

## EARNED VALUE ANALYSIS METHOD FOR EVALUATION TIME AND COST IN THE PROJECT X

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### ABSTRACT

The implementation of building construction projects, especially Project X, is quite complex and costly in terms of time and expenses. Of course, in project implementation, the factors of planning and controlling time and costs are crucial to the project's success. Therefore, this study aims to evaluate time and expenses using the EVA method. In this context, EVA is used as a method considered sufficiently effective and efficient in analyzing time and cost evaluations for project completion. The findings of this study indicate that the project contract value is IDR 638,553,623,000, with an SPI value of 0.738 in week 84, while the CPI value in week 84 is 0.932. In terms of time, there is a deviation from the established standard of 2 years and 6 months of implementation. From these two aspects, it can be concluded that the time and cost set at the beginning of the project refer to delays in implementation and cost overruns in this project, so the existing implementation methods must be changed, especially project performance and cost payments, which must be carried out on time and in accordance with the plan.

**Keywords** : Earned Value Analysis, Time Management, Cost Management, Evaluation

### 1. BACKGROUND

The University lecture building project is one of the state universities located in East Java. As a university that is in great demand by new students, of course, Project X continues to improve facilities and services. To achieve the best quality of education, had been carried out the construction of a new lecture building, referred to as Project X, which has a building area of 54,827 m<sup>2</sup>. The problems that exist in this project are arguably quite complex and diverse, which can affect factors in project execution. Issues include labor shortages or labor accumulation on work items, which naturally affect the planned progress. Because additional workers may be needed, budgeted costs will also change with regard to worker wages. The selection of the Earned Value Analysis (EVA) method is considered more effective in identifying delays and progress based on the example of the problems above. This allows for improvements in project strategies that can be applied according to the initial planning and costs that have been set, especially in this Project X. This study aims to address several key issues: determining the values of Budgeted Cost of Work Scheduled (BCWS) or Planned Value (PV), Budgeted Cost of Work Performed (BCWP) or Earned Value (EV), and Actual Cost of Work Performed (ACWP) or Actual Cost (AC) at reporting time; estimating the remaining project duration and cost for

unfinished work; identifying factors causing delays in Project X and formulating strategies to manage discrepancies between planned and actual project progress.

During this evaluation process, performance metrics such as Schedule Performance Index (SPI) and Cost Performance Index (CPI) are used to evaluate the cost and time efficiency of the project. CPI shows how well the project manages the budget, while SPI shows the project's progress compared to the established schedule. This analysis serves as the basis for strategic decision-making to ensure the project remains on track. The purpose of this research is to determine the total Plan Value (BCWS), Earned Value (BCWP), and Actual Cost (ACWP) at the reporting time, to estimate the remaining project duration and associated costs for unfinished work, to identify the factors contributing to project delays, and to develop strategies to address discrepancies between planned and actual project progress.

### 2. METHOD

Site Location Area

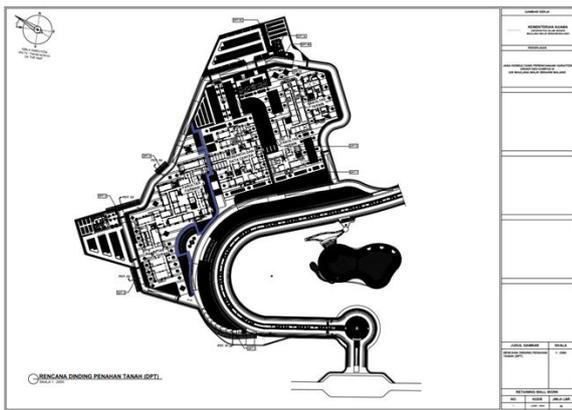


Figure 1. Site Layout Installation

Sources: Shop Drawing Project

The importance of site installation in this project lies in its ability to create an organized and systematic working environment. With good planning, site installation can reduce potential obstacles in the execution of work, ensure good accessibility for machines and workers, and prevent losses due to theft or damage to materials. In addition, site installation also contributes to more effective resource management, so that projects can be completed on time and within the set budget.

