COST PERFORMANCE EVALUATION OF THE IMPROVEMENT OF THE WIROSARI - KARANGASEM ROAD SECTION, WIROSARI DISTRICT USING EARNED VALUE METHOD

Arie Kris Irawan[1*], Putri Anggi Permata [2], Agung Kristiawan [3]

Faculty of Engineering and Informatics, Universitas PGRI Semarang, Jl. Sidodadi-Timur No.24 Semarang, Central Java 50232, Indonesia

*arie_kris_irawan@upgris.ac.id

Abstract. In construction projects that occur in Indonesia, implementation often experiences delays and cost losses where the realization in the field does not match the planned schedule and planned budget due to several factors that occur, even though a thorough cost plan has been prepared, in practice in the field there are still many problems that arise problems in implementation. So the Earned Value Concept or EVM (Earned Value Method) method is used to overcome this problem to determine the implementation cost performance during the project and the indicators used for analysis include: BCWP (Budget Cost of Work Performance), BCWS (Budget Cost of Work Schedule), ACWP (Actual Cost of Work Performance), SV (Schedule Variance), CV (Cost Variance), SPI (Schedule Performance Index), CPI (Cost Performance Index), ETS (Estimated Temporary Schedule), and EAS (Estimated All Schedule). This research aims to evaluate the cost performance of the Wirosari - Karangasem Subdistrict road section improvement project. Wirosari uses the Earned Value Concept method. This method is used to measure project performance by comparing the value of the results achieved (Earned Value) with the planned value (Planned Value) and target value (Budgeted Cost of Work Performed) from week 1 to week 16 using the Concept Earned Value or EVM (Earned Value Method). From the results of this research, the performance of project implementation costs or calculations is knownCost Performance Index (CPI) Whichcut offweek 16 of 34 weeks in the period 6 to 12 May 2024 was 1.156 and there was no CPI value < 1 with Cost Variation (CV) week 16 amounting to IDR 589,440,708.64, so that if the project implementation performance in the weekly reporting remains the same until the project is completed, the estimated costs required to complete the remaining project work orEstimate To Complete (ETC) amounting to IDR 1,294,766,228.89 so that the total estimated project costs required to complete the project work orEstimate At Completion (EAC) is IDR 5,075,881,759.65 and the estimated profit obtained from the project or Variance At Completion (VAC) is IDR 791,424,240.35

Keywords : Earned Value Method, Outcome Value Concept, Cost

1. Introduction

A project is identified as an effort within a specified time period and cost with clear targets, namely achieving planned results, at the beginning of the project construction will begin. We make various

efforts to achieve the planned goals, including structural calculations, effective and economical cost estimation calculations (Cost Budget Plan), and managerial implementation both time managerial and cost managerial. We must carry out all of this to ensure that the plans we have made are achieved.

As for Limitation Problem on preparation of the journal "Evaluation of Cost Performance in Improving the Wirosari - Karangasem Road Section, Wirosari District, Grobogan Regency Using the Value of Results Concept Method (*Earned Value Concept*)" namely: (a) The Object of Study is the Wirosari – Karangasem Road Section Improvement Project, Wirosari District, Grobogan Regency, (b) The research time is 112 calendar days from Week 1 to Week 16 (Period 22 January 2024 to 12 May 2024), and (c) The aspects that will be controlled are project costs.

As for Benefits Study on preparation of the journal "Evaluation of Cost Performance in Improving the Wirosari - Karangasem Road Section, Using the Value of Results Concept Method (*Earned Value Concept*)" namely: (a) To be used as a reference in controlling project implementation, (b) As information material for related parties to take policies regarding the Wirosari - Karangasem Road Section Improvement Project, Wirosari District, Grobogan Regency, and (c) To apply the best method to control implementation time in the next project.

2. Methods

2.1. Research Design

Research design is a research design that is used as a guide in carrying out the research process. The research design aims to provide clear and structured guidance to researchers in conducting their research. There are several main characteristics of a good research design, namely (a) neutrality, (b) reliability, (c) validity, and (d) generalization. The (Differences in Qualitative Research with Quantitative Research) can be seen in (Table 1).

The method used in this research is quantitative descriptive. Namely research that describes certain project conditions with analysis of existing data. For data analysis using methods analysis and descriptive. Analysis means that existing data is processed in such a way as to produce final results that can be concluded. Meanwhile, descriptive means describing problems that already exist or are visible. Result Value Concept (*Earned Value Analysis*) examines trends in schedule variances and cost variances over a period of time while the project is underway.

2.2. Research Sites

Determining the research location is stage Which very important in study. Research locations are useful for making it easier for researchers to carry out research. This research was carried out on the Wirosari-Karangasem Road Section Improvement Project, Wirosari District, Grobogan Regency, Central Java.

