Formosa Journal of Science and Technology (FJST)
Vol. 5, No. 6, 2026: 1343-1358

Housing Development Performance Evaluation Through the Earned Value Technique (Case Study: Safira Gold Mansion, Appenzel Model, Two-Story Home)

Axel Prasetya Adoe[1*], Budi Witjaksana[2], Dika Ayu Safitri[3]
Civil Engineering Master's Study Program, Faculty of Engineering Universitas 17 Agustus 1945 Surabaya
Corresponding Author: Axel Prasetya Adoe, 1472400081@surel.untag-sby.ac.id , budiwitjaksana@untag-sby.ac.id ; dika-ayu@untag-sby.ac.id

A R T I C L E I N F O

Keywords: : Earned Value, Project, Cost, Performance, Implementation.

Received : 27, April
Revised : 29, May
Accepted: 30, June

A B S T R A C T

Project performance control requires an approach that quantitatively integrates planning and implementation. Earned Value Management is used as a method to evaluate cost and time performance through the Cost Performance Index (CPI) and Schedule Performance Index (SPI) indicators. Therefore, it is necessary to implement EVM that not only focuses on evaluating performance indicators numerically, but is also able to represent the actual conditions of the project based on implementation data, so that the analysis of project performance deviations can be carried out more comprehensively and contextually according to the characteristics of the housing project being studied. The results of the project cost performance analysis using the Cost Performance Index (CPI) indicator, the project experienced inefficiency in implementation costs. In the 43rd week, the CPI value was obtained at 0.64, indicating that the actual costs used were greater than the value of the work successfully achieved. The results of the Cost Variance (CV) calculation showed a negative value of Rp149,531,847,789, indicating that the project cost overrun occurred. In addition, the results of the Estimate at Complete (EAC) calculation showed that the estimated final project cost had increased compared to the initial project plan cost. This condition was influenced by increased operational costs due to delays in project duration, increased work implementation costs, and suboptimal use of project resources during the project implementation process.

ISSN-E: 2964-6804
DOI: https://doi.org/10.55927/fjst.v5i6.91
https: https://journalfjst.my.id/index.php/fjst

INTRODUCTION

The Safira Gold Mansion 2-story Appenzelle type housing development project in Sukodono District, Sidoarjo Regency experienced delays in work implementation against the established project plan schedule. This project is a house with an indent construction system, namely that the housing units are built after sales have been made, so that the work is carried out in stages and not simultaneously. Delays in this housing development project occurred due to operational constraints related to the availability of materials and labor in the field. One indication of delay is seen in the finishing work. Based on the time schedule data and the S-curve plan, the cumulative progress target in the 43rd week was planned to reach 57.10%, but the realization in the field only reached 33.72%, resulting in a progress deviation of 23.38%. When viewed from the Budget Plan (RAB) recap, the total project budget was Rp 7,920,721,610 for 10 housing units. As of week 43, the planned budget had been absorbed at Rp 4,522,732,039 (57.10%), but the actual costs in the field had only reached Rp 2,670,867,326 (33.72%). This difference indicates a cost deviation of Rp 1,881,864,721 from the plan for the same period. This deviation indicates that cost absorption is not in line with the plan due to uneven work implementation and tends to be delayed. Actual conditions show that of the total 10 Appenzelle-type houses, 2 units (20%) have been completed, 3 units (40%) are under construction, and 5 units (50%) have not been built because they have not been sold. This uneven distribution of progress indicates irregularities in work implementation between units. This irregularity in progress causes deviations between plans and realization and impacts overall project delays (Yonomastuti et al., 2024).

Landed housing development in buffer zones of large cities continues to increase in line with the growing demand for housing and the expansion of residential areas. Sidoarjo Regency, particularly Sukodono District, is developing as a new residential area with a phased development pattern for each unit spread across the region. Data from the Central Statistics Agency (BPS) shows that the construction sector is a major contributor to Indonesia's Gross Domestic Product, accounting for approximately 9% and plays a significant role in driving regional economic activity, including the housing subsector (BPS, 2025). Medium-scale housing development generally utilizes a phased development system, where unit construction begins after sales. This system prevents work from being carried out simultaneously, resulting in uneven progress between units within a single implementation period. Furthermore, operational constraints such as vendor delays, material delays, and limited effective working days often impact construction project performance. The Safira Gold Mansion project demonstrates that the deviation between plans and actual results is not caused by a single factor, but rather by a combination of several operational factors in the field. Delays in finishing work delay the completion of housing units, while work stoppages during holidays reduce the number of effective working days. On the other hand, the phased construction system causes differences in progress between units, making project control more complex and impossible to implement conventionally. In terms of costs, this project uses a lump-sum contract system, where the project cost is set from the outset and does not