Project Data

Table 1. General Project Data

No.	Object	Description
1.	Work Area	54.827 m <sup>2</sup> (Fifty-four thousand and eight hundred twenty seven meter square)
2.	Implementation Time	610 Days (120 Days acceleration from the set time of 730 Days)
3.	Maintenance Periode	365 Days (three hundred and sixty five day) or 1 year
4.	Contract Value	Rp 638.553.623.000,00 (Six hundred thirty-eight billion and five hundred fifty-three million six hundred twenty-three thousand Indonesian Rupiah)
5.	Contract Type	Lumpsum
6.	Work System	Fixed and Contract

Sources: Survey Results Area

Flowchart Diagram

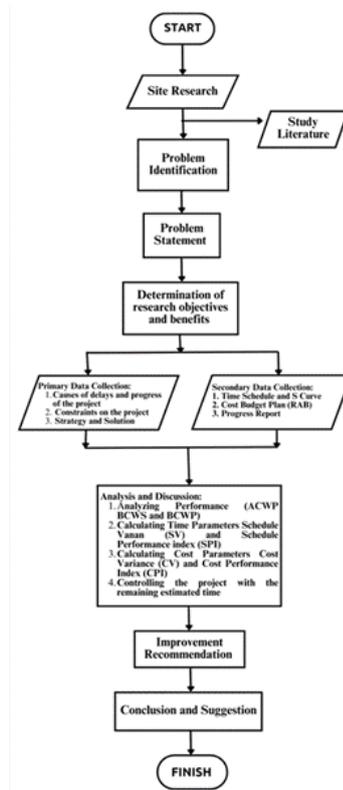


Figure 2. Flowchart Research

**Earned Value Analysis Concept**

1. BCWP (Budget Cost of Work Performed)

BCWP or Earned Value (EV) is the value of completed work against the planned budget for a work implementation or the value received from completed work. To get the EV value using the **2.1 Formula**.

$$BCWP = Realization\ Progress\ (\%) \times Plan\ Cost \quad (2.1)$$

2. BCWS (Budget Cost of Work Schedule)

BCWS or Planned Value (PV) is a budget that has been planned according to the implementation schedule, where each job description has a cost and schedule that can make a benchmark for the implementation of work on each report received. To get the PV value using the **2.2. Formula**:

$$BCWS = Planning\ Progress\ (\%) \times Plan\ Cost \quad (2.2)$$

3. ACWP (Actual Cost of Work Performed)

ACWP (Actual Cost of Work Performed) ACWP or actual cost (AC) is the cumulative actual cost of work performed. This cost is obtained from accounting or financial data on the project recorded at each reporting date.

**Integrated Time and Cost Variance**

To get the value of schedule variance (SV) and cost variance (CV) it is necessary to use the BCWS value, BCWP and ACWP so that the schedule and cost variance formula can be determined in the following formula:

1. Schedule Variants (SV)

Schedule Variants integrated (SV) used to determine whether the project being run is still according to the planned schedule or not. The schedule difference is the difference between BCWP and BCWS which is obtained by the **2.3 formula:**

$$SV = BCWP - BCWS \quad (2.3)$$

With the value :

- Minus (-) = Implementation is late from the plan schedule
- Zero (0) = Implementation in accordance with the plan schedule
- Positive (+) = Implementation ahead of plan schedule

2. Cost Variants (CV)

Cost Variants (CV) used to determine whether the project being run is still within the budget limit or exceeds the plan budget. The cost difference is the difference between BCWP and ACWP which is obtained by the **2.4 formula:**

$$CV = BCWP - ACWP \quad (2.4)$$

With the value :

- Minus (-) = Costs above plan budget
- Zero (0) = Costs in accordance with the plan budget
- Positive (+) = Costs below plan budget