2.3. Research Objects and Research Time

The research object of this Cost Performance of Improving the Wirosari - Karangasem Road Section, Wirosari District, Grobogan Regency Using the Results Value Concept Method (*Earned Value Concept*) for 112 calendar days from Week 1 to Week 16 (Period 22 January 2024 to 12 May 2024.

2.4. Research Purposes

The aim of preparing the final assignment "Evaluation of Cost and Cost Performance Improvement of the Wirosari Road Section data. Karangasem, Wirosari District, Regency Grobogan Uses the Results Value Concept Method (*Earned Value Concept*)" namely (a) To find out how much the cost of project implementation is by using the Results Value Concept Method (*Earned Value Concept),* and (b) To determine the effectiveness of the implementation of the Wirosari - Karangasem Road Section Improvement Project, Wirosari District, Grobogan Regency in terms of cost.

2.5. Data collection

Project Planning Data is used as a reference during the control process, namely control for all management functions. In this case, control is with a progress monitoring system and evaluating project

results due to deviations in terms of time, costs and resources. These data were obtained from the field, namely project budget plan data, unit price data and implementation schedule.

Project implementation data is used as a reference during the control process, namely controlling all management functions. In this case, control with a progress monitoring system progress and evaluate project results due to deviations in terms of time, cost and quality of work/project, namely Weekly and Monthly Report Data and Project Image Data (*Soft Drawing).*

2.6. Determine the variables / aspects to be evaluated

The variables / aspects contained in the MethodEarned Valuein this research is the cost, namely control of the costs that have been determined before the implementation of the work to improve the Wirosari - Karangasem Road Section, Wirosari District, Grobogan Regency, regarding the implementation costs, both On Budget, Smaller or Bigger from the budget provided.

Table 1. Differences in Qualitative Research with Quantitative Research

Reference	Variables	Method
[1]	Emphasize on theory development and hypothesis	Emphasize on application of theories and
[2]	Performing analysis includes summarizing,	Analyze data requires use mathematics and
[3]	Most of the information is expressed in text	Form of expression most common with
[4]	Answers are only required from a small group of	There must be many participants
[5]	Explore under-researched problems and propose	Evaluate performance care and programs

2.7. Research Flow Chart / Research Flow Chart

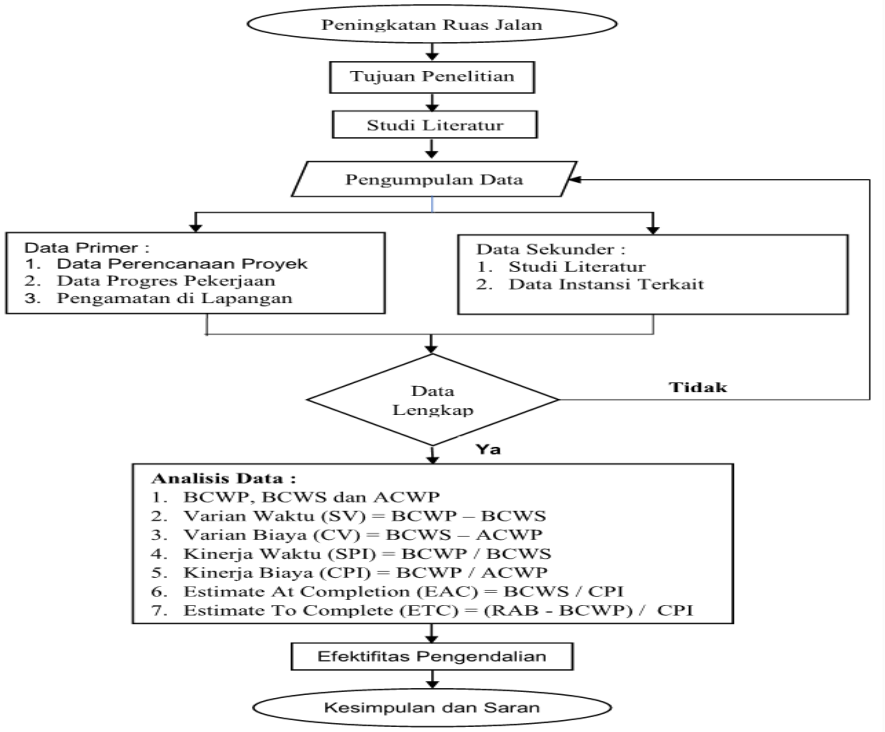

Figure 1. Research Stages Flow Chart

2.8. Data Processing with Methods Earned Value

In accordance with the problem formulation in the research, namely to determine the effectiveness of control using the method *Earned Value*namely by identifying the implementation time from the results of reports recorded from the field with the implementation realization plan.

