PROJECT MANAGEMENT INFORMATION SYSTEM AT CV. PUTRA PRATAMA

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ABSTRACT

CV. Putra Pratama is a company engaged in the development fields including construction, development of planning and implementation of the project tender. Currently the scheduling is done do not show the relationship between each of the activities in the project, plus the absence of network scheduling a project to identify the activities that are important that have a huge impact on the project schedule, the result of it all so it is difficult to know the impact of the delay suatau project activities the overall project schedule and Neglect of risks - risks that may negatively affect or interfere with the implementation of the project. Based on the existing problems, hence the need for a project management information system to assist in monitoring and controlling the execution of a project.

Based on the problems described above, it is to mitigate these problems need a method, among others in the planning of the project consists of two stages project scheduling methods Precedence Diagraming Method (PDM) and in analyzing the chances of the emergence of risks and their impact on project work using Probability Impact Matrix (PIM), and in project control using motode Erned Value Management (EVM) is used to facilitate the estimation of project costs and time.

This research resulted in the Management Information System project that can assist in scheduling the project knowing the impact caused by the delay of a project activity, help identify risks that may have a negative impact on project implementation and prepare treatment solutions and help in estimating the cost and time of execution of the project.

Keywords: Project Management Information System, Earned Value Management, Precedence Diagraming Method, Probability Impact Matrix,

1. INTRODUCTION

CV. Putra Pratama is a company engaged in the development fields including construction, development of planning and implementation of the project tender.

Based on the interview with Mr. Eki Isman Sobari as directors of the company CV. PUTRA PRATAMA, stating that the scheduling is done by the manager did not show the relationship between each of the activities in the project, plus the absence of network scheduling a project to identify the activities that are important that have a huge impact on the project schedule, the result of it all so it is difficult to know the impact by delays in a project activity against the overall project schedule. Ignored The risks that may negatively affect or interfere with the implementation of the project, such as delays materials needed, resulting in delays in project execution, materials that are not good or do not comply with the required lead times and additional costs to be incurred, contour-resistant or difficult path in the resulting predictions excavation process requires extra time. These risk factors above resulted in the project experienced delays where schedule workmanship not in accordance with the planned schedule before, the impact on expenditure of work experience delays exceed the weights predetermined, thus affecting the estimated cost and timing of the project, plus the cost control and time who performed traditional still is only comparing between actual costs and plan costs, this has led to employment status can not be known, the impact on the budget spent is not in accordance with that done. The project location is away from the office resulted in delayed reporting of progress by implementing the project, because the process of reporting the progress made in the central office.

Of these factors have a major impact for the company, which is where the company suffered financial losses. The addition of the overall project timeline will be liable to fines on each day of delay in execution or for resolution of the work stated in the project contract. In addition, the company name to no good in the eyes organizer of the project.

Based on the problems described above, it is to mitigate these problems required a project management information system based websites that can help directors and project managers in monitoring and controlling the execution of a project and assist implementers in the process of reporting the progress of work. The method used in the construction project management information system at CV. PUTRA PRATAMA is as follows. Precedence Diagraming Method (PDM) method is used to optimize project scheduling. PDM technique

used graphical representation by means of arrows diagram, boxes as well as the basic rules of logic dependence in the collating sequence of activities in a project [2]. Probability Impact Matrix (PIM) method to analyze the chances of the emergence of risks and their impact on project work, with PIM risk can be analyzed how much risk may impact a job by weighting the risks that arise [1], and Erned Value Management (EVM) method to facilitate the control of the project cost estimates and time, this method can provide information about the position of project progress and can estimate the progress of the project in the next period in both time and cost [3]. Hopefully with this system is expected that each project undertaken by CV. PUTRA PRATAMA can be completed on time.

2. THE CONTENT OF RESEARCH

2.1 Analysis Project Planning

Analysis contains time management project planning and risk management. In this respect to risk management undertaken is divided into two stages: Risk Identification and Risk Analysis. For the identification of risk by means of interviews to the company, then for risk analysis using Probability Impact Matrix (PIM). As for time management method Predence Diagramming Method (PDM).

