PROJECT MANAGEMENT INFORMATION SYSTEM AT PT. PANORAMA GRAHA ASRI

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ABSTRACT

PT Panorama Graha Asri is a company that concern in the construction field which is construction field, development, planning, and the house project implementer. The company is located at Jl. Cikutra 205 Bandung. The project can't be finished at the specified time. This delays is caused by several factors including the ordering of items needed item are not appropriate with the existing specification, losing the material of goods, damaging the material of goods, late delivery of material goods and work accidents. The swelling cost occur is caused by the delays of time during the project. There is no appropriate responsibility of the project team position in implementing every project. There is no identification level of risk importance which estimating will occur in the field and there is no mitigating preparation that have to do if those risks appear at the project realization. These problem make the manager of project have difficulty in controlling action of the project in order to make the time and project cost can be conducted as planned.
Based on the problem occur, the solution is needed to help the project manager in controlling the time of implementing project using Precedence Diagraming Method (PDM), identifying the responsibilities of each member of the project team using Responsible Accountable Consulted Informed Chart (RACI) method, identifying the risk opportunities will occur and determining the mitigation using Probability Impact Matrix (PIM) method, the estimate and project cost and time control using current methods of Earned Value Management (EVM).

Based on the results of functionality test, UAT testing, and end-user testing after applied in the environment it can be concluded that the information system of project management in PT. Panorama Graha Asri has been able to help the project manager in controling the time of implementing project, identifying the opportunities and risks that will occur and determining the mitigation, identifying the responsibilities of each member of the project team and the estimated cost control and project time.

Keywords: Project Management, PDM, RACI, PIM, EVM.

1. INTRODUCTION

In the implementation of this project implementation has been delayed where a project cannot in finish in accordance with the time determined. As in the project house in the eastern hills the type 2 36 which began in august 7 2016 and is scheduled to be completed in 18 october 2016.
This project just over 1 months but it has been delayed on sunday to 4 of the project.This delay caused by several factors including reservations goods needed not in accordance with the specifications there, loss of material goods, the material goods, shipping material goods late and employment accident.
Financing in the implementation of this project , project manager making payments per week in terms of financing for the. At the time of the project sunday to 4 , experienced pembengkakkan the cost of the city government had allocated .
Over cost of this is happening because of the late time of the project ,it has an amount of impact on the expense incurred not in accordance with that had been budgeted at the time of project plans . Because of that project manager difficulty in containing costs project
The mismatch decision-making in accordance with a team responsibility project for every work .
In addition the absence of classifications the importance risk those expected to occur he can disrupt the implementation of the project add period of completion project and cost become larger because of the absence preparation mitigation to be done if the risks appeared at the time when of the project

1.1 Management Information System

Management information system (management information system or often known by the abbreviation e.g) was the implementation of information system in organization to support informasi-informasi by all levels management .

Information system also called the management a system based on a computer that making information available for the users who have need of similar [1] .

1.2. Project Management

The project is a task that needs to be formulated to achieve the objectives to be stated concretely and should be completed within a certain period by using manpower and tools are limited and so complex that it takes management and cooperation that is different from that normally used.
The project has a characteristic that has a goal, is dynamic, has a sequential activities, have diverse resources, has a unique purpose and clear and has sponsors for the projects implemented in accordance with the goals and objectives that have been set [2].

1.3. Risk Management

Project management is the procedures for organize and managing the source of income which is important to complete projects from the beginning to the end .Project management could be applied to type of project anything and worn widely to complete large projects and complex [3].

1.3 *Probability Impact Matrix* (PIM)

Probability the matrix (pim) used to produce a relative of the risk, by combining langkah-langkah probability expressed as possible percentage is to be or the frequency and impact on one or more dimension.Pim that can be used to analyze threats and opportunities, a matrix can be used for determining p-i (probability-impact) scores for any event risk, allowing event to priority, and the risk to plan to give graphic representation often known as a map risk or risk profile [4]. But the map risk is presented in figure 1.



Figure 1

The criteria for assessing which impact factor shown in table 1 .

Table 1

No	Appraisal	Impact
1	Slight	No significant impact is felt, the financial loss does not mean
2	Minor	Need direct handling in place, the financial losses into the cost of additional expenditure (over head)
3	Significant	Need to be addressed by implementing, significant financial loss
4	Severe	Their failure, decreased productivity, significant financial loss
5	Mayor	Error impact on the other, need handling by the director, a huge loss, need special handling

Measurement criteria opportunities probability shown in table 2.