The completion steps or formula of the method *Earned Value*are as follows (a) Determine indicators of BCWS, BCWP, and ACWP values, (b) Calculating the Cost Performance Index (CPI), (c) Calculate Estimated costs to complete remaining activities (ETC), and (d) Calculating Total Total Costs (EAC).

3. Results and Discussion

3.1. Research Result

(Research Location Map) sites "Evaluation of the Cost and Cost Performance of Improving the Wirosari-Karangasem Road Section, Wirosari District, Grobogan Regency" can be seen in (Figure 2). In identify time Implementation means analyzing reporting data on the implementation of activities at a certain time and comparing them with what has been pla

Figure 2. Research Location Map

3.2. Calculation of Activity Weights Using the S Curve Method

In count something activity work using the S Curve Method first (Calculates The Activity Weight) to find the project presentation which is used to determine the progress of the project, to calculate the activity weight the formula below is used (Table 2).

3.3. Calculating BCWS Value

From Table 2. Execution Time Control, obtained BCWS Percentage Value (plan) on the entire work each week.

Week 1 Plan Percentage = 0,058 %
Week 2 Plan Percentage = 0,058 %
Cumulative BCWS Value up to Week 2 = Week 1 Plan + Week 2 Plan
= 0,058 + 0,058 = 0,116 % .....(etc)

3.4. Calculating BCWP Value

From Table 2. Execution Time Control, obtained BCWS Percentage Value (plan) on the entire work each week.

% of Realization Week 1 = 0,311 %
% of Realization Week 2 = 0,064 %
Cumulative BCWP Value up to Week 2 = Week 1 Realization+Week 2 Realization
= 0,311 + 0,064 = 0,375 % .....(etc)

3.5. Analysis Discussion Earned Value

The results of the data analysis calculations that have been obtained using the Earned Value Method are as follows :

Contract Value+11% VAT : 5.867.306.000,00
Status Date : 12 Mei 2024 / M16
Precentage (%) Complete Week 16
Period : Week 1 (22 to 28 January 2024)
Work : Preparatory Work and SMKK
Duration : 1 Week (7 days)
Budget : Rp 3.403.037,48 .... (etc

3.6. Calculation of Job Percentage Deviation

Deviation is the difference between the plan and existing progress. Work Percentage Deviation is the difference between the percentage of work realization and the percentage of work plan. From the field data, the following data was obtained. (Calculation of Percentage Deviation Work) can see (Table 3).

Table 2. Calculates The Activity Weight

No.	Uraian Pekerjaan	Nilai Kontrak	Bobot
	Mata Pembayaran Pekerjaan Umum		
	Divisi 1. Umum		
1.	Mobilisasi	8.000.000,00	0,151
2.	Manajemen Keselamatan Lalu lintas	1.500.000,00	0,028
3.	Manajemen Mutu	3.000.000,00	0,057
	Divisi 2. Sistem Manajemen Keselamatan Konstruksi (SMKK)		
1.	Sistem Manajemen Keselamatan Konstruksi (SMKK)	9.032.500,00	0,171
	Mata Pembayaran Pekerjaan Utama		
	Divisi 3. Pekerjaan Tanah dan Geosintetik		
1.	Galian Perkerasan Berbutir	39.783.885,76	0,753
2.	Timbunan Pilihan dari Sumber Galian	333.380.432,34	6,307
	Divisi 5. Perkerasan Berbutir dan Perkerasan Beton Semen		
1.	Lapis Pondasi Agregat Kelas A	689.266.252,13	13,040
2.	Perkerasan Beton Semen dengan Anyaman Tulangan Tunggal	2.278.040.411,93	43,097
3.	Lapis Pondasi Bawah Beton Kurus	864.103.752,13	16,347
	Divisi 7. Struktur		
1.	Beton mutu rendah fc'= 15 MPa	384.511.374,29	7,274
2.	Pekerjaan Pembongkaran Beton	14.867.092,16	0,281
	Mata Pembayaran Pekerjaan Lainnya		
	Divisi 3. Pekerjaan Tanah dan Geosintetik		
1.	Galian Biasa	3.277.295,28	0,062
	Divisi 6. Pekerjaan Perkerasan Aspal		
1.	Lapis Resap Pengikat - Aspal Cair/Emulsi	3.715.503,21	0,070
2.	Laston Lapis Aus (AC-WC)	142.446.206,21	2,695
	Divisi 7. Struktur		
1.	Pekerjaan Box Cuilvert 150 x 150 P : 8 m	63.632.001,58	1,204
2.	Pasangan Batu Putih	59.634.222,02	1,128
3.	Beton mutu sedang fc'= 20 Mpa	6.883.322,65	0,130
4.	Baja Tulangan Polos BjTP 280	76.817.016,76	1,453
5.	Pekerjaan Plesteran	5.270.491,99	0,100
6.	Pekerjaan Acian	4.135.088,76	0,078
	Divisi 9. Pekerjaan Harian & Pekerjaan Lain-Lain		
1.	Marka Jalan Thermoplastik	81.942.905,34	1,550
	Divisi 10. Pekerjaan Pemeliharaan Kinerja		
1.	Galian pada Saluran Air atau Lereng untuk Pemeliharaan	16.894.354,29	0,320
2.	Timbunan Pilihan pada Lereng Tepi Saluran untuk Pemeliharaan	10.196.333,01	0,193
3.	Perbaikan Campuran Aspal Panas	152.100.562,71	2,877
4.	Pengendalian Tanaman	33.430.375,01	0,632
	Jumlah	**5.285.861.379,53**	**100,000**