experience significant changes during implementation. Data from the budget summary and cost realization show that project costs remain relatively stable despite work delays. This situation creates an imbalance between the project's time and cost performance, where the project experiences delays but is not accompanied by significant cost increases (Asmoro, 2023).

These issues indicate that project performance is not yet optimally controlled. Deviations between plans and actual results require quantitative analysis to determine the extent of delays and project cost efficiency. Therefore, a method capable of simultaneously integrating cost and time aspects is needed so that project performance evaluation can be conducted objectively and measurably (Emilio, 2022). Based on available secondary project data, namely the time schedule, the planned S-curve, weekly progress reports, and the budget (RAB) and actual cost data, a quantitative approach can be used to analyze project performance. The data indicates that actual project progress is below plan, while costs have not increased significantly. This situation indicates a mismatch between time and cost performance, requiring an analytical method capable of explaining the relationship between these two aspects in an integrated manner.

Project performance control requires an approach capable of quantitatively integrating plans and actual results. Earned Value Management is used as a method to evaluate cost and time performance through the Cost Performance Index (CPI) and Schedule Performance Index (SPI) indicators. This indicator provides an overview of the project's position relative to the plan, both in terms of cost utilization and schedule achievement, and allows for quantitative predictions of final project performance (Asmoro, 2023). In modern construction management practices, EVM has also been developed as a data-driven decision-making tool capable of connecting aspects of project planning and implementation in an integrated manner (Ateş & Eirgash, 2025). Various studies have shown that EVM is effective in identifying measurable deviations in project performance and providing a basis for evaluating project control (Yonamastuti et al., 2024).

These findings are reinforced by research (Setiyowati et al., 2026), which shows that housing projects experience delays, as indicated by Schedule Performance Index (SPI) values below 1, even though under some conditions the project costs are still relatively efficient, with Cost Performance Index (CPI) values above 1. This condition indicates an imbalance between time and cost performance, requiring an integrated analysis method. Other research indicates that construction project delays often occur due to suboptimal project control systems that fail to simultaneously integrate physical progress, cost, and time information. Other studies also apply EVM to projects with relatively uniform implementation conditions, thus not specifically examining the characteristics of housing projects with a phased (indent) construction system.

In these conditions, progress between units is uneven and is influenced by operational factors such as delays in finishing work and limited effective working days. Furthermore, in projects with a lump-sum contract system, delays are not always accompanied by increased costs, creating an imbalance between time and cost performance that is not fully reflected in the conventional EVM approach

(Acebes et al., 2022). Therefore, it is necessary to implement EVM that focuses not only on numerical evaluation of performance indicators but also represents the actual project conditions based on implementation data. This allows for a more comprehensive and contextual analysis of project performance deviations, tailored to the characteristics of the housing project being studied.

Based on these conditions, the study of the 2-story Safira Gold Mansion, Appenzelle, project focused on analyzing project performance from a cost and time perspective using the Earned Value Management (EVM) method. The analysis was conducted to determine the level of alignment between plans and actual results using the Cost Performance Index (CPI) and Schedule Performance Index (SPI) indicators, identify project delays, and evaluate cost efficiency based on actual data in the form of S-curves, weekly progress reports, and cost realizations. This approach is relevant because EVM is able to quantitatively identify project performance deviations and provides an objective picture of project conditions. It is also effective for project control, which simultaneously involves cost and time aspects (Wakano & Oei, 2025; Yonamastuti et al., 2024). This analysis also considers project operational conditions, such as delays in finishing work and limited effective working days, which directly impact project progress.

THEORETICAL REVIEW

Research by (Emilio, 2022) analyzed improvements in project control accuracy through the development of a singularity function-based Earned Value Management (EVM) method. The method used a continuous mathematical approach to model the relationship between project progress and time and cost. The study results showed that the continuous EVM model was able to provide more accurate project performance estimates than the discrete approach, particularly in monitoring time and cost deviations in real time (Emilio, 2022).