Table 2

No	Appraisal	Impact
1	Very unlikely	Rarely, only on certain conditions
2	Unlikely	Sometimes occurs in certain conditions
3	possible	Occurs under certain conditions
4	Likely	Often occurs in every condition
5	Very likely	Occur in all conditions

Based on the matrix boston assessment of any chances risks and impacts generated made in a scale the 1 to 25, where the scale said levels of low , medium and high , as described in table 3 .

Table 3

Scale	Risk Value
1 - 5	Low
6 - 14	Moderate
15 - 25	High

1.4 Time Schedules Project *Precedence Diagramming Method* (PDM)

The purpose of the equation forward on pdm is to mentukan when it started the earliest (early start) happened .Provisions on the: is as follows :

1. Looking for value earliest finish time (ef) obtained from earliest start time (ice) totaled with duration

EF=ES+d (1.1)

2. Looking for value slack (sl) obtained from value earliest start time (es) after reduced value earliest finish time (ef)
   SL=ES(next node)-EF (1.2)
3. Looking for value latest start time (ls) obtained value slack (sl) plus the earliest start time (es)
   LS=SL+ES (1.3)
4. Looking for value latest finish time (lf) obtained from value latest start time (ls) plus the duration (d).
   LF=LS+d (1.4)

1.5 *Earned Value Management* (EVM)

A method of evm or method of value the result is a method of control performance project more progressive.Method to be able to provide information regarding the position progress projects in a certain period of time and can estimate that progress project in the period next both in terms of cost and period of completion project.
BCWP=(%Actual Progress)×Total Budget Project (BAC) (1.5)
There are three indicators in informing the progress of the project, namely:

1. BCWS (*Budgeted Cost of Work Shedule*), describe the budget plan until a certain period the volume of planned projects to be undertaken.

2. BCWP (*Budgeted Cost of Work Performed*), describes the project plan budget for a certain period of what has been done on the actual volume of work.

3. ACWP (*Actual Cost of Work Performed*), describes the actual budget spent on implementation of the work on the state of the volume of actual work.

To measure the work and expense experience delays or cost overrun used a variance. As for the variants analyzed are the schedule (schedule) and cost (cost).

CV *(Cost Varians) :*
CV=BCWP-ACWP (1-6)

SV (*Schedule Varians) :*
SV = BCWP – BCWS (1-7)

CPI (*Cost Performance Index)* :
CPI=BCWP/ACWP (1-8)

SPI *(Schedule Perfoemance Index)* :
SPI=BCWP/BCWS (1-9)

The purpose of the calculation of CPI and SPI indices above are to assess the work time and cost of a project. For meengestimasikan the time and cost needed to complete a project using ECD calculations and EAC, while ECD and EAC calculation formula is as follows:

To determine the approximate time of completion of work or ECD (Estimated at Completion Date), use the following formula :

ECD = (Total time - time use)/SPI (1-10)

To determine the estimated cost of the remaining work or ETC (Estimated to Completion), use the following formula :

ETC = (BAC- BCWP)/CPI (1-11)

1.6 Human Resource Management (SDM)

HR Management to the overall determination and implementation of various activities, policy, and program that aims to obtain employment, development, and maintenance in order to increase its support terhdap enhancing organizational effectiveness in a way that is ethically and socially accountable. The purpose of HR management is to improve human resource support in an effort to increase the effectiveness of the organization in order to achieve objectives [5].
RACI (*Responsible, Accountable, Consulted dan Informed*) a small part of human resource management. RACI Chart is one tool that can be used for decision making and assist the management in-meng identify roles and responsibilities of its employees. Clear division of tasks and responsibilities and their role is crucial in an organization. The lack of clarity of roles and responsibilities would cause confusion which ultimately will result in reduced productivity of employees. RACI Chart consists of four parameters, namely:

1. *Responsible***,** that is people who perform a task or job. Responsible is essentially an administrative task.
2. *Accountable*, that is, those who are responsible for a task or job and have the authority to decide on an issue or case. Accountable question here is basically in charge and decision makers.
3. *Consulted*, that is, those who provide feedback, opinions or contribution when needed on the task or the job. Consulted essentially a consultant or advisor.
4. *Informed*, that is, those who need to know the results or actions and decisions taken.

As an example of the RACI chart can be seen in Figure 2.