Table 3. Calculation of Percentage Deviation Work

Minggu	Waktu Pelaksanaan (Periode)	Rencana		Realisasi		Deviasi
		Minggu	Kom	Minggu	Kom	%
1.	22 s/d 28 Januari 2024	0,058	0,058	0,311	0,311	0,253
2.	29 s/d 4 Februari 2024	0,058	0,116	0,064	0,375	0,259
3.	5 s/d 11 Februari 2024	0,133	0,249	0,737	1,112	0,863
4.	12 s/d 18 Februari 2024	0,560	0,809	4,239	5,351	4,542
5.	19 s/d 25 Februari 2024	0,559	1,368	4,732	10,083	8,715
6.	26 s/d 3 Maret 2024	1,193	2,561	10,164	20,247	17,686
7.	4 s/d 10 Maret 2024	2,061	4,622	5,137	25,384	20,762
8.	11 s/d 17 Maret 2024	3,013	7,635	6,001	31,385	23,750
9.	18 s/d 24 Maret 2024	2,462	10,097	10,919	42,304	32,207
10.	25 s/d 31 Maret 2024	5,336	15,433	3,440	45,744	30,311
11.	1 s/d 7 April 2024	5,335	20,768	0,002	45,746	24,978
12.	8 s/d 14 April 2024	5,336	26,104	0,003	45,749	19,645
13.	15 s/d 21 April 2024	5,260	31,364	0,292	46,041	14,677
14.	22 s/d 28 April 2024	5,260	36,624	6,527	52,568	15,944
15.	29 s/d 5 Mei 2024	5,261	41,885	12,977	65,545	23,66
16.	6 s/d 12 Mei 2024	5,260	47,145	8,945	74,49	27,345

M1 Plan Work : 0,058 %
M1 Realization Work : 0,311 %
% Deviation M1 : % Actual M1-% Plan M1
: 0,311 – 0,058
: 0,253 % .....(etc)

3.7. Calculation Budgeted Cost of Work Schedule (BCWS)

BCWS for Week 1 is obtained from the planned cumulative work percentage in week 1 (from Table 2 Calculation of Work Percentage Deviation) multiplied by the Contract Value plus Tax, so that (Calculation Budgeted Cost of Work Schedule) can see (Table 4) :

Cumulative Work Plan M1 = 0,058 %
Contract Value + 11% VAT = BAC
BAC = Rp 5.867.306.000,00
BCWS (M1) = % Comm Plan M1 x BAC
= 0,058 % x 5.867.306.000,00 = Rp 3.403.037,48 .....(etc)

3.8. Calculation Budgeted Cost of Work Performed (BCWP)\

BCWP for Week 1 is obtained from the cumulative percentage of work realized in week 1 (from Table 4.1. Implementation Time Control) multiplied by the Contract Value plus Tax, so that (Calculation Budgeted Cost of Work Performed) can see (Table 5).

Cumulative Real M1 : 0,311 %
BAC : Rp 5.867.306.000,00
BCWP (M1) : % Real Comm M1 x BAC
: 0,311 x 5.867.306.000,00 : Rp 18.247.321,66.....(etc)

3.9. Actual Cost of Wor Performed (ACWP)

Actual costs (Actual Cost = AC) or commonly calledActual Cost of Work Performed (ACWP) is the actual cost of the job that have been implemented in a certain reporting period. These costs are obtained from data ± accounting or project financial data at the reporting date. So ACWP is the actual amount of expenditure or funds used to carry out work in a certain period of time can see (Table 6)

3.10. Calculation Cost Variation (CV)

Cost Variance (CV) is the difference between the estimated project costs at the planning stage and the actual costs incurred, or in other words Cost Variance (CV) is the deviation of costs incurred for carrying out work against real performance in cost units can see (Table 7).

