cost completion was lower than the planned project cost.	
2.	Estimate Completion Date (ECD)	557,6 days ≈ 79,6 week	The work progress is estimate will be late for 17,6 days ahead from the plan.	

According to the result of Table 5, the total cost for the whole project is estimating IDR116.811.884.888. This cost is lower than the planned budget is around IDR 137.425.746.927. The work progress in this project is estimate will be done on 558 days or 79,6 weeks. The result is estimated that the project will be late for 17,6 days.

Discussion

The relationship between BCWS, BCWP, and ACWP in this project reflects the dynamic interplay between time and cost performance. A consistently increasing BCWS indicates a structured and progressive work plan. When BCWP exceeds BCWS, particularly during weeks 26 to 35, it signifies that the project was progressing ahead of schedule, as reflected by a Schedule Performance Index (SPI) > 1 and a positive Schedule Variance (SV). Furthermore, a higher BCWP compared to ACWP reflects cost effectiveness, with a CPI exceeding 1 and a positive

CV, which suggests that the project incurred less cost than the value of the work performed. However, by week 40, slowdown in progress was observed, with BCWP approaching BCWS and a decreasing SV, suggesting stagnating performance. Despite this, ACWP remained below BCWP, indicating that the project continued to operate within budget without cost overruns. Overall, these three indicators are interdependent: BCWS represents planned values, BCWP reflects achieved progress, and ACWP denotes actual costs. Those indicators are such a fundamental basis for project performance assessment, as changes in one can significantly impact other performance indices such as SPI, CPI, EAC, and TE. Therefore, the continuous monitoring and control are essential to ensure the project remains both cost efficient and on schedule.

CONCLUSION

The feasibility analysis of this road construction project was carried ou using Earned Value Method (EVM), which incorporates three key indicators: Planned Value (PV) or known as BCWS, Earned Value (EV) or BCWP, and the Actual Cost (AC) or known as ACWP. Based on the analysis, the following conclusion can be found:

1. Throughout week 26 to week 39, the project showed steady progress ahead of schedule, as evidenced by BCWP values that continually exceed BCWS. This trend was validated by the positive SV and SPI values exceeding 1. These results show that in term of time, the project was feasible and well-managed during this period.
2. In week 40, a shift occurred where BCWS exceeded BCWS, resulting in a negative SV and SPI value below 1. This indicates that the project had begun to fall behind schedule. However, the cost performance remained efficient, as reflected in the continued positive Cost Variance (CV).
3. Overall, based on EVM indicators, the project can be considered feasible due to its high cost efficiency and minimal schedule deviation, which only appeared at the end of the last period. The total estimated project cost was lower than the plan budget and the expected delay was approximately two days. With proper control, the project remains highly likely to be completed successfully.

REFERENCES

Arofah, N. S. F. (2021). Pengaruh Pembangunan Infrastruktur Dasar Terhadap Pertumbuhan Ekonomi di Indonesia. *Jurnal Pendidikan Ekonomi Indonesia, 3*(2), 265-278. doi:http://dx.doi.org/10.24036/ecosains.10962757.00

Eriyanti, M., Kuryanto, T. D., & Gunasti, A. (2024). Pengendalian Proyek Dengan Metode Earned Value Pada Pekerjaan Rehabilitasi Jaringan Irigasi Sumber Nangka Jember. *Sustainable Civil Building Management and Engineering Journal, 1*(1), 56-56. doi:https://doi.org/10.47134/scbmej.v1i1.2151

Ghozali, M. (2022). Pengaruh pembangunan infrastruktur jalan, distribusi pendapatan, dan zis (zakat, infaq, sedekah) terhadap pertumbuhan ekonomi. *ijmus, 3*(1), 9-22. doi:https://doi.org/10.62289/ijmus.v3i1.33

Hammadi, F. R., Lenggogeni, L., & Berliana, R. (2023). Studi Faktor Penyebab Keterlambatan Proyek Konstruksi Bangunan Gedung. *Jurnal Pendidikan Tambusai, 7*(3), 31457-31462. doi:https://doi.org/10.31004/jptam.v7i3.12134

Hasan, R., Chowdhury, S. A., & Akter, J. (2021). Construction project monitoring: The cost and schedule control by Earned Value Method (EVM). *Journal of Technology Management and Business, 8*(1), 1-9. doi:https://doi.org/10.30880/jtmb.2021.08.01.001