**Table 2.1** Analysis Variants Integrated

Schedule Variance (SV)	Cost Variance (CV)	Description
+	+	Work ahead of schedule and cost less than budget
0	+	Work is on schedule and cost is less than budget
+	0	Work is ahead of schedule and cost is within budget
0	0	Work is on schedule and on budget
-	-	Work completed late and cost higher than budget
0	-	Work is on schedule and cost is higher than budget
-	0	Work is completed late and costs are within budget

+	-	Work is completed quickly and costs are above budget
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Source: Nurtisani (2017)

**Project Performance Index**

1. Cost Performance Index (CPI)

The cost efficiency factor that has been incurred can be shown by comparing the value of work that has been physically completed (BCWP) with the costs that have been incurred in the same period (ACWP). **2.5 formula**

$$CPI = \frac{BCWP}{ACWP} \quad (2.5)$$

2. Schedule Performance Index (SPI)

The performance efficiency factor in completing the work can be shown by the comparison between the value of the work that has been physically completed (BCWP) and the planned cost expenditure incurred based on the work plan (BCWS). **2.6 formula**

$$SPI = \frac{BCWP}{BCWS} \quad (2.6)$$

The value according in calculation of CPI and SPI analysis have an statement like table below :

**Table 2.2** Project Performance Index

Indeks	Value	Description
CPI	> 1	ACWP released is less than the planned work value (under cost)
	< 1	ACWP released is greater than planned work value (over cost)
	1	ACWP released is equal to planned work value (on cost)
SPI	> 1	Project performance ahead of schedule (a head schedule)
	< 1	Project performance is slower than planned schedule (behind schedule)
	1	Project performance suitable with planned schedule (on schedule)

**Predicted Cost and Time of Project Completion**

This EVA method can also be used to estimate the final cost of the project as well as the project completion time. This estimate is calculated based on performance trends and the assumption that these trends will not change until the end of the project.

1. Estimate To Completion (ETC)

ETC is a cost estimate for the remaining work assuming that the project performance trend will remain until the end of the project. From the intended approach, the following method can be used:

a. ETC for progress < 50%  

$$ETC = Total\ Budget\ (BAC) - EV \quad (2.7)$$

b. ETC for progress > 50%  

$$ETC = Total\ Budget\ (BAC) - EV \quad (2.8)$$

2. Estimation Temporary (ETS)

ETS is an estimate of the time required to complete the remaining work at the time of project performance evaluation. Using the **2.9 formula**:

$$ETS = \frac{Planning\ Duration - Reporting\ Period}{SPI} \quad (2.9)$$

3. Estimate At Completion (EAC)

EAC is the estimated total cost at the end of the project. Here is the **2.10 formula**:

$$EAC = ACWP + \frac{BAC - BCWP}{CPI} \quad (2.10)$$

4. Estimate All Schedule (EAS)

EAS is an estimate of the total project completion time based on performance analysis up to the reporting time. Using the **2.11 formula**:

$$EAS = Reporting\ Period + ETS \quad (2.11)$$

5. Variance At Complication (VAC)

VAC shows the difference between the initial project budget and the estimated total cost at the end of the project. Here is the **2.12 formula**:

$$VAC = BAC - EAC \quad (2.12)$$

6. Variance All Schedule (VAS)

VAS measures the difference between the planned duration and the estimated total project completion time (EAS). Here is the **2.13 formula**:

$$VAS = Project\ Duration - EAS \quad (2.13)$$

**3. RESULT AND DISCUSSION**

This chapter will discuss the analysis and discussion of the calculation of Earned Value Analysis (EVA) which includes important components such as Actual Cost of Work Performed (ACWP), Budgeted Cost of Work Performed (BCWP), and Budgeted Cost of Work Scheduled (BCWS). By using this data, EVA calculations will be carried out to determine and evaluate the extent to which the company can assess performance based on estimated time and budgeted

costs which will exceed the cost of capital or not, along with the calculation of whether or not the target is achieved on time that has been agreed upon in a project.