2.1.1 Project Time Management

Time management is the management activities and the work necessary to complete the project within the order and a specific time frame, where each activity should be carried out so that the project is completed on time. Time management / scheduling project aims to optimize the project schedule by finding the critical path of a job using the Precedence Diagramming Method (PDM) [8].

2.1.1.1 Work activity

Table 1. Activities Project Work

Activity code	Job description
I.1	Pek. Pemb. Gudang bahan
I.2	Pek. Pengukuran
I.3	Pek.Pemb.Papan nama proyek
I.4	Pek. *Quality Control* awal
I.5	Pek. *Quality Control* akhir
I.6	Pek. As.Builtdrawing
II.1	Pek.Pembongkaran beton
II.2	Pek.Galian biasa (manual)
II.3	Pek. Lapis pondasi bawah (Batu belah) (Leveling + Pelebaran)
II.4	Pek.lapis pondasi agregat kelas C (Sirtu) (Leveling + Pelebaran)
II.5	Pek. Lantai kerja beton K-125
II.6	Pek. Baja Tulangan U24
II.7	Pek. Pekerasan jalan beton K.350
II.8	Pek. Perendaman
II.9	Pek. Lapis pondasi agregat kelas C
III.1	Pek. Lapis pondasi bawah (Batu Belah)
III.2	Pek. Lapis pondasi agregat kelas C (Sirtu)
III.3	Pek. Pemberesan

2.1.1.2 Determining Relationships Work

Relations between jobs can be determined by determining a previous relationship (predecessor), the relationship thereafter (successor). Relations between the work can be seen in Table 2.

Table 2. Relationship between Jobs

Sequence Event	Activity code	predecessor activity	duration
Pek. Pemb. Gudang bahan	I.1	-	7
Pek. Pengukuran	I.2		7
Pek.Pemb.Papan nama proyek	I.3		7
Pek. *Quality Control* awal	I.4	I.1,1.2,1,3	5
Pek.Pembongkaran beton	II.1	I.1,1.2,1,3	5
Pek.Galian biasa (manual)	II.2	I.1,1.2,1,3	7
Pek. Lapis pondasi bawah	II.3	II.2,II.1,I.2	6
Pek.lapis pondasi agregat kelas C	II.4	II.3	7
Pek. Lantai kerja beton K-125	II.5	II.4	14
Pek. Baja Tulangan U24	II.6	II.5,II.4	21
Pek. Pekerasan jalan beton K.350	II.7	II.6	28
Pek. Perendaman	II.8	II.7	56
Pek. Lapis pondasi agregat kelas C	II.9	II.8,II.7	14
Pek. Lapis pondasi bawah	III.I	II.8	6
Pek. Lapis pondasi agregat kelas C	III.2	III.1	7
Pek. Quality Control akhir	I.5	III.2,II.9	7
Pek. As.Builtdrawing	I.6	I.5	5

2.1.1.3 Analysis Calculation of Forward and Backward On PDM

Based on the relationship between the work that has been created, the next step is to calculate the total project completion time, advanced computation (fordward pass), countdown (backward pass).

1. Calculation of the forward direction (forward pass) on activities / Node to find the value of ES and EF.
   a. Work I.1
      ES = 0
      D = 7
      EF = (ES+ D) = 7
   b. Work I.2
      ES = 0
      D = 7
      EF = (ES+ D) = 7
2. Calculation backward direction (backward pass) on activities / Node to find the value of SL, LS and LF..
   Work 1.

SL = ESI.4 – EFI.1	LS = SLI.1 + ESI.1	LF = LSI.1 + DI.1
SL = 7 – 7	LS = 0 + 0	LF = 0 + 7
SL = 0	LS = 0	LF = 7

Calculation recapitulation Network can be seen in Table 3.