Jatnika, A., & Johari, G. J. (2021). Analisis Pengendalian Waktu dengan Earned Value Concept Pembangunan Rumah Susun Jawa Barat 2 TA. 2019 Universitas Garut. *Jurnal Konstruksi, 19*(1), 336-346. doi:https://doi.org/10.33364/konstruksi/v.19-1.990

Messah, Y. A., Lona, L. H. P., & Sina, D. A. (2013). Pengendalian Waktu Dan Biaya Pekerjaan Konstruksi Sebagai Dampak Dari Perubahan Desain. *Jurnal Teknik Sipil, 2*(2), 121-132. doi:https://doi.org/10.35508/jts.2.2.121-132

Nabil, R. R., Furuhitho, X., Setiawan, L., Susanto, R. H., & Slameto, P. J. (2023). Perencanaan Pengendalian Biaya dan Waktu pada Proyek Pembangunan Rumah Susun Stie Tazkia Cendikia Bogor dengan Metode Earned Value. *Innovative: Journal Of Social Science Research, 3*(6), 7591-7600. Retrieved from https://j-innovative.org/index.php/Innovative/article/view/7133

Proaño-Narváez, M., Flores-Vázquez, C., Vásquez Quiroz, P., & Avila-Calle, M. (2022). Earned value method (EVM) for construction projects: current application and future projections. *Buildings, 12*(3), 301. doi:https://doi.org/10.3390/buildings12030301

Rozik, M. A., & Putra, I. N. D. P. (2024). Analisis Nilai Hasil Dan Pengendalian Biaya Dan Waktu Pembangunan Proyek Gedung Perawatan Tahap Ii Rspal Dr. Ramelan Surabaya. *Jurnal Al Ulum LPPM Universitas Al Washliyah Medan, 12*(1), 1-9. Retrieved from https://univamedan.ac.id/ejurnal/index.php/alulum/article/view/536

Silalahi, Y. I., Masthura, L., & Fahriana, N. (2023). Analisis Faktor-Faktor Penentu Keberhasilan Proyek Konstruksi Berdasarkan Mutu, Biaya dan Waktu. *Jurnal Komposit: Jurnal Ilmu-Ilmu Teknik Sipil, 7*(2), 233-240. doi:https://doi.org/10.32832/komposit.v7i2.14240

Sudiantini, D., Juliansyah, F., Nugroho, Y., Surachman, A., & Pakphan, R. A. (2024). Analisa Penjadwalan Proyek Dengan Menggunakan Pert Di PT Summarecon Agung Tbk Pada Perumahan Summarecon Bogor. *Musytari: Neraca Manajemen, Akuntansi, dan Ekonomi, 3*(8), 111-121. doi:https://doi.org/10.8734/musytari.v3i8.1960

Suksmono, A. K., & Sari, C. A. N. (2024). Evaluasi Waktu dan Biaya Menggunakan Earned Value Method (EVM) pada Gedung Mal Pelayanan Publik (MPP) Kota Tegal. *Pasak: Jurnal Teknik Sipil dan Bangunan, 2*(1), 13-19. Retrieved from https://ojs.unsiq.ac.id/index.php/pasak/article/download/7886/3376

Verma, A., Pathak, K., & Dixit, R. (2014). Earned value analysis of construction project at Rashtriya Sanskrit Sansthan, Bhopal. *Int. J. Innov. Res. Sci. Eng. Technol, 3*(4), 11350-11355. Retrieved from https://www.academia.edu/download/34537121/66_Earned.pdf

Warka, I. G. P., Handayani, T., & Asmina, D. (2015). Pengendalian Biaya Dan Waktu Pada Proyek Pembangunan Gedung J (Irma Utama) Rsu Provinsi Ntb Menggunakan Metode Earned Value: Cost and Time Control on Construction Project of NTB Province Public Hospitalâ€™ s J Building (Irna Utama) using Earned Value Method. *Spektrum Sipil, 2*(2), 125-136. Retrieved from https://spektrum.unram.ac.id/index.php/Spektrum/article/view/28

Wedananta, K. G. T. B., Tjendani, H. T., & Witjaksana, B. (2025). Evaluation of Cost and Time Estimates Using The Earned Value Method: A Case Study of The Construction of RU Guest House and Main House. *Journal of Social Research, 4*(4), 648-659. Retrieved from https://ijsr.internationaljournallabs.com/index.php/ijsr/article/view/2488