1. Budget Cost of Work Schedule (BCWS)

From the S-Curve data, the weight obtained in week 84 is 3.799%, then the BCWS value can be calculated using the following formula:

$$\begin{aligned} BCWS &= Planning\ Progress\ (\%) \times Project\ budget \\ &= 3.799\% \times Rp\ 683.553.623.000,00 \\ &= Rp\ 24.258.652.137,77 \end{aligned}$$

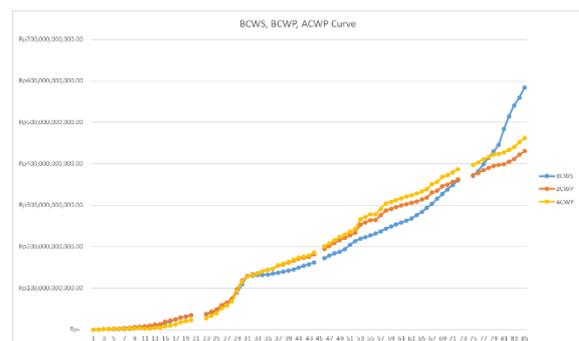
2. Budget Cost of Work Performed (BCWP)

From the S-Curve data, the weight obtained in week 84 is 1.374%, then the BCWP value can be calculated using the following formula:

$$\begin{aligned} BCWP &= Realization\ Progress\ (\%) \times Project\ budget \\ &= 1,374\ \% \times Rp\ 683.553.623.000,00 \\ &= Rp\ 8.773.726.780,02 \end{aligned}$$

3. Actual Cost of Work Performed (ACWP)

The data used to obtain the Actual Cost of Work Performed (ACWP) value is data on the amount of actual expenditure costs on the project in accordance with the records during project implementation, so that the actual cost value obtained consists of expenditure data for each period and is recorded every week such as costs from project implementation records and labor costs that are outside the budget for the Campus 3 UIN Maulana Malik Ibrahim Malang project implementation. The actual ACWP cost incurred in week 84 amounted to Rp 9.914.311.261,42 with a cumulative cost of Rp 461.767.242.836,51



**Figure 3.** Graphic of ACWP, BCWP, BCWS value  
 Sources: Data Calculation

From the curve above, it can be seen that BCWS rose sharply in week 84, which is located above the BCWP and ACWP values. From this, it can be concluded that the project is experiencing delays or has high targets toward the end of the project because the BCWS (plan) is above the BCWP (realization progress). It is also known that the ACWP value is greater than the BCWP value (realization progress),

meaning that the actual costs incurred are greater than the work completed (over budget).

**Calculation of Integrated Time and Cost Performance**

In the calculation of time and cost performance to determine the value of Schedule Variance (SV), Cost Variance (CV), Schedule Performance Index and Cost Performance Index (CPI) aims to determine the condition of the project in a state faster or slower than the initial planning schedule and on budget or over budget costs incurred against the implementation schedule analyzed every week

This calculation is made by comparing the planning calculations and the value obtained from the implementation of the project. How to calculate SV, CV, SPI, and CPI on the Campus 3 UIN Maulana Malik Ibrahim Malang project can be determined in the following way.

1. Schedule Variance (SV)

In calculating the SV value, cumulative BCWP and BCWS data is used from week 1 to week 84. With a cumulative BCWP value in week 84 of Rp 430,468,153,872.99 and a cumulative BCWS value in week 84 of Rp 583,363,433,364.11 which is obtained in the following formula.

$$SV = BCWP - BCWS$$

$$SV = Rp\ 430,468,153,872.99 - Rp\ 583,363,433,364.11$$

$$SV = - Rp\ 152,895,279,491.12$$

2. Cost Variance (CV)

In the calculation, the CV value uses the cumulative BCWP and cumulative ACWP values in weeks 84 to 100. From this data, the cumulative BCWP value for week 84 is IDR 430,468,153,872.99 which is then reduced by the cumulative ACWP value for week 84 of IDR 444,178,091,724.89. So that the CV value is obtained by the following formula.