Table 3. Network

Code	Duration	ES	EF	SL	LS	LF
I.1	7	0	0	0	7	7
I.2	7	0	0	0	7	7
I.3	7	0	0	0	7	7
I.4	5	7	12	2	9	14
II.1	5	7	12	2	9	14
II.2	7	7	14	0	7	14
II.3	7	14	21	0	14	21
II.4	7	21	28	14	35	42
II.5	14	28	42	0	28	42
II.6	21	46	23	0	46	23
II.7	28	63	91	28	91	119
II.8	56	63	119	0	63	119
II.9	14	119	133	0	119	133
III.1	7	119	126	0	119	126
III.2	7	126	133	0	126	133
I.5	7	133	140	0	133	140
I.6	7	140	147	0	140	147
III.3	3	147	150	0	147	150

From the calculation of network project, which has obtained a job is a job slack I.4, II.1, II.4 and II.7. and obtained the critical path ie I.1, I.2, I.3, II.2, II.3, II.4, II.5, II.6, II.7, II.8, III.1, III , 2, I.5, I.6, III.3, which is where the jobs are in the critical path may not be too late.

2.1.1.3 Network

Based networks in Table 3, and then described in terms of jobs generated network diagram as Figure 1 below.

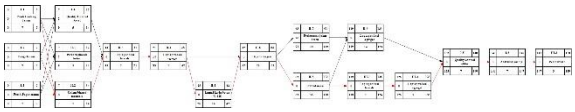


Figure 1. Network PDM

2.1.2 Project Risk Management

Here are some steps that are used in analyzing the possible risks that will occur as well as handling. The steps taken in the management of risk in this study are as follows.

2.1.2.1 Risk Identification

The risk management process begins with the identification of risks that aims to identify and make a list of possible risks. Risk identification process carried out by means of direct interviews with the project manager CV. PUTRA PRATAMA. Here are the results of risk identification can be seen in Table 4.

Table 4. Risk identification

Risk code	Risk
R1	Kondisi cuaca yang buruk
R2	Kondisi tanah yang tidak terduga
R3	Curah Hujan dilokasi proyek
R4	Kejadian yang tidak terduga
R5	Pengiriman peralatan dan material yang cukup lama
R6	Ketersediaan peralatan tidak memadai
R7	Kenaikan harga material
R8	Terdapatnya Pekerjaan Ulang
R9	Kecelakaan Kerja
R10	Kecelakaan Lalulintas
R11	Kesalahan Pekerjaan
R12	Kerusakan Peralatan proyek

2.1.2.2 Determining Risk And Impact Possible Values

After the stage of identification of all the risks that might occur in the project, further identification of the probability of risk occurrence and the impact that may be caused if the risk occurs, so it will be the level of importance of each risk. The purpose of risk assessment is to obtain a list of risks that have been assessed based on the level of impact and likelihood of occurrence. The results of the risk assessment are then mapped to determine the major risks that should be a priority to be addressed. Furthermore, the risk that has been identified is assessed to provide the scale value using the Boston Square Matrix and can be seen in Figure 2 [5].



Figure 2. Boston Square Matrix

Based on the Matrix Square Boston, assessment of any risk opportunity and the impact made in a scale that is 1 to 25 as described in Table 5.

Table 5. Scale Risk Level

No	Scale	Risk level
1	1-5	Low
2	6-14	moderate
3	15-25	High

The evaluation criteria for the consequences (impact factor) and measurement chance (probability) in accordance with Australian / New Zealand Standard Risk Management of shown in Table 6 and Table 7 [5].

Table 6. Parameter Risk Impact (Impact Factor)

No	Parameter	effect
1	Very Low (Slight)	There is no impact, financial loss does not mean
2	Low (Minor)	Need direct handling in place, the financial losses into the cost of additional expenditure (over head)
3	Medium (Significant)	Managers need to be addressed by the project planners, significant financial loss

4	High (severe)	Their failure, decreased productivity, significant financial loss
5	Very High (major)	Error impact on the other, needs to be a leader, a huge loss, need special handling

Table 7. Parameter Possible Risk (Probability)

No	Parameter	Possibility
1	Very low (very unlikely)	Rarely, only on certain conditions
2	Low (unlikely)	Sometimes occurs in certain conditions
3	Medium (possible)	Occurs under certain conditions
4	High (Likely)	Often occurs in every condition
5	Very high (very Likely)	Occur in all conditions

The determination of probability and impact of risk based on interviews with project implementers CV. PUTRA PRATAMA. The value of probability and impact of risk resulting in project implementation can be seen in Table 8.