RACI CHART

Nama Staff	Andi	Allan	Sam	Hendry
Perencanaan Produk	I	A	I	R
Pengembangan Produk	I	C	R	I
Produksi/Pembuatan Produk	R	A	C	i

Figure 2

2. CONTENTS OF RESEARCH

2.1 Risk Analysis

Analisis resiko yang digunakan secara kualitatif by identifying the risks resulting from the interview data with the help of a form of the possibility of the risk and impact of these risks to the scale of values. Furthermore, the resulting value will be determined based on the level of risk level matrix. Respondents were drawn from the PT. Panorama Graha Asri ie Project Manager. The risks generated can be seen in Table 4.

Table 4

No	Risk	Risk Code
1.	**Work Environment Risk**	
	1.1. Coordination with difficult people	R1
	1.2. Access to the project environment that does not support	R2
	1.3. The weather can not be predicted	R3
2.	**Raw Material Procurement Risk**	
	1.1. Material material that does not comply with the required specifications	R4
	1.2. Damage materials	R5
	1.3. The loss of material	R6
	1.4. Delays in the supply of materials	R7
3.	**Project Implementation Risk**	
	3.1. Work accident	R8
	3.2. Protests from certain organizations	R9
	3.3. Installation of materials that takes a long time	R10

From -risk list above obtained value of the interest risk by using risk assessment form data. As for the results of the interest risk can be seen in Table 5.

Table 5

No	Kode Risiko	Probability	Impact	Importance of Risk
1	R1	2	2	4
2	R2	2	2	4
3	R3	4	4	16
4	R4	2	3	6
5	R5	2	3	6
6	R6	3	3	9
7	R7	3	3	9
8	R8	3	3	9
9	R9	3	3	9
10	R10	4	4	16

2.2. Time Schedule Project (Precedence Diagramming Method)

Based on the network that has been made then the next step was to calculate the total project completion time, advanced computation (forward pass), countdown (backward pass), and calculate slack. Critical path that produced that is at work A-B-C-D-E-F-H-I-J-K-LN.

Table 6

No	Activity Code	Recapitulation Calculation					
		d (Duration)	ES	EF	SL	LS	LF
1	A	2 hari	0	2	0	0	2
2	B	14 hari	2	16	0	2	16
3	C	8 hari	16	24	0	16	24
4	D	4 hari	24	28	0	24	28
5	E	6 hari	28	34	0	28	34
6	F	4 hari	34	38	0	34	38
7	G	3 hari	34	37	1	35	38
8	H	8 hari	38	46	0	38	46
9	I	6 hari	46	52	0	46	52
10	J	6 hari	51	58	0	52	58
11	K	3 hari	58	61	0	58	61
12	L	5 hari	61	66	0	61	66
13	M	2 hari	61	63	3	64	66
14	N	2 hari	66	68	0	66	68

2.3 Analysis Project Control (*Earned Value Management*)

Analysis of project control contains analysis of the evaluation of the project dikerakan by PT. Panorama Graha Asri. Analysis of project control using Earned Value Management (EVM). The budget plan per week (BCWS) from Eastern Hills Phase 2 project can be seen in Table 7.

Table 7

Calculating Analysis of BCWS			
Week	**Weight %**	**Hasil BCWS**	**Kumulatif**
Week 1	3.62 %	Rp 3.914.961	Rp 3.914.961
Week 2	22.09 %	Rp 23.889.917	Rp 27.804.878
Week 3	11.21 %	Rp 12.123.403	Rp 39.928.281

Week 4	8.48 %	Rp 9.170.959	Rp 49.099.240
Week 5	9.72 %	Rp 10.511.996	Rp 59.611.236
Week 6	9.65 %	Rp 10.436.292	Rp 70.047.528
Week 7	8.77 %	Rp 9.484.589	Rp 79.532.117
Week 8	10.17 %	Rp 10.998.662	Rp 90.530.779
Week 9	7.26 %	Rp 7.851.552	Rp 98.382.331
Week 10	8.04 %	Rp 8.695.108	Rp 107.077.439
Week 11	1.04 %	Rp 1.070.672	Rp 108.148.111

The Budget Cost of Work Performed (BCWP) describes the project plan budget for a certain period of what has been done on the actual volume of work can be seen in Table 8.