From the data calculations for Week 1, we get :

BCWP (M1) = Rp 18.247.321,66
ACWP (M1) = Rp 16.42.2589,49
CV (M1) = BCWP (M1) - ACWP (M1)
= 18.247.321,66-16.42.2589,49
= Rp 1.824.732,17 .....(etc

3.11. Calculation Cost Performance Index (CPI)

Cost Performance Index (CPI) is a financial metric that measures the cost efficiency and financial effectiveness of a project so that the CPI is an index of productivity and time performance used to determine cost efficiency of resource use can see (Table 8).

BCWP (M1) = Rp 18.247.321,66
ACWP (M1) = Rp 16.42.2589,49
CPI (M1) = BCWP (M1) / ACWP (M1)
= 18.247.321,66:16.42.2589,49
= 1,111 .....(etc)

Table 4. Calculation *Budgeted Cost of Work Schedule* (BCWS)

Minggu	Rencana	BAC (Rp)	BCWS Minggu (Rp)	BCWS Komulatif
1.	0.058	5.867.306.000.00	3.403.037.48	3.403.037.48
2.	0.058	5.867.306.000.00	3.403.037.48	6.806.074.96
3.	0.133	5.867.306.000.00	7.803.516.98	14.609.591.94
4.	0.560	5.867.306.000.00	32.856.913.60	47.466.505.54
5.	0.559	5.867.306.000.00	32.798.240.54	80.264.746.08
6.	1.193	5.867.306.000.00	69.996.960.58	150.261.706.66
7.	2.061	5.867.306.000.00	120.925.176.66	271.186.883.32
8.	3.013	5.867.306.000.00	176.781.929.78	447.968.813.10
9.	2.462	5.867.306.000.00	144.453.073.72	592.421.886.82
10.	5.336	5.867.306.000.00	313.079.448.16	905.501.334.98
11.	5.335	5.867.306.000.00	313.020.775.10	1.218.522.110.08
12.	5.336	5.867.306.000.00	313.079.448.16	1.531.601.558.24
13.	5.260	5.867.306.000.00	308.620.295.60	1.840.221.853.84
14.	5.260	5.867.306.000.00	308.620.295.60	2.148.842.149.44
15.	5.261	5.867.306.000.00	308.678.968.66	2.457.521.118.10
16.	**5.260**	**5.867.306.000.00**	**308.620.295.60**	**2.766.141.413.70**
17.	5.745	5.867.306.000.00	337.076.729.70	3.103.218.143.40
18.	5.745	5.867.306.000.00	337.076.729.70	3.440.294.873.10
19.	5.325	5.867.306.000.00	312.434.044.50	3.752.728.917.60
20.	5.325	5.867.306.000.00	312.434.044.50	4.065.162.962.10
21.	5.325	5.867.306.000.00	312.434.044.50	4.377.597.006.60
22.	4.455	5.867.306.000.00	261.388.482.30	4.638.985.488.90
23.	4.455	5.867.306.000.00	261.388.482.30	4.900.373.971.20
24.	3.365	5.867.306.000.00	197.434.846.90	5.097.808.818.10
25.	2.070	5.867.306.000.00	121.453.234.20	5.219.262.052.30
26.	2.070	5.867.306.000.00	121.453.234.20	5.340.715.286.50
27.	2.070	5.867.306.000.00	121.453.234.20	5.462.168.520.70
28.	1.870	5.867.306.000.00	109.718.622.20	5.571.887.142.90
29.	1.840	5.867.306.000.00	107.958.430.40	5.679.845.573.30
30.	1.617	5.867.306.000.00	94.874.338.02	5.774.719.911.32
31.	1.490	5.867.306.000.00	87.422.859.40	5.862.142.770.72
32.	0.072	5.867.306.000.00	4.224.460.32	5.866.367.231.04
33.	0.008	5.867.306.000.00	469.384.48	5.866.836.615.52
34.	0.006	5.867.306.000.00	469.384.48	5.867.306.000.00

Table 5. Calculation *Budgeted Cost of Work Performed* (BCWP)