$$CV = BCWP - ACWP$$

$$CV = Rp\ 430.468.153.872,99 - Rp\ 461.767.242.836,51$$

$$CV = - Rp\ 31.299.088.963,52$$

3. Schedule Performance Index (SPI)

The cumulative value of BCWP in week 84 is IDR 430,468,153,872.99 and the cumulative value of BCWS in week 84 is IDR 583,363,433,364.11. For the calculation of the next SPI value using the same method from week 1 to week 84 which is obtained by the following formula.

$$SPI = BCWP / BCWS$$

$$SPI = Rp\ 430.468.153.872,99 / Rp\ 583.363.433.364,11$$

$$SPI = 0.738$$

4. Cost Performance Index (CPI)

The cumulative value of BCWP in week 84 is IDR 430,468,153,872,99 and the cumulative value of ACWP

in week 84 is IDR 461.767.242.836,51. For the calculation of the next CPI value using the same method from week 1 to week 84 which is obtained by the following formula.

$$CPI = BCWP / ACWP$$

$$CPI = Rp\ 430.468.153.872,99 / Rp\ 461.767.242.836,51$$

$$CPI = 0.932$$

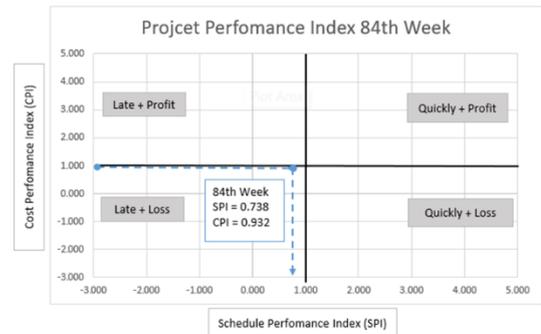


Figure 4. Value of CPI and SPI in week 84

Sources: Data Calculation

Based on the results of the graph, it can be seen that in week 84, the project was leaning toward physical progress delays, as indicated by a Schedule Performance Index (SPI) value of 0.738, as well as relatively minor cost overruns, as indicated by a Cost Performance Index (CPI) value of 0.932. If we assess based on the midpoint of the graph, we can see many data points indicating that the project is more inclined toward delays in physical progress compared to the planned schedule and that cost overruns are occurring.

**Cost and Time Estimates**

In calculating the time and cost of each job, the results of the evaluation include calculating the estimated time and cost required, estimating the cost of the remaining work, estimating the total project implementation time, estimating the total project cost until completion. So, in obtaining this value, the calculation of ETS, ETC, EAS, EAC, VAS, VAC on the Campus III UIN Malang phase II project is obtained in the following way.

**Estimated Time and Cost for Remaining Work**

Calculation of remaining time and cost estimates is done to find out how much value is needed for work that has not been completed. Some of them are Estimate Temporary Schedule (ETS) and Estimate to Complete (ETC) which can be described as follows:

1. Estimate Temporary Schedule (ETS)

Estimate Temporary Schedule (ETS) is obtained from the time of the work contract which can be known that the planned duration of project implementation is 113 days and it is known that the reporting period is carried out every

week and the SPI in week 84 is 0.74, then the description in week 84 is as follows:

$$\begin{aligned} \text{ETS} &= (\text{Planning Duration}-\text{Reporting Period})/\text{SPI} \\ \text{ETS} &= (113-84)/0,74 \\ \text{ETS} &= 39.3 \approx 40 \text{ Weeks} \end{aligned}$$

2. Estimate To Complete (ETC)

Estimate Temporary Cost (ETC) is obtained from the project contract value reduced by the earned value or ACWP in week 84, namely Rp 430,468,153,872.99 and the CPI in week 84 is 0.97, then the description in week 84 is as follows:

$$\begin{aligned} \text{ETC} &= ((\text{BAC}-\text{BCWP}))/\text{CPI} \\ \text{ETC} &= ((\text{Rp}638.553.623.000-\text{Rp } 40.468.153.872.99))/0.932 \\ \text{ETC} &= \text{Rp Rp } 223.215.242.494,97 \end{aligned}$$

**Estimated Time and Cost for Project Completion**

The calculation of time and cost at the end of the project is carried out to determine the time and cost of the entire work implementation obtained using the Estimate All Schedule (EAS) and Estimate at Completion (EAC) analysis.