(Setiyowati et al., 2026) examined the time and cost performance of a housing project using the Earned Value Management (EVM) approach. The method used involved analyzing SPI, CPI, SV, and CV indicators based on project progress data. The results showed that the project experienced delays, indicated by an SPI value <1, although cost efficiency was maintained with a CPI >1, resulting in an imbalance between time and cost performance (Setiyowati et al., 2026).

A study by (Robi'in & Setiawan, 2022) focused on evaluating project performance from a time and cost perspective using the EVM method combined with an S-curve. The analysis was conducted by comparing the planned and actual project implementation. The findings showed that the project was running on schedule with an SPI of 1.00, but there was cost overrun, reflected in a CPI of 0.99, so cost control was not optimal (Robi'in & Setiawan, 2022).

METHODOLOGY

This research was conducted on the Safira Gold Mansion, a two-story Appenzelle-type housing development located in Sukodono District, Sidoarjo Regency, East Java. This project is part of a residential development project being built in stages, each unit, using a foreman-based implementation system.

The site was selected purposively because this project reflects the characteristics of mid-scale housing development with a foreman-based system, where labor control and work execution are carried out by each work group. Furthermore, this project exhibits variations in progress between units and differences in work outcomes influenced by labor productivity and field conditions, making it relevant for analysis using the Earned Value Management method. The research implementation period is broadly divided into:

1. Secondary data collection: obtained from project documents in the form of planned and actual S-curves, as well as project budget data during the implementation period.
2. Data processing and analysis: conducted after all data has been collected, including the calculation of Earned Value Management (CPI and SPI) and project performance evaluation.
3. Research results preparation: conducted at the final stage, including the preparation of a research report and drawing conclusions.

Research instruments are tools used to collect, measure, and analyze data in accordance with the research objectives. In this study, the instruments were developed based on the application of the Earned Value Management (EVM) method combined with labor productivity analysis and work quality evaluation based on actual project conditions (Robi'in & Setiawan, 2022; Setiyowati et al., 2026). This study used three types of instruments:

1. Project Documents (Secondary Data)

The main instruments in this study were project documents, which served as sources of quantitative and qualitative data. The data used included:

- Planned and actual S-curves
- Project time schedule
- Cost Budget Plan (RAB)
- Actual Cost Data
- Weekly progress reports

These documents were used to obtain Planned Value (PV), Earned Value (EV), and Actual Cost (AC) data as the basis for project performance analysis (Asmoro, 2023). Additionally, weekly progress data and S-curves are used to illustrate work progress and identify deviations between the project plan and actual performance.

The planned and actual S-curves are used to illustrate the cumulative progress of the work for each implementation period, thus determining the level of alignment between the project plan and actual performance (ScheduleReader, 2021).

2. Earned Value Management (EVM) and Productivity Calculation Format

This instrument is a calculation template used to process project data into performance indicators. The calculation format is structured in a table containing:

- Planned Value (PV)
- Earned Value (EV)
- Actual Cost (AC)
- Cost Performance Index (CPI)
- Schedule Performance Index (SPI)
- Cost Variance (CV)
- Schedule Variance (SV)
- Estimate at Completion (EAC)
- Estimate to Complete (ETC)

Calculations are performed periodically to monitor project performance over time. This instrument serves to measure the level of cost efficiency and timeliness of project implementation, as well as to predict the final condition of the project based on actual performance.

3. Project Performance Deviation Analysis Format

This instrument is used to identify and analyze deviations between planned and actual project performance based on EVM calculation results. The analysis focuses on:

- Cost variance
- Schedule variance
- Comparison between CPI and SPI values

Furthermore, this instrument is also used to relate the results of the numerical analysis to actual project conditions in the field, such as work delays, irregular progress between units, and limited effective workdays. Thus, the analysis is not only quantitative but also considers operational factors that affect project performance.

4. Data Summary and Visualization (Excel Format)

This instrument is used to present the analysis results in a systematic and easy-to-understand format. This format includes:

- Summary of PV, EV, and AC values for each period
- Planned and actual S-curve graphs
- CPI and SPI value graphs
- Project performance deviation table
- Project performance trend graph

This data visualization is used to facilitate the interpretation of the analysis results and to identify project performance patterns, particularly related to delays and cost efficiency during the implementation period.