Minggu	Realisasi	BAC (Rp)	BCWP Minggu (Rp)	BCWP Komulatif
1.	0.311	5.867.306.000.00	18.247.321.66	18.247.321.66
2.	0.064	5.867.306.000.00	3.755.075.84	22.002.397.50
3.	0.737	5.867.306.000.00	43.242.045.22	65.244.442.72
4.	4.239	5.867.306.000.00	248.715.101.34	313.959.544.06
5.	4.732	5.867.306.000.00	277.640.919.92	591.600.463.98
6.	10.164	5.867.306.000.00	596.352.981.84	1.187.953.445.82
7.	5.137	5.867.306.000.00	301.403.509.22	1.489.356.955.04
8.	6.001	5.867.306.000.00	352.097.033.06	1.841.453.988.10
9.	10.919	5.867.306.000.00	640.651.142.14	2.482.105.130.24
10.	3.440	5.867.306.000.00	201.835.326.40	2.683.940.456.64
11.	0.002	5.867.306.000.00	117.346.12	2.684.057.802.76
12.	0.003	5.867.306.000.00	176.019.18	2.684.233.821.94
13.	0.292	5.867.306.000.00	17.132.533.52	2.701.366.355.46
14.	6.527	5.867.306.000.00	382.959.062.62	3.084.325.418.08
15.	12.977	5.867.306.000.00	761.400.299.62	3.845.725.717.70
16.	8.945	5.867.306.000.00	524.830.521.70	4.370.556.239.40

Table 6. Data *Actual Cost of Wor Performed* (ACWP)

Minggu	Periode	ACWP Minggu	ACWP Komulatif
1.	22 s/d 28 Januari 2024	16.422.589.49	16.422.589.49
2.	29 s/d 4 Februari 2024	3.379.568.26	19.802.157.75
3.	5 s/d 11 Februari 2024	37.620.579.34	57.422.737.09
4.	12 s/d 18 Februari 2024	211.407.836.14	268.830.573.23
5.	19 s/d 25 Februari 2024	244.324.009.53	513.154.582.76
6.	26 s/d 3 Maret 2024	530.754.153.84	1.043.908.736.60
7.	4 s/d 10 Maret 2024	247.150.877.56	1.291.059.614.16
8.	11 s/d 17 Maret 2024	306.324.418.76	1.597.384.032.92
9.	18 s/d 24 Maret 2024	550.959.982.24	2.148.344.015.16
10.	25 s/d 31 Maret 2024	171.560.027.44	2.319.904.042.60
11.	1 s/d 7 April 2024	105.611.51	2.320.009.654.11
12.	8 s/d 14 April 2024	158.417.26	2.320.168.071.37
13.	15 s/d 21 April 2024	15.419.280.17	2.335.587.351.54
14.	22 s/d 28 April 2024	337.003.975.11	2.672.591.326.64
15.	29 s/d 5 Mei 2024	662.418.260.67	3.335.009.587.31
16.	6 s/d 12 Mei 2024	446.105.943.45	3.781.115.530.76

Table 7. Cost Varience (CV) Calculation

Minggu	BCWP (Rp)	ACWP (Rp)	CV Mingguan (Rp)	CV Komulatif (Rp)
1.	18.247.321,66	16.422.589,49	1.824.732,17	1.824.732,17
2.	3.755.075,84	3.379.568,26	375.507,58	2.200.239,75
3.	43.242.045,22	37.620.579,34	5.621.465,88	7.821.705,63
4.	248.715.101,34	211.407.836,14	37.307.265,20	45.128.970,83
5.	277.640.919,92	244.324.009,53	33.316.910,39	78.445.881,22
6.	596.352.981,84	530.754.153,84	65.598.828,00	144.044.709,22
7.	301.403.509,22	247.150.877,56	54.252.631,66	198.297.340,88
8.	352.097.033,06	306.324.418,76	45.772.614,30	244.069.955,18
9.	640.651.142,14	550.959.982,24	89.691.159,90	333.761.115,08
10.	201.835.326,40	171.560.027,44	30.275.298,96	364.036.414,04
11.	117.346,12	105.611,51	11.734,61	364.048.148,65
12.	176.019,18	158.417,26	17.601,92	364.065.750,57
13.	17.132.533,52	15.419.280,17	1.713.253,35	365.779.003,92
14.	382.959.062,62	337.003.975,11	45.955.087,51	411.734.091,44
15.	761.400.299,62	662.418.260,67	98.982.038,95	510.716.130,39
16.	524.830.521,70	446.105.943,45	78.724.578,25	589.440.708,64

Table 8. Calculation *Cost Performance Index* (CPI)