1. Estimate All Schedule (EAS)

EAS is calculated by summing the time already run (reporting time) with the estimated time required to complete the remaining work (ETS). Schedule review is done every week. In this case, in week 84, the Estimate Temporary Schedule (ETS) value is 39.30, so the calculation as below is used

$$\begin{aligned} \text{EAS} &= \text{finish time}+\text{ETS} \\ \text{EAS} &= 84 + 39.30 \\ \text{EAS} &= 123.30 \text{ Weeks} \approx 124 \text{ Weeks} \end{aligned}$$

2. Estimate at Completion (EAC)

It is known that the contract value of this project is Rp 638,553,623,000.00 and the ACWP value at week 84 is Rp 461.767.242.836,51, the BCWP value at week 84 is Rp 430.468.153.872,99, and the CPI value at week 84 is 0.932. So to calculate the EAC value in week 84 using the following formula.

$$\begin{aligned} \text{EAC} &= \text{ACWP}+(\text{BAC}-\text{BCWP})/\text{CPI} \\ \text{EAC} &= \text{Rp}461.767.242.836,51 + (\text{Rp} \\ & 638.553.623.000,00-\text{Rp } 430.468.153.872,99)/0,932 \\ \text{EAC} &= \text{Rp } 684.982.485.331,48 \end{aligned}$$

**Estimated Time and Cost Variances at the End of the Project**

This time and cost estimate is used to determine the difference in time and cost of completion at the end of the project obtained from Variance at Completion (VAC) and Variance All Schedule (VAS). The calculation of VAC and VAS can be described as follows:

1. Variance All Schedule (VAS)

VAS at week 84, it is necessary to know that the duration of this project lasts 113 weeks and the Estimate All Schedule (EAS) value at week 84 is 123.3. So to calculate the VAS value using the formula below.

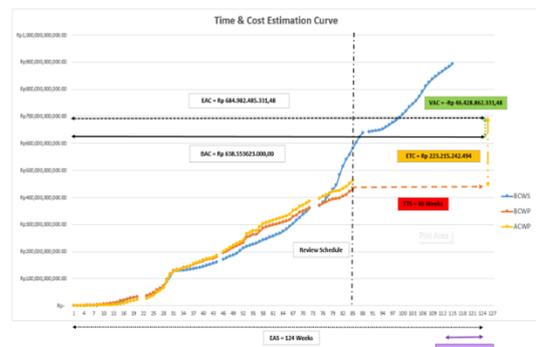
$$\begin{aligned} \text{VAS} &= \text{planning duration}-\text{EAS} \\ \text{VAS} &= 113 \text{ Weeks}-123.3 \\ \text{VAS} &= -10.3 \text{ Weeks} \approx -11 \text{ Weeks} \end{aligned}$$

2. Variance At Completion (VAC)

VAC is a cost variance that shows the difference between the project cost budget (BAC) and the estimated final project cost (EAC). To find out the VAC value at week 84, it is necessary to know the contract value of this project is Rp 638.553.623.000,00 and the EAC value at week 84 is Rp 684.982.485.331,48. The details of the work are in the formula below:

$$\begin{aligned} \text{VAC} &= \text{BAC}-\text{EAC} \\ \text{VAC} &= \text{Rp } 638.553.623.000,00- \text{Rp} \\ & 684.982.485.331,48 \\ \text{VAC} &= -\text{Rp } 46.428.862.331,48 \end{aligned}$$

Based on the results of the calculation of the Variance At Completion (VAC) value at week 84, an amount of -Rp 46.428.862.331,48 is obtained, which means that this project is experiencing cost overruns (overbudget).