Table 8. Probability Values Analysis Results and Impact of Risk

Risk code	Risk	Probability	Impact
R1	Kondisi cuaca yang buruk	4	4
R2	Kondisi tanah yang tidak terduga	2	2
R3	Curah Hujan dilokasi	4	4
R4	Kejadian yang tidak terduga	2	3
R5	Pengiriman peralatan dan material yang cukup lama	3	4
R6	Ketersediaan peralatan tidak memadai	3	4
R7	Kenaikan harga material	3	3
R8	Terdapatnya Pekerjaan Ulang	2	4
R9	Kecelakaan Kerja	3	3
R10	Kecelakaan Lalulintas	2	2
R11	Kesalahan Pekerjaan	3	3
R12	Kerusakan Peralatan proyek	3	4

2.1.2.3 Determining the Level of Risk

After determining the value of probability and risk impact, then calculating the risk index using Probability Impact Matrix. The level of importance of each risk is calculated by using the formula Risk Exposure.

*Risk Exposure = probability (outcome) * Loss (outcome)*

Description:

1. Risk Exposure
   importance level
2. Risiko Probability (outcome)
   Risk Probability Value
3. Loss (outcome)
   Value Impact Generated Risks

Here are the results of the calculation of the level of interest rate risk can be seen in Table 9.

Table 9. Importance rate Risk Calculation Results

Risk code	Risk	Probability	Impact	importance level
R1	Kondisi cuaca yang buruk	4	4	16
R2	Kondisi tanah yang tidak terduga	2	2	4
R3	Curah Hujan dilokasi	4	4	16
R4	Kejadian yang tidak terduga	2	3	6
R5	Pengiriman peralatan dan material yang cukup lama	3	4	12
R6	Ketersediaan peralatan tidak memadai	3	4	12
R7	Kenaikan harga material	3	3	9
R8	Terdapatnya Pekerjaan Ulang	2	3	6
R9	Kecelakaan Kerja	3	3	9
R10	Kecelakaan Lalulintas	2	2	4
R11	Kesalahan Pekerjaan	3	3	9
R12	Kerusakan Peralatan proyek	3	4	12

Based on the calculation above the level of risk, and then grouped by risk Boston Square Matrix. The following categories of risk level can be seen in Table 10.

Table 10. Category Level Risk

No	Risk	importance level	Risk level
R1	Kondisi cuaca yang buruk	16	Tinggi
R2	Kondisi tanah yang tidak terduga	4	Rendah
R3	Curah Hujan dilokasi	16	Tinggi
R4	Kejadian yang tidak terduga	6	Sedang
R5	Pengiriman peralatan dan material yang cukup lama	12	Sedang
R6	Ketersediaan peralatan tidak memadai	12	Sedang
R7	Kenaikan harga material	9	Sedang
R8	Terdapatnya Pekerjaan Ulang	6	Sedang
R9	Kecelakaan Kerja	9	Sedang
R10	Kecelakaan Lalulintas	4	Rendah
R11	Kesalahan Pekerjaan	9	Sedang
R12	Kerusakan Peralatan proyek	12	Sedang

From the result of the determination of the level of risk, obtained two variables with a high risk level that is at risk of code R1 and R3. 8 variables with

moderate risk level that is R5, R6, R12, R7, R9, R11, R4 and R8. 2 variables with low risk levels are R2 and R10.