Table 8

No	Week	Weight	BCWP	
			Cost Per Week	Cumulative
1	Week 1	3.62 %	Rp 3.914.961	Rp 3.914.961
2	Week 2	22.09 %	Rp 23.889.917	Rp 27.804.878
3	Week 3	11.21 %	Rp 12.123.403	Rp 39.928.281
4	Week 4	5.48 %	Rp 5.926.516	Rp 45.854.797

Actual Cost of Work Performed (ACWP) describes the budget spent on implementation of the work on the state of the volume of actual work. ACWP value obtained based on expenditure data from the work that has been carried out. The value ACWP on a 4-week project Eastern Hills Phase 2 Type 36 can be seen in Table 9.

Table 9

No	Week	ACWP	
		Cost Per Week	Cumulative
1	Week 1	Rp 3.740.000	Rp 3.740.000
2	Week 2	Rp 21.500.000	Rp 25.240.000
3	Week 3	Rp 11.270.000	Rp 36.510.000
4	Week 4	Rp 6.250.000	Rp 42.760.000

Scheduling Variance (SV) can show the difference between the work carried out against the planned execution time. The positive value of SV results may indicate that the work completed more quickly than the planned time, on the contrary if the value SV is negative then completed the job longer than planned. The complete calculation of the value Scheduling Variance (SV) at 4 weeks work can be seen in Table 10.

Table 10

No	Weeks	BCWS	BCWP	SV
1	Week 1	Rp 3.914.961	Rp 3.914.961	Rp 0
2	Week 2	Rp 23.889.917	Rp 23.889.917	Rp 0
3	Week 3	Rp 12.123.403	Rp 12.123.403	Rp 0
4	Minggu 4	Rp 9.170.959	Rp 5.926.516	−Rp 3.244.443

SV calculation based on the analysis above can be concluded that the value of SV in week 1 till week 3 is 0 which indicates that the project in this period has been run in accordance with the project schedule planning. While at week 4 is negative, it indicates that the project is implemented more slowly than planned schedule.

Cost Variance (CV) showed differences in the values obtained after completing part of the work to the actual value of the project. The positive value of Cost Variance (CV) indicates that part of the benefit otherwise work if the value is negative CV shows that part of the work gives a loss in the project. The complete calculation of the value of Cost Variance (CV) at 4 weeks work can be seen in Table 11.

Table 11

No	Week	BCWP	ACWP	CV
1	Week 1	Rp 3.914.961	Rp 3.740.000	Rp 171.961
2	Week 2	Rp 23.889.917	Rp 21.500.000	Rp 2.389.917
3	Week 3	Rp 12.123.403	Rp 11.270.000	Rp 853.403
4	Week 4	Rp 5.926.516	Rp 6.250.000	−Rp 323.484

From the table above it can be concluded that the project at week 1 till week 3 the cost of the project in accordance with the actual costs implemented and benefit the company, while at the work week to four

project costs incurred higher costs that have been done and give losses on the company.

Calculation of schedule performance index (SPI) is intended. SPI value shows how much work can be completed (relative to the overall project) against the planned work unit. The calculation of the SPI at 4 weeks of project implementation can be seen in Table 12.

Table 12

No	Week	BCWP	BCWS	SPI
1	Week 1	Rp 3.914.961	Rp 3.914.961	1
2	Week 2	Rp 23.889.917	Rp 23.889.917	1
3	Week 3	Rp 12.123.403	Rp 12.123.403	1
4	Week 4	Rp 5.926.516	Rp 9.170.959	0.65

Based on the calculation above it can be concluded that in week one to week three there is no deviation timeline of the project while in minggku to 4 projects experienced irregularities and time schedule.

Calculations to determine the value of cost performance index, or the so-called Cost Performance Index (CPI) can be seen in Table 13.

Table 13

No	Week	BCWP	ACWP	CPI
1	Week 1	Rp 3.914.961	Rp 3.740.000	1.05
2	Week 2	Rp 23.889.917	Rp 21.500.000	1.11
3	Week 3	Rp 12.123.403	Rp 11.270.000	1.08
4	Week 4	Rp 5.926.516	Rp 6.250.000	0.95

Based on the above calculation values obtained Cost Performance Index (CPI) from week 1 to week 3 has a value of CPI> 1. Based on the calculation rules Cost Performance Index (CPI), which has been described in formula equation 2.11, it can be concluded that in week 1 to 3 weeks into the project can be completed ahead of schedule (Schedule underrun). While at week 4 there is a delay from the scheduled project (Schedule overrun).

Based on the analysis of the calculation of SV, CV, SPI and CPI has been done before it can be seen that the project completion time will be late or faster, and costs will be excessive or less than budgeted. Aside from the progress of the project for the future will also need to estimate the time and cost of completion. The estimated time to complete the project under construction can be seen in Table 14.