Data Analysis Techniques

The data analysis technique in this study was quantitative using the Earned Value Management (EVM) approach. This analysis aims to evaluate project performance in terms of cost and time, as well as identify deviations between planned and actual project implementation based on actual field conditions.

The entire analysis process was conducted using secondary project data in the form of S-curves, time schedules, weekly progress reports, and project cost data. This approach ensures that performance evaluations are objective, measurable, and based on actual data. The analysis steps were carried out systematically as follows:

1. Processing Project Progress and Cost Data

The collected data was processed to obtain three main components of the EVM method:

- Planned Value (PV) → based on the planned S-curve
- Earned Value (EV) → based on the actual S-curve
- Actual Cost (AC) → based on the actual project costs

This data is compiled periodically (weekly) to illustrate the development of project performance throughout the implementation period.

2. Calculation of Project Performance Indicators (EVM)

After obtaining the PV, EV, and AC values, the project performance indicators are calculated, namely:

- Cost Performance Index (CPI) → to assess cost efficiency
- Schedule Performance Index (SPI) → to assess time performance

In addition, the project deviation indicators are also calculated:

Cost Variance (CV) = EV – AC

Schedule Variance (SV) = EV – PV

The CPI and SPI values are used to determine the project's condition, whether it is efficient, behind schedule, or on schedule (Yonomastuti et al., 2024; Wakano & Oei, 2025).

3. Project Performance Estimation

Based on the results of the performance indicator calculations, an estimate is made of the final project condition using:

- EAC = CPI/BA
- ETC = EAC – AC

This stage aims to predict the final project cost and the remaining costs required until project completion. This estimate is important as a basis for evaluating the sustainability of project performance.

4. Cost and Time Deviation Analysis

The results of the variance calculations and performance indices are then analyzed to identify deviations between the project plan and actual performance, including:

- Cost Variance
- Schedule Variance

This analysis is used to determine the extent of the project's deviation from the plan and to identify periods of delay during project implementation.

5. S-Curve Analysis

The analysis is conducted by comparing the planned and actual S-curves to visually observe the project's progress patterns.

The objectives of this analysis are:

- Identifying periods of delay

- Determining project progress trends
- Validating EVM calculation results

The S-curve is used as a supporting tool to strengthen the interpretation of project time performance, so that the analysis is not only based on numbers but also on actual progress patterns.

6. Project Performance Interpretation

The analysis results are then interpreted by considering the actual conditions of project implementation. The interpretation focuses on:

- Project cost efficiency conditions
- Project delay levels
- Project performance patterns during implementation

In addition, the analysis results are also linked to operational factors in the field, such as:

- Delays in finishing work
- Delays in vendors and materials
- Limited effective working days

This stage aims to explain the causes of project deviations in a more contextual manner, so that the analysis results are not only numerical.

RESULTS AND DISCUSSION

Calculations Based on Cost Aspects

Earned Value analysis, from a cost perspective, uses Cost Variance (CV), Cost Performance Index (CPI), and Estimate at Complete (EAC). The detailed calculation of these parameters is as follows:

a. Cost Variance (CV)

Cost variance is the difference between the project's performance value (EV) and the planned budget (PV).

week	EV	AC	CV
1	Rp1.346.522.675	Rp1.537.004.312	-Rp190.481.638
2	Rp2.534.630.917	Rp2.893.184.588	-Rp358.553.671
3	Rp3.881.153.591	Rp4.430.188.900	-Rp549.035.309
4	Rp5.069.261.833	Rp5.786.369.176	-Rp717.107.342
5	Rp7.049.442.237	Rp8.046.669.635	-Rp997.227.398
6	Rp9.980.109.235	Rp11.391.914.314	-Rp1.411.805.080
7	Rp12.910.776.232	Rp14.737.158.994	-Rp1.826.382.762
8	Rp15.920.650.446	Rp18.172.815.692	-Rp2.252.165.246
9	Rp19.326.560.740	Rp22.060.532.482	-Rp2.733.971.742
10	Rp23.049.299.899	Rp26.309.897.345	-Rp3.260.597.446