2.2 Project Control

2.2.1 Weight Calculation Analysis Works

Weight of work is needed to determine the percentage of the price of the work of the total project costs. The weight of the work is calculated based on unit price corresponding to the contract value (excluding PPN = 10%). Later percentage of the weight of the work will be used in the analysis Planned Value (PV) and analysis of Earned Value (EV) [8]. Weights are calculated using the following formula:

$$\textbf{Bobot} = \left(\frac{\textbf{Harga Pekerjaan}}{\textbf{Harga Total Pekerjaan}}\right) x\ 100\%$$

The following is a calculation of weight:
Pek. Pemb. Gudang Bahan Proyek :
Harga Total Pekerjaan = Rp. 448,181,818.18
Harga Pekerjaan = Rp. 1,200,000.00

$$\text{Bobot} = \left(\frac{1{,}200{,}000{,}00}{448{,}181{,}818{,}18}\right) x\ 100\%$$

= 0.27 %

Table 11. Weights Work Road Improvement Project

No	Name of activity	Work Price (Rp)	Weight (%)
1	Pek. Pemb.gudang bahan	1.200.000	0.27
2	Pek. Pengukuran	1.200.000	0.27
3	Pek. Papan nama proyek	250.000	0.06
4	Pek. Quality Control Awal	1.475.000	0.33
5	Pek. Quality Control Akhir	1.475.000	0.33
6	Pek. As.Builtdrawing	700.000	0.16
7	Pek. Pembongkaran Beton (oprit lama)	781.910.93	0.17

2.2.2 Analysis of Project Evaluation

Results value method or the Earned Value Method, a method that can provide information about prosisi progress of the project within a certain period and can predict the progress of the project in the next period, namely in terms of costs and project completion time. There are three indicators in the assessment value method results, as follows:

1. *BCWS (Budgeted Cost of Work Schedule)* or Planned Value (PV)
2. *BCWP (Budgeted Cost of Work Performed)* or *Earned Value (EV)*
3. *ACWP (Actual Cost of Work Performed)* or *Actual Cost (AC)*

Because of the progress report of work done every week of activities, therefore, the value of PV, EV and AC are grouped so per week of activity.

2.2.2.1 Calculation of Planned Value (PV)

PV also called Budgeted Cost of Work Schedule (BCWS) is budgeted cost for the work scheduled in a given period and is set in the budget. Obtained by multiplying the percentage of progress plans with total project budget Budget At Completion (BAC).

Here is the calculation of PV at week 1:
BAC = Rp. 448,181,818.18
Weight PV = 0.59 %
PV = (% progress plan) x BAC
= 0.59 % x 448,181,818.18
= Rp. 2,650,000

For the calculation of PV next week can be seen in Table 12.

Table 12. Analysis Calculation of Planned Value (PV)

No	week	Weight (%)	PV	
			weekly (Rp.)	Cumulative (Rp.)
1	Week 1	0.59	2.650.000	2.650.000
2	Week 2	1.15	5.171.200	7.821.200
3	Week 3	4.19	18.765.700	26.586.900
4	Week 4	2.64	11.814.200	38.401.100
5	Week 5	5.35	23.964.000	62.365.100
6	Week 6	5.35	23.964.000	86.329.100
7	Week 7	7.83	35.094.000	121.423.100

2.2.2.2 Calculation of Earned Value (EV)

EV also called Budgeted of Work Performed (BCWP) is the value received from the completion of work during a certain time period, this indicator shows the value of the results from the perspective of the value of the work completed on the budget that has been provided. EV is derived by multiplying the percentage of progress that has been implemented with a total budget of the project Budget At Completion (BAC). The job is complete, if the percentage of implementation reached 100%.

BAC = Rp. 448,181,818.18
Weight EV = 0.59 %
EV = (% actual progress) x BAC
= 0.59 % x 448,181,818.18
= Rp. 2,650,000

Table 13. Analysis Calculation of Earned Value (EV)

No	Week	Weight (%)	EV	
			Weekly (Rp.)	Cumulative (Rp.)
1	Week 1	0.59	2.650.000	2.650.000
2	Week 2	1.15	5.171.200	7.821.200
3	Week 3	4.19	18.765.700	26.586.900
4	Week 4	2.64	11.814.200	38.401.100
5	Week 5	5.35	23.964.000	62.365.100
6	Week 6	5.35	23.964.000	86.329.100
7	Week 7	7.83	35.094.000	121.423.100

2.2.2.3 Calculation of Actual Cost (AC)

Analysis of Actual Cost is the amount of the actual cost of the work that has been carried out. AC value obtained based on the expenses of the work already done.