Table 14

No	Week	Time Left (Week)	SPI	Time Passed	ECD (Week)
1	Week 1	10	1	1	11
2	Week 2	9	1	2	10
3	Week 3	8	1	3	11
4	Week 4	7	0.65	4	14.769 ≈ 15

From the table above it can be concluded that to finish this project PT. Panorama Graha Asri takes 15 weeks in order to complete the housing projects of the type 36. Where the initial plan the implementation of this project for 11 weeks, but suffered ketelambatan impacting project implementation time increased 4 weeks so that the project is expected to be completed by week 15.

To find the estimated costs necessary for accomplishing the project, can be done by finding the value of EAC (Estimate at Completion). The EAC calculation results can be seen in Table 15.

Table 15

No	Week	BAC	CPI	EAC
1	Week 1	Rp 108.148.111	1.05	Rp 102.998.200
2	Week 2	Rp 108.148.111	1.11	Rp 97.430.730
3	Week 3	Rp 108.148.111	1.08	Rp 100.137.139
4	Week 4	Rp 108.148.111	0.95	Rp 113.840.116

From the calculation above it can be concluded that the estimated costs necessary for accomplishing projects starting from week 1 to week 3 does not exceed the total budget of the project cost. While the estimated cost of completion of projects initiated from week 4 of the excess cost of the project is budgeted at 108.148.111 rupiah. This is because at week 4 project has been delayed time and cost overruns of the project.

2.4 Analysis *Responsible Accountabel Consulted Informed* (RACI)

The analysis process responsible accountabel consulted informed (RACI) aims to describe the role of the various parties in completing a job in a project, which will make it easier to determine who is responsible in a job using responsible methods accountabel consulted informed (RACI).

Table 16

No	Work Description	Project Manager	Technical Manager	Implementer
1	A.Preparation Work	I	A, C	R
2	B. Work Foundations and Structure	I	A, C	R
3	C. Wall Works	I	A, C	R
4	D. Wall Coating Works	I	A, C	R
5	E. Floor job	I	A, C	R
6	F. Door & Window Works	I	A, C	R
7	G. Hinges & Locks Work	I	A, C	R
8	H. Roof Work	I	A, C	R
9	I. Ceiling Work	I	A, C	R
10	J. Paintwork	I	A, C	R
11	K. Pekerjaan listrik	I	A, C	R
12	L. Water Installation Work	I	A, C	R
13	M. Accessories Sanitary Works	I	A, C	R
14	N. Works Park	I	A, C	R

RACI analysis of the results of the above can be seen responsibilities of each position in handling project work Eastern Hills Phase 2 Type 36 that is being done by PT. Panorama Graha Asri. So that if an error occurs when executing workmanship can see who is responsible for each job.

2.5. *User Acceptance Test*

In a software required a test to obtain objective of the user acceptance test was to confirm that the system is currently in testing to meet the business needs to provide assurance that the test system is working properly and can be used before it was officially to end users. End user testing conducted by one or more representatives of the user with the help of a team of testers. End user acceptance testing approach will have to use the black box [6].

Based on user acceptance testing has been done by the user representative is the project manager of the project management information systems PT. Panorama Graha Asri, it can be concluded that the results of user acceptance testing as many as 25 test scenarios can be received by a representative of users that the project manager. But there is one test scenarios with the results accepted by the record due to the expected output is not in accordance with the results obtained. Therefore, it must be done improvements to the system in order to conform with the expected output in user acceptance testing scenarios. If already done repairs and test results in accordance with the expected output scenario, the test can be carried to the next stage of the end-user acceptance scenarios after the system is implemented in a corporate environment.

3. CONCLUSION

3.1. Conclusion

Based on the results of research and testing has been conducted on the project management information system in PT. Panorama Graha Asri, it can be deduced as follows:

1. The system can assist the project manager in charge of the project in knowing and menestimasi time so that project implementation in accordance with the project time plan that has been determined and there is no delay in the project.
2. The system can assist the project manager in charge of the project cost control so that no swelling cost of the project and can match the project cost planning which has been determined.
3. The system can help the manager in charge of the project in positioning the project team in accordance with project responsibilities so that all forms of decision-making in the project can be in accordance with their respective responsibilities.
4. The system can help managers project the party responsible for the emergence of a project to identify opportunities that are often overlooked in the field of risk into the factors that influence in the delay of the project, as well as prepare mitigation.

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