**Figure 5.** Curve of Cost and Time Estimates

Sources: Data Calculation

Based on the Graph and calculations in week 84 of the project, the estimated time required for the Estimate Temporary Schedule (ETS) is 39,30 weeks or it means 40 weeks, bringing the total Estimate All Schedule (EAS) to 123,30 weeks or it means 124 weeks, indicating a delay in completion compared to the initial schedule. From a cost perspective, the cost estimate for the Estimate To Complete (ETC) is IDR 223.215.242.494, resulting in a total Estimate At Completion (EAC) of IDR 684.982.485.331,48. The Variance All Schedule (VAS) of minus 10.30 weeks indicates a schedule delay of approximately 11 weeks, while

the Variance At Completion (VAC) of minus IDR 46.428.862.331,48 shows a cost overrun of IDR 46,42 billion from the starting budget.

#### Efficiency Project Based On Direct Cost

The direct costs to be discussed this time are related to the costs of materials and supplies incurred by the project, as well as the wages of workers for each item of work performed. The following are the details of the work resulting from the.

The results of the above calculations related to direct costs in week 84 show a total of Rp 43,354,172,602 for the entire project in the RAB (results with owner). 28 and the RAP (analysis) shows a value of Rp 35,187,143,453.71, meaning that the value of the analysis of material and supply requirements in week 84 is lower than the project RAB. To determine the difference between the two calculations, the following calculation is used:

Variation= RAB-RAP

Variation= Rp 43.354.172.602,28- Rp 35.187.143.453,71

Variation= Rp 8.167.029.148,57

The difference in calculations obtained in week 84 is Rp 8,167,029,148.57. This result can be used to accelerate work in the following week or can be used as a saving value or project benefit for other needs. This calculation will cause the ACWP value to decrease due to cost savings from week 84, although it remains a loss, it is not excessive. direct costs.

The strategic changes that can be made to the project based on the analysis shown in the table above are as follows:

1. From the beginning, work that was categorized as daily work was changed to a lump sum system (with lower costs) based on the evaluation of previous work. This was done in order to save or reduce direct costs (ACWP) in week 84.
2. Looking for alternative materials used in project implementation that are more affordable, such as purchasing from other distributors or directly from a factory related to the materials to be used without compromising specifications.

#### Efficiency Projection Based on Indirect Cost

Efficiency in indirect costs is also included in the calculation to reduce the actual costs incurred in the project (ACWP). In other words, the project can save expenses, especially in week 84, to be used in the following week. In this context, indirect costs include the monthly salaries or wages of office and field staff of PT. working in the Project X. Other costs include office rental fees and monthly utility bills (water and electricity) paid until the project is completed.

1. Calculate of Salary Staff and Employeess

The following is an attachment of salary or income reports that must be issued for each staff member or employee of PT. working in the Project X. It is known that the project duration is 26 months or 113 weeks, the total staff salary costs are Rp 494,867,000.00, and the contract value (BAC) is Rp 638,553,623,000.00, then:

Total spending cost=26 month x Rp 494.867.000.00  
Total spending cost= Rp 12.866.542.000,00

or

Total spending cost= Rp 12.866.542.000,00 ÷ Rp 638.553.623.000,00

Total spending cost= 2,01%

So, the costs that must be incurred by the project to pay salaries or wages until the completion of the project each month are Rp 12.866.542.000,00 or 2.01% of the contract value (BAC) that was set at the beginning. Of course, the above method can reduce or minimize the costs incurred in paying staff salaries each month.

2. Temporary Office Rents Costs

From the above data calculations, the total rental price is Rp134.517.600,00 per month with two concrete roof units per zone.

3. Water and Electrical Works

Based on the data calculations, the monthly expenses for electricity and water are Rp 6.933.393,75, and the annual amount to be paid is Rp 83.200.700,00.