11	Rp26.613.624.626	Rp30.378.438.172	-Rp3.764.813.546
12	Rp30.257.156.569	Rp34.537.391.017	-Rp4.280.234.448
13	Rp32.078.922.540	Rp36.616.867.439	-Rp4.537.944.899
14	Rp33.821.481.295	Rp38.605.931.843	-Rp4.784.450.548
15	Rp37.940.256.535	Rp43.307.356.798	-Rp5.367.100.263
16	Rp43.405.554.449	Rp49.545.786.066	-Rp6.140.231.617
17	Rp52.435.177.090	Rp59.852.756.160	-Rp7.417.579.070
18	Rp61.860.835.812	Rp70.611.786.346	-Rp8.750.950.534
19	Rp70.811.251.237	Rp80.828.344.421	-Rp10.017.093.185
20	Rp79.682.459.445	Rp90.954.490.478	-Rp11.272.031.033
21	Rp90.217.019.193	Rp102.979.288.921	-Rp12.762.269.729
22	Rp101.702.065.534	Rp116.089.031.585	-Rp14.386.966.050
23	Rp107.088.156.232	Rp122.237.048.834	-Rp15.148.892.601
24	Rp112.949.490.227	Rp128.927.538.193	-Rp15.978.047.966
25	Rp118.969.238.655	Rp135.798.851.589	-Rp16.829.612.934
26	Rp124.988.987.082	Rp142.670.164.985	-Rp17.681.177.903
27	Rp130.850.321.077	Rp149.360.654.344	-Rp18.510.333.267
28	Rp137.503.727.233	Rp156.955.263.887	-Rp19.451.536.654
29	Rp144.473.962.254	Rp164.911.521.504	-Rp20.437.559.249
30	Rp150.968.953.979	Rp172.325.307.010	-Rp21.356.353.031
31	Rp102.018.894.399	Rp228.199.934.361	-Rp126.181.039.962
32	Rp110.573.273.743	Rp237.964.432.345	-Rp127.391.158.602
33	Rp121.820.698.436	Rp250.802.938.953	-Rp128.982.240.517
34	Rp133.226.537.561	Rp263.822.269.599	-Rp130.595.732.037
35	Rp144.711.583.903	Rp276.932.012.262	-Rp132.220.428.359
36	Rp157.701.567.351	Rp291.759.583.274	-Rp134.058.015.923
37	Rp171.721.244.609	Rp307.762.510.525	-Rp136.041.265.916
38	Rp189.780.489.891	Rp328.376.450.713	-Rp138.595.960.822
39	Rp207.602.113.525	Rp348.719.154.846	-Rp141.117.041.322
40	Rp224.710.872.213	Rp368.248.150.814	-Rp143.537.278.601
41	Rp236.195.918.554	Rp381.357.893.477	-Rp145.161.974.923
42	Rp249.344.316.435	Rp396.366.288.526	-Rp147.021.972.092
43	Rp267.086.732.852	Rp416.618.580.641	-Rp149.531.847.789

The CV calculation for week 43 is as follows:

$$CV = EV - AC$$

= Rp 416,618,580,641 – Rp 267,086,732,852
= - Rp 149,531,847,789

The CV calculation for week 43 yields a CV of - Rp 149,531,847,789, meaning the CV is less than 0 (CV < 0) or negative. This indicates that the costs incurred in completing the project are greater than the planned costs.

b. Cost Performance Index (CPI)

The CPI calculation for week 43 is as follows:

$$CPI = EV/AC$$

= Rp 267,086,732,852/Rp 416,618,580,641
= 0.64

The value of 0.64 indicates that the costs incurred in completing the project exceeded the planned costs.

c. Estimate at Complete (EAC)