Table 14. Analysis Calculation of Actual Cost (AC)

No	Week	AC	
		Weekly (Rp.)	Cumulative (Rp.)
1	Week 1	2,400,000	2.400.000
2	Week 2	5,000,000	7.400.000
3	Week 3	18,500,000	25.900.000
4	Week 4	11,570,000	37.470.000
5	Week 5	23,900,000	61.370.000
6	Week 6	23,950,000	85.320.000
7	Week 7	35,000,000	120.320.000

2.2.2.4 Calculation Analysis of Variance

Variant Analysis is done by finding the value of Cost Variance (CV) and the Schedule Variance (SV). CV calculation derived from EV reduced AC, was obtained from the SV EV reduced PV. PV value obtained from the table 12 (Analysis Calculation of Planned Value) EV value obtained from the table 13 (Analysis Calculation of Earned Value) and AC values obtained from tables 14 (Analysis Calculation of Actual Cost). Table appraisal value of the element can be seen in Table 15.

Table 15. Element Value Assessment Results

Indicator	variants	Value	performance	Value	ratings
Cost	CV	+	CPI	> 1	Profit
	CV	0	CPI	= 1	Spending = cost plan
	CV	-	CPI	< 1	Loss
Schedule	SV	+	SPI	> 1	Ahead of schedule
	SV	0	SPI	= 1	On schedule
	SV	-	SPI	< 1	Behind schedule

CV calculations in week 1:

EV = Rp. 2,650,000

AC = Rp. 2,400,000

CV = EV – AC

= Rp. 2,650,000 – Rp. 2,400,000

= Rp. 250,000

Table 16. Analysis Calculation of Cost Variance (CV)

No	Week	EV (Rp.)	AC (Rp.)	CV = EV – AC (Rp.)
1	Week 1	2.650.000	2.400.000	250.000
2	Week 2	7.821.200	7.400.000	421.200
3	Week 3	26.586.900	25.900.000	686.900
4	Week 4	38.401.100	37.470.000	931.100
5	Week 5	62.365.100	61.370.000	995.100
6	Week 6	86.329.100	85.320.000	1.009.100
7	Week 7	121.423.100	120.320.000	1.103.100

SV calculation at week 1:

EV = Rp. 2,650,000

PV = Rp. 2,650,000

SV = EV – PV

= Rp. 2,650,000 – Rp. 2,650,000

= 0

Table 17. Analysis Calculation Schedule Variance (SV)

No	Week	EV (Rp.)	PV (Rp.)	SV = EV – PV
1	Week 1	2.650.000	2.650.000	0
2	Week 2	7.821.200	7.821.200	0
3	Week 3	26.586.900	26.586.900	0
4	Week 4	38.401.100	38.401.100	0
5	Week 5	62.365.100	62.365.100	0
6	Week 6	86.329.100	86.329.100	0
7	Week 7	121.423.100	121.423.100	0

2.2.2.5 Calculation of Index Analysis Work

Analysis of the performance index is done by finding the value of the Schedule Performance Index (SPI) and the Cost Performance Index (CPI). SPI calculation derived from a comparison between EV with PV, while the CPI is derived from the ratio of the EV to the AC.

The calculation of the SPI at week 1:

EV = Rp.2,650,000

PV = Rp.2,650,000

SPI = EV/PV

= Rp.2,650,000 / Rp.2,650,000

= 1.000

Table 18. Analysis Calculation Schedule Performance Index (SPI)

No	Week	EV (Rp.)	PV (Rp.)	SPI = EV / PV
1	Week 1	2.650.000	2.650.000	1.000
2	Week 2	7.821.200	7.821.200	1.000
3	Week 3	26.586.900	26.586.900	1.000
4	Week 4	38.401.100	38.401.100	1.000
5	Week 5	62.365.100	62.365.100	1.000
6	Week 6	86.329.100	86.329.100	1.000
7	Week 7	121.423.100	121.423.100	1.000

CPI calculation Week 1:

EV = Rp.2,650,000

AC = Rp. 2,400,000

CPI = EV/AC

= Rp.2,650,000 / Rp. 2,400,000

= 1.104

Table 19. Analysis Calculation of Cost Performance Index (CPI)