Minggu	Waktu Pelaksanaan	BCWP Komulatif	ACWP Komulatif	CPI
1.	22 s/d 28 Januari 2024	18.247.321,66	16.422.589,49	1,111
2.	29 s/d 4 Februari 2024	22.002.397,50	19.802.157,75	1,111
3.	5 s/d 11 Februari 2024	65.244.442,72	57.422.737,09	1,136
4.	12 s/d 18 Februari 2024	313.959.544,06	268.830.573,23	1,168
5.	19 s/d 25 Februari 2024	591.600.463,98	513.154.582,76	1,153
6.	26 s/d 3 Maret 2024	1.187.953.445,82	1.043.908.736,60	1,138
7.	4 s/d 10 Maret 2024	1.489.356.955,04	1.291.059.614,16	1,154
8.	11 s/d 17 Maret 2024	1.841.453.988,10	1.597.384.032,92	1,153
9.	18 s/d 24 Maret 2024	2.482.105.130,24	2.148.344.015,16	1,155
10.	25 s/d 31 Maret 2024	2.683.940.456,64	2.319.904.042,60	1,157
11.	1 s/d 7 April 2024	2.684.057.802,76	2.320.009.654,11	1,157
12.	8 s/d 14 April 2024	2.684.233.821,94	2.320.168.071,37	1,157
13.	15 s/d 21 April 2024	2.701.366.355,46	2.335.587.351,54	1,157
14.	22 s/d 28 April 2024	3.084.325.418,08	2.672.591.326,64	1,154
15.	29 s/d 5 Mei 2024	3.845.725.717,70	3.335.009.587,31	1,153
16.	6 s/d 12 Mei 2024	4.370.556.239,40	3.781.115.530,76	1,156

3.12. Calculation Estimate To Complete (ETC)

Estimate to Complete (ETC) is the estimated cost required to complete the remaining project work. ETC is an indicator for determining additional cost projections in completing work items on a project. From the data calculations for Week 1, we get can see Table (9).

Contract Value + VAT 11% = BAC = Rp 5.867.306.000,00
BCWP (M1) = Rp 18.247.321,66
CPI (M1) = 1,111

Table 9. Calculation *Estimate To Complete (ETC*)

Minggu	BAC	BCWP Komulatif	CPI	ETC
1.	5.867.306.000,00	18.247.321,66	1,111	5.264.679.278,43
2.	5.867.306.000,00	22.002.397,50	1,111	5.261.299.372,19
3.	5.867.306.000,00	65.244.442,72	1,136	5.107.448.553,94
4.	5.867.306.000,00	313.959.544,06	1,168	4.754.577.445,15
5.	5.867.306.000,00	591.600.463,98	1,153	4.575.633.595,85
6.	5.867.306.000,00	1.187.953.445,82	1,138	4.111.909.098,58
7.	5.867.306.000,00	1.489.356.955,04	1,154	3.793.716.676,74
8.	5.867.306.000,00	1.841.453.988,10	1,153	3.491.632.273,98
9.	5.867.306.000,00	2.482.105.130,24	1,155	2.930.909.843,95
10.	5.867.306.000,00	2.683.940.456,64	1,157	2.751.396.320,97
11.	5.867.306.000,00	2.684.057.802,76	1,157	2.751.294.898,22
12.	5.867.306.000,00	2.684.233.821,94	1,157	2.751.142.764,10
13.	5.867.306.000,00	2.701.366.355,46	1,157	2.736.335.042,82
14.	5.867.306.000,00	3.084.325.418,08	1,154	2.411.594.958,34
15.	5.867.306.000,00	3.845.725.717,70	1,153	1.753.322.014,14
16.	5.867.306.000,00	4.370.556.239,40	1,156	1.294.766.228,89

ETC (M1) = (BAC – BCWP) / CPI
= (5.867.306.000,00–18.247.321,66)/1,111
= Rp 5.264.679.278,43 .....(etc)

3.13. Calculation Estimate At Completion (EAC)

EAC is used to understand the impact of unexpected events on future project costs. Its implementation helps reduce losses and reallocate resources. So that Estimate At Completion(EAC) is a periodic evaluation of project status that shows an estimate of the total costs that will realistically be incurred at the time of project completion. From the data calculations for Week 1, we get can see Table (10).

ACWP (M1) = Rp 16.422.589,49
ETC (M1) = Rp 5.264.679.278,43
EAC (M1) = ACWP + ETC
= 16.422.589,49 + 5.264.679.278,43 = Rp 5.281.101.867,92 ..... (etc)

3.14. Calculation Variance At Completion (VAC)

VAC is a project management and analysis tool used to project the difference between initial and estimated budgets. VAC is a projected budget surplus or deficit. From the data calculations for Week 1, we get we get can see Table (11).