$$EAC = ACWP + ETC$$

week	BAC	EV	AC	CPI	ETC	EAC
1	Rp7.920.721.615	Rp1.346.522.675	Rp1.537.004.312	0,88	Rp7.504.197.525	Rp9.041.201.837
2	Rp7.920.721.615	Rp2.534.630.917	Rp2.893.184.588	0,88	Rp6.148.017.249	Rp9.041.201.837
3	Rp7.920.721.615	Rp3.881.153.591	Rp4.430.188.900	0,88	Rp4.611.012.937	Rp9.041.201.837
4	Rp7.920.721.615	Rp5.069.261.833	Rp5.786.369.176	0,88	Rp3.254.832.661	Rp9.041.201.837
5	Rp7.920.721.615	Rp7.049.442.237	Rp8.046.669.635	0,88	Rp994.532.202	Rp9.041.201.837
6	Rp7.920.721.615	Rp9.980.109.235	Rp11.391.914.314	0,88	-Rp2.350.712.478	Rp9.041.201.837
7	Rp7.920.721.615	Rp12.910.776.232	Rp14.737.158.994	0,88	-Rp5.695.957.157	Rp9.041.201.837
8	Rp7.920.721.615	Rp15.920.650.446	Rp18.172.815.692	0,88	-Rp9.131.613.855	Rp9.041.201.837
9	Rp7.920.721.615	Rp19.326.560.740	Rp22.060.532.482	0,88	-Rp13.019.330.645	Rp9.041.201.837
10	Rp7.920.721.615	Rp23.049.299.899	Rp26.309.897.345	0,88	-Rp17.268.695.508	Rp9.041.201.837
11	Rp7.920.72	Rp26.613.	Rp30.378.	0,88	-	Rp9.041.20

	1.615	624.626	438.172		Rp21.337.236.335	1.837
12	Rp7.920.721.615	Rp30.257.156.569	Rp34.537.391.017	0,88	-Rp25.496.189.180	Rp9.041.201.837
13	Rp7.920.721.615	Rp32.078.922.540	Rp36.616.867.439	0,88	-Rp27.575.665.602	Rp9.041.201.837
14	Rp7.920.721.615	Rp33.821.481.295	Rp38.605.931.843	0,88	-Rp29.564.730.006	Rp9.041.201.837
15	Rp7.920.721.615	Rp37.940.256.535	Rp43.307.356.798	0,88	-Rp34.266.154.962	Rp9.041.201.837
16	Rp7.920.721.615	Rp43.405.554.449	Rp49.545.786.066	0,88	-Rp40.504.584.229	Rp9.041.201.837
17	Rp7.920.721.615	Rp52.435.177.090	Rp59.852.756.160	0,88	-Rp50.811.554.323	Rp9.041.201.837
18	Rp7.920.721.615	Rp61.860.835.812	Rp70.611.786.346	0,88	-Rp61.570.584.509	Rp9.041.201.837
19	Rp7.920.721.615	Rp70.811.251.237	Rp80.828.344.421	0,88	-Rp71.787.142.584	Rp9.041.201.837
20	Rp7.920.721.615	Rp79.682.459.445	Rp90.954.490.478	0,88	-Rp81.913.288.642	Rp9.041.201.837
21	Rp7.920.721.615	Rp90.217.019.193	Rp102.979.288.921	0,88	-Rp93.938.087.085	Rp9.041.201.837
22	Rp7.920.721.615	Rp101.702.065.534	Rp116.089.031.585	0,88	-Rp107.047.829.748	Rp9.041.201.837
23	Rp7.920.721.615	Rp107.088.156.232	Rp122.237.048.834	0,88	-Rp113.195.846.997	Rp9.041.201.837
24	Rp7.920.721.615	Rp112.949.490.227	Rp128.927.538.193	0,88	-Rp119.886.336.356	Rp9.041.201.837
25	Rp7.920.721.615	Rp118.969.238.655	Rp135.798.851.589	0,88	-Rp126.757.649.752	Rp9.041.201.837
26	Rp7.920.721.615	Rp124.988.987.082	Rp142.670.164.985	0,88	-Rp133.628.963.148	Rp9.041.201.837
27	Rp7.920.721.615	Rp130.850.321.077	Rp149.360.654.344	0,88	-Rp140.319.452.508	Rp9.041.201.837
28	Rp7.920.721.615	Rp137.503.727.233	Rp156.955.263.887	0,88	-Rp147.914.062.050	Rp9.041.201.837