## 4. CONCLUSION AND RECOMMENDATION

### CONCLUSION

Based on the results of research and analysis conducted using the Earned Value Analysis method in the Project X, the following conclusions were summarized from the related discussion:

1. The results of the cumulative BCWS calculation in week 84 gave a value of IDR 583.363.433.364,11 , then the cumulative BCWP value in week 84 is IDR 430.468.153.872,99 , and the cumulative ACWP value in week 84 is IDR 461.767.242.836,51. These values were obtained from project reports and evaluated using the Earned Value Analysis (EVA) method.
2. For the Project Performance Index related to time and cost, mainly in the calculation of the Schedule Performance Index (SPI) conducted in week 84, gave a result of 0.738, which is less than one (<1). Then for the Cost Performance Index (CPI) calculation in week 84, the value was 0.932, which is also less than one (<1). From these results, it can be concluded that there is a

delay in physical progress and a relatively small cost overrun in the project implementation. This can be seen in the Schedule Variance (SV) calculation, which is minus IDR 152.895.279.491,12. This value indicates that the work has not been completed on time according to the schedule, or in other words, the project will experience a physical progress delay of 152,9 billion in the completion of week 84. Additionally, the Cost Variance (CV) is minus IDR 31.299.088.963,52. This indicates that the project experienced a cost overrun of 31,3 billion in week 84 compared to the budget allocated for the completed work.

3. Based on the analysis and calculations in week 84 of the project, the estimated time required for the Estimate Temporary Schedule (ETS) is 39,30 weeks or it means 40 weeks, bringing the total Estimate All Schedule (EAS) to 123,30 weeks or it means 124 weeks, indicating a delay in completion compared to the initial schedule. From a cost perspective, the cost estimate for the Estimate To Complete (ETC) is IDR 223.215.242.494, resulting in a total Estimate At Completion (EAC) of IDR 684.982.485.331,48. The Variance All Schedule (VAS) of minus 10.30 weeks indicates a schedule delay of approximately 11 weeks, while the Variance At Completion (VAC) of minus IDR 46.428.862.331,48 shows a cost overrun of IDR 46,43 billion from the starting budget.
4. The results of the recommendations obtained from applying the Earned Value Analysis method to the performance of the UIN -Malang Campus 3 project are to reanalyze the calculations between the RAB (result with owner) and RAP (analysis result) for each task to be completed in week 84, with total direct costs included in the Actual Cost or ACWP. The difference between the two calculations is IDR 8.167.029.148,57. This value can be used to accelerate work in the following week or as a saving value or project benefit for other needs. Additionally, the analysis of indirect costs shows that the total monthly salary for staff

members amounts to IDR 494.867.000,00, which the project must pay to the staff members working on the project. The cost for office rent that must be paid is IDR 134.517.600,00 per month with a concrete roof for 2 units per zone. Finally, the monthly expenses for electricity and water usage amount to IDR 6.933.393,75. This calculation results in a decrease in the ACWP value due to cost savings in week 84, although the project remains unprofitable, it is not excessively so.

### RECOMMENDATION

Based on the results of research and analysis conducted using the Earned Value Analysis method in the Project X, the following recommendations were summarized from the related conditions above, there is:

1. Prioritize evaluations focused on improving time and cost control, especially during the final phase of the project, to prevent delays and cost overruns from escalating. This can be achieved through regular monitoring and swift responses to any deviations that arise, ensuring the project remains under control until completion.
2. Implementing changes to the project's strategy or execution methods, shifting from a labor-intensive approach or daily labor categories to a lump-sum system. This change is expected to reduce project expenses as a result of evaluating previous work.
3. Other actions related to changes in strategy or implementation methods include seeking alternative materials for project execution that are more cost-effective, such as purchasing from other distributors or directly from manufacturers related to the materials to be used, without compromising specifications.
4. Regular reviews of the progress of implementation are needed in order to adjust to the initial plan until the end of the project so that project performance can be maximized.

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