BAC = Rp 5.867.306.000,00
EAC (M1) = Rp 5.281.101.867,92
VAC (M1) = BAC – EAC (M1)
= 5.867.306.000,00 – 5.281.101.867,92
= Rp 586.204.132,07 .....(etc)

4. Conclusion

After doing Analysis And calculations, the author concludes several things related to the "Wirosari - Karangasem Road Section Improvement Project, Wirosari District Using the Earned Value Concept Method" as follows : (a) Project implementation cost performance or Calculation *Cost Performance Index (CPI*) Which*cut off*week 16 of 34 weeks in the period 6 to 12 May 2024 was 1.156 and there was no CPI value < 1 with*Cost Variation (CV)* week 16 amounting to IDR 589,440,708.64 and if the project implementation performance in the weekly reporting remains the same until the project is completed, the estimated costs required to complete remaining project work or*Estimate To Complete (ETC*) amounting to IDR 1,294,766,228.89 so that the total estimated project costs required to complete the project work or *Estimate At Completion (EAC*) is IDR 5,075,881,759.65 and the estimated profit obtained from the project or *Variance At Completion (VAC*) is IDR 791,424,240.35. and (b) Cost Performance Evaluation of the Improvement of the Wirosari - Karangasem Road Section, Wirosari

Table 10. Calculation *Estimate At Completion* (EAC)

Minggu	Periode	ACWP Komulatif	ETC	EAC
1.	22 s/d 28 Januari 2024	16.422.589,49	5.264.679.278,43	5.281.101.867,93
2.	29 s/d 4 Februari 2024	19.802.157,75	5.261.299.372,19	5.281.101.529,94
3.	5 s/d 11 Februari 2024	57.422.737,09	5.107.448.553,94	5.164.871.291,04
4.	12 s/d 18 Feb 2024	268.830.573,23	4.754.577.445,15	5.023.408.018,38
5.	19 s/d 25 Feb 2024	513.154.582,76	4.575.633.595,85	5.088.788.178,61
6.	26 s/d 3 Maret 2024	1.043.908.736,60	4.111.909.098,58	5.155.817.835,17
7.	4 s/d 10 Maret 2024	1.291.059.614,16	3.793.716.676,74	5.084.776.290,90
8.	11 s/d 17 Maret 2024	1.597.384.032,92	3.491.632.273,98	5.089.016.306,90
9.	18 s/d 24 Maret 2024	2.148.344.015,16	2.930.909.843,95	5.079.253.859,11
10.	25 s/d 31 Maret 2024	2.319.904.042,60	2.751.396.320,97	5.071.300.363,57
11.	1 s/d 7 April 2024	2.320.009.654,11	2.751.294.898,22	5.071.304.552,33
12.	8 s/d 14 April 2024	2.320.168.071,37	2.751.142.764,10	5.071.310.835,47
13.	15 s/d 21 April 2024	2.335.587.351,54	2.736.335.042,82	5.071.922.394,36
14.	22 s/d 28 April 2024	2.672.591.326,64	2.411.594.958,34	5.084.186.284,98
15.	29 s/d 5 Mei 2024	3.335.009.587,31	1.753.322.014,14	5.088.331.601,45
16.	6 s/d 12 Mei 2024	3.781.115.530,76	1.294.766.228,89	5.075.881.759,65

Table 11. Calculation *Variance At Completion* (VAC)

Minggu	Periode	BAC	EAC	VAC
1.	22 s/d 28 Januari 2024	5.867.306.000,00	5.281.101.867,93	586.204.132,07
2.	29 s/d 4 Februari 2024	5.867.306.000,00	5.281.101.529,94	586.204.470,06
3.	5 s/d 11 Februari 2024	5.867.306.000,00	5.164.871.291,04	702.434.708,96
4.	12 s/d 18 Februari 2024	5.867.306.000,00	5.023.408.018,38	843.897.981,62
5.	19 s/d 25 Februari 2024	5.867.306.000,00	5.088.788.178,61	778.517.821,39
6.	26 s/d 3 Maret 2024	5.867.306.000,00	5.155.817.835,17	711.488.164,83
7.	4 s/d 10 Maret 2024	5.867.306.000,00	5.084.776.290,90	782.529.709,10
8.	11 s/d 17 Maret 2024	5.867.306.000,00	5.089.016.306,90	778.289.693,10
9.	18 s/d 24 Maret 2024	5.867.306.000,00	5.079.253.859,11	788.052.140,89
10.	25 s/d 31 Maret 2024	5.867.306.000,00	5.071.300.363,57	796.005.636,43
11.	1 s/d 7 April 2024	5.867.306.000,00	5.071.304.552,33	796.001.447,67
12.	8 s/d 14 April 2024	5.867.306.000,00	5.071.310.835,47	795.995.164,53
13.	15 s/d 21 April 2024	5.867.306.000,00	5.071.922.394,36	795.383.605,64
14.	22 s/d 28 April 2024	5.867.306.000,00	5.084.186.284,98	783.119.715,02

Minggu	Periode	BAC	EAC	VAC
15.	29 s/d 5 Mei 2024	5.867.306.000,00	5.088.331.601,45	778.974.398,55
16.	6 s/d 12 Mei 2024	5.867.306.000,00	5.075.881.759,65	791.424.240,35

District Using the Earned Value Concept Method, for Value SV is Positive, then the costs used smaller rather than budget.

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