29	Rp7.920.721.615	Rp144.473.962.254	Rp164.911.521.504	0,88	-Rp155.870.319.667	Rp9.041.201.837
30	Rp7.920.721.615	Rp150.968.953.979	Rp172.325.307.010	0,88	-Rp163.284.105.173	Rp9.041.201.837
31	Rp7.920.721.615	Rp102.018.894.399	Rp228.199.934.361	0,45	-Rp210.482.548.153	Rp17.717.386.208
32	Rp7.920.721.615	Rp110.573.273.743	Rp237.964.432.345	0,46	-Rp220.918.269.570	Rp17.046.162.775
33	Rp7.920.721.615	Rp121.820.698.436	Rp250.802.938.953	0,49	-Rp234.495.855.797	Rp16.307.083.157
34	Rp7.920.721.615	Rp133.226.537.561	Rp263.822.269.599	0,50	-Rp248.137.235.734	Rp15.685.033.864
35	Rp7.920.721.615	Rp144.711.583.903	Rp276.932.012.262	0,52	-Rp261.774.266.654	Rp15.157.745.608
36	Rp7.920.721.615	Rp157.701.567.351	Rp291.759.583.274	0,54	-Rp277.105.661.462	Rp14.653.921.812
37	Rp7.920.721.615	Rp171.721.244.609	Rp307.762.510.525	0,56	-Rp293.566.822.771	Rp14.195.687.755
38	Rp7.920.721.615	Rp189.780.489.891	Rp328.376.450.713	0,58	-Rp314.671.256.610	Rp13.705.194.103
39	Rp7.920.721.615	Rp207.602.113.525	Rp348.719.154.846	0,60	-Rp335.414.341.613	Rp13.304.813.233
40	Rp7.920.721.615	Rp224.710.872.213	Rp368.248.150.814	0,61	-Rp355.267.955.156	Rp12.980.195.658
41	Rp7.920.721.615	Rp236.195.918.554	Rp381.357.893.477	0,62	-Rp368.569.231.724	Rp12.788.661.753
42	Rp7.920.721.615	Rp249.344.316.435	Rp396.366.288.526	0,63	-Rp383.775.237.430	Rp12.591.051.097
43	Rp7.920.721.615	Rp267.086.732.852	Rp416.618.580.641	0,64	-Rp404.263.343.967	Rp12.355.236.674

Before determining the EAC value, the Estimate to Complete (ETC) is first calculated. Then, the EAC is calculated as follows:

ETC = (BAC – EV) / CPI

= (Rp 7,920,721,615 - Rp 267,086,732,852 / 0.64)

= - Rp 404,263,343,967

$$EAC = AC + ETC$$

= Rp 416,618,580,641 + (- Rp 404,263,343,967)
= Rp 12,355,236,674

CONCLUSION AND RECOMMENDATION

The results of the project cost performance analysis using the Cost Performance Index (CPI) indicator, the project experienced inefficiency in implementation costs. In the 43rd week, the CPI value was 0.64, indicating that the actual costs used were greater than the value of the work successfully achieved. The results of the Cost Variance (CV) calculation showed a negative value of Rp149,531,847,789, indicating a project cost overrun. In addition, the results of the Estimate at Complete (EAC) calculation showed that the estimated final project cost had increased compared to the initial project plan cost. This condition was influenced by increased operational costs due to delays in project duration, increased work implementation costs, and suboptimal use of project resources during the project implementation process.

REFERENCES

(Setiyowati et al., 2026) Acebes, F., Poza, D., González-Varona, J. M., & López-Paredes, A. (2022). Stochastic Earned Duration Analysis for Project Schedule Management. Engineering, 9, 148–161. https://doi.org/10.1016/j.eng.2021.07.019

Acebes, F., Poza, D., González-Varona, J. M., & López-Paredes, A. (2022). Stochastic Earned Duration Analysis for Project Schedule Management. Engineering, 9, 148–161. https://doi.org/10.1016/j.eng.2021.07.019

Amarasinghe, A. A. S. R., Agdas, D., & Dawes, L. (2025). Evaluating labor productivity and profitability in precast concrete manufacturing. Engineering, Construction and Architectural Management, 32(13), 148–173. https://doi.org/10.1108/ECAM-05-2024-0666

Asmoro, M. R. (2023). Cost and Time Analysis Using Earned Value Method Construction of Upbjj Building Open University of Surabaya Phase Ii. Asian Journal of Engineering, Social and Health, 2(12), 1799–1810. https://doi.org/10.46799/ajesh.v2i12.206

Ateş, B., & Eirgash, M. A. (2025). Proactive and data-driven decision-making using earned value analysis in infrastructure projects. Buildings, 15(14), 2388. https://doi.org/10.3390/buildings15142388

Fikriyah, N., Wibowo, K., & Rochim, A. (2026). Labor Analysis in Improving Work Productivity in the Palm Vista Residence Housing Development, Where Delays in Ground Floor Structure Work Were Found. 5(April).