No	Week	EV (Rp.)	AC (Rp.)	CPI = EV / AC
1	Week 1	2.650.000	2.400.000	1.104
2	Week 2	7.821.200	7.400.000	1.057
3	Week 3	26.586.900	25.900.000	1.027

4	Week 4	38.401.100	37.470.000	1.025
5	Week 5	62.365.100	61.370.000	1.016
6	Week 6	86.329.100	85.320.000	1.012
7	Week 7	121.423.100	120.320.000	1.009

2.2.2.6 Calculation and Analysis Estimated Completion Time

Analysis of the performance of the index is done by looking for a cost estimate or Estimate At Completion (EAC) and the Estimate To Complete (ETC) is the estimated time for a particular job with the assumption that the tendency of the performance of the project, but until the end of the project. Calculation, EAC is obtained from the total cost of the project or Budget At Completion (BAC) with CPI. ETC is obtained from the comparison between the duration of the project or the Original Duration (OD) with SPI.

Calculation of EAC Week 1:

BAC = Rp. 448,181,818.18
CPI = 1.10
EAC = BAC / CPI
= Rp. 448,181,818.18 / 1.10
= Rp 405,900,500

Table 20. Analysis Calculation Estimate at Completion (EAC)

No	Week	BAC (Rp.)	CPI	EAC = BAC / CPI (Rp.)
1	Week 1	448,181,818.18	1.104	405.900.500
2	Week 2	448,181,818.18	1.057	424.045.600
3	Week 3	448,181,818.18	1.027	436.602.600
4	Week 4	448,181,818.18	1.025	437.314.900
5	Week 5	448,181,818.18	1.016	441.030.600
6	Week 6	448,181,818.18	1.012	442.943.000
7	Week 7	448,181,818.18	1.009	444.110.200

Calculation of ETC Week 1:

OD = 150 hari
SPI = 1.00
ETC = OD / SPI
= 150 / 1.00
` = 150 hari

Table 21. Analysis Calculation Estimate To Completion (ETC).

No	Minggu	OD	SPI	ETC = OD / SPI
1	Week 1	150	1.000	150
2	Week 2	150	1.000	150
3	Week 3	150	1.000	150
4	Week 4	150	1.000	150
5	Week 5	150	1.000	150
6	Week 6	150	1.000	150
7	Week 7	150	1.000	150

2.2.2.7 Calculation Results Earned Value Method (EVM)

Based on the analysis of variance, the performance index, and obtained estimates of the recapitulation of the analysis are shown in Table 22.

Table 22. Recapitulation Calculation Results Earned Value Method (EVM)

Week	Analisis Varian		Analisis Kinerja		Analisis Estimasi	
	Time SV (Rp)	Cost CV (Rp)	Time SPI	Cost CPI	Time ETC (Day)	Ci\ost EAC (Rp)
Week 1	0	250.000	1.000	1.104	150	405.900.500
Week 2	0	421.200	1.000	1.057	150	424.045.600
Week 3	0	686.900	1.000	1.027	150	436.602.600
Week 4	0	931.100	1.000	1.025	150	437.314.900
Week 5	0	995.100	1.000	1.016	150	441.030.600
Week 6	0	1.009.100	1.000	1.012	150	442.943.000
Week 7	0	1.103.100	1.000	1.009	150	444.110.200

3. CLOSING

Based on the research findings and the results of testing that was done on the Project Management System at CV. PUTRA PRATAMA, it can be deduced as follows:

1. The project management information system that is built can help project managers in the scheduling of the project in order to facilitate the project manager determine the impact caused by the delay of a project activity.
2. The project management information system built to help the project manager knows the risks that may have a negative impact on project implementation and prepare treatment solutions.
3. project management information system built to help directors and project managers in the estimation of the cost and time of execution of the project..
4. The project management information system that is built to help the project implementers in reporting the progress of work in order to progress reporting process can be carried out at the project site.

Based on the results of testing the system, there are suggestions that can be done to add things that can complement the project management system in the future. Project management information system is complemented with acceleration features of project work.

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