Fikriyah, N., Wibowo, K., & Rochim, A. (2026). Labor Analysis in Improving Work Productivity in the Palm Vista Residence Housing Development, where delays in ground floor structural work were found. 5 (April).

Iskandar, D. N., & Pranata, G. (2024). Background, Problem Formulation, Research Objectives, Theoretical Basis. Journal of Civil Engineering Partners, 7(1), 321–328.

Iskandar, D. N., & Pranata, G. (2024). Background, Problem Formulation, Research Objectives, Theoretical Basis. Jurnal Mitra Teknik Sipil, 7 (1), 321–328.

Kalpeshkumar, T. G., Shah, D., Solanki, J., & Khatik, J. (2025). Impact of Labor Productivity on Construction Project Performance. Ijirt, 12(1), 5261–5266. https://ijirt.org/publishedpaper/IJIRT181544_PAPER.pdf

Kalpeshkumar, T. G., Shah, D., Solanki, J., & Khatik, J. (2025). Impact of Labor Productivity on Construction Project Performance. Ijirt, 12 (1), 5261–5266. https://ijirt.org/publishedpaper/IJIRT181544_PAPER.pdf

Robi'in, M. A., & Setiawan, A. (2022). Time and Cost Control in Road Improvement Projects Using the Earned Value Method. Dearsip, 1(1), 45–56.

Robi'in, M. A., & Setiawan, A. (2022). Time and Cost Control in Road Improvement Projects Using the Earned Value Method. Dearsip, 1 (1), 45–56.

Sayyed, F. H., & Dahake, H. B. (2021). Comparative Study of R.C.C., Composite, and Steel Structures Under Dynamic Conditions. International Journal of Scientific Development and Research (IJSDR), 6(6), 219–218. www.ijsdr.org

Sayyed, F. H., & Dahake, H. B. (2021). Comparative Study of R.C.C, Composite and Steel Structure Under Dynamic Conditions. International Journal of Scientific Development and Research (IJSDR), 6(6), 219–218. www.ijsdr.org

Setiyowati, R., History, A., Article, C. T., & Using, P. E. (2026). Time and Cost Performance Evaluation Using Earned Value Management in Residential Construction Projects: A Case Study of the Hanglekir Housing Development 1, 2. 5(1), 306–324.

Setiyowati, R., History, A., Article, C. T., & Using, P. E. (2026). Time and Cost Performance Evaluation Using Earned Value Management in Residential Construction Projects: A Case Study of the Hanglekir Housing Development 1,2. 5(1), 306–324.

Wakano, V. Y., & Oei, F. J. (2025). Comparative Analysis of Earned Value Management and Earned Schedule Methods in Home Construction and Renovation Projects. JMTS: Jurnal Mitra Teknik Sipil, 8(3), 985–996. https://doi.org/10.24912/jmts.v8i3.34358

Wakano, V. Y., & Oei, F. J. (2025). Comparative Analysis of Earned Value Management and Earned Schedule Methods in Home Construction and Renovation Projects. JMTS: Journal of Civil Engineering Partners, 8(3), 985–996. https://doi.org/10.24912/jmts.v8i3.34358

Yonomastuti, E., Asri, I. A., Adi, H. P., & Satrio, E. M. (2024). Evaluation of Cost and Time Performance Using the Earned Value Method (Case Study of Shophouses on Jalan Ki Ageng Panjawi, North Klaten District, Klaten

Regency). Sultan Agung Scientific Journal, 3(1), 16–26. https://jurnal.unissula.ac.id/index.php/JIMU/article/view/36946

Yonomastuti, E., Asri, I. A., Adi, H. P., & Satrio, E. M. (2024). Evaluation of Cost and Time Performance Using the Earned Value Method (Case Study of Shophouses on Jalan Ki Ageng Panjawi, North Klaten District, Klaten Regency). Sultan Agung Scientific Journal, 3(1), 16–26. https://jurnal.unissula.ac.id/index.php/JIMU/article/view/36946