



CONTROLLING OF TIME AND COST IMPLEMENTATION BY USING EARNED VALUE ANALYSIS (CASE STUDY: SHRIMP CULTIVATION DEVELOPMENT PROJECT WITH AREA-BASED IN KEBUMEN REGENCY)

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ABSTRAK

The development and progress of existing infrastructure in Indonesia at this time encourages many innovations in the course of a development project. In carrying out the construction of a project, there are limitations such as cost, time, manpower, equipment, and methods. With these limitations, it is certainly one of the obstacles that must be faced by project implementers. with the problems that occur, it does not mean that existing innovations cannot be realized. These obstacles and problems are one of the supporting factors that in project implementation requires good management so that the project can run according to plan and can be completed properly. The purpose of this research was to find out the cost and time for planning and implementing the project, knowing the problems encountered and how to control time and costs in area-based shrimp farming development projects from the first week to the 20th week.

This paper will show the implementation of the project in terms of cost and time as well as controlling the ongoing project. In this study, the method used is a quantitative method. The data used in this study are weekly reports, the 's' curve, and the RAB.

Keywords: Project, Time and Cost, Earned Value Analysis

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1. INTRODUCTION

Everyone has heard the term project which is one of the manifestations of economic development, even though it has various connotations. In the Project Management book (Nurjaman and Dimyati, 2014) it is explained that a project is a task that needs to be formulated to achieve concretely stated goals and be completed within a certain period using limited human resources and tools.

Project activities can be interpreted as a temporary activity that lasts for a limited period of time, with the allocation of certain resources intended to carry out tasks whose objectives have been clearly outlined. These tasks can be in the form of building factories, making new products or conducting research and development (Soeharto, 1999).

According to Mary Coulter in the book Principles of management with a global perspective (Rusdiana and Gazin, 2014) emphasizes that management has an established and universally accepted definition, namely defining management as the art of getting work done through other people. which means a manager is in charge of managing and directing other people to achieve organizational goals.

The concept of yield value or often called earned value analysis is one of the methods that can be used in controlling time and costs in a project. In the construction management book written by (Widiasanti and Lenggogeni, 2013) the concept of yield value has several benefits, namely:

- a. To increase the level of effectiveness in monitoring and controlling project activities
- b. Can be developed to make estimates or projections of the future state of the project.

According to (Sahid, 2017) in the Construction Implementation Engineering book it is explained that the dependency relationship between one activity and another in PDM is regulated in more detail when compared to CPM. In PDM there are four (4) types of relationships, namely Finish to Start (FS), Start to Start (SS), Start to Finish (SF), and Finish to Finish (FF).

From these ideas, it shows that in a project implementation, management is needed to complete the project according to the plans that have been made.

2. RESEARCH METHOD

This research was conducted at a shrimp pond development project in Kebumen district. The method used consists of several stages such as:

The first stage is to determine the location of the research. In determining the research location in the preparation of this journal, the location used is an area-based shrimp farming development project in Kebumen Regency. The next stage is formulating the problem and conducting a literature review.

In the formulation of the problem in this study there are 3 important points related to the implementation of the project in the field. Literature review is done by looking for literature or research references related to previous research. The next step is to collect the data needed in conducting the analysis. At the data collection stage, the researcher conducts research for a certain duration to obtain data and information related to the title taken.

The primary data needed in this study was obtained by conducting interviews with someone who understands the implementation of this project. After obtaining the required data, then perform data analysis. Data analysis was carried out starting from the project 's' curve data. analysis of the 's' curve is carried out by observing changes in volume and work items related to the implementation of the addendum 3x and also looking at the 's' curve graph of plans and implementation carried out. Then perform an analysis using the value concept method to determine the final state of the project. After conducting an analysis using the yield value concept, the next step is to reschedule with a time that corresponds to the calculation results using the yield value concept.

After conducting the analysis, the results of the research and discussion will be obtained. After conducting an analysis using the concept of the value of the results and knowing the results, the next step is to write down the results and discuss them. The discussion is written in accordance with how to see the results obtained and by looking at the theory used. The last step is conclusion and suggestion. After all stages of the research have been carried out and obtained the results of the analysis, the next process is to conclude the research that has been done and provide suggestions as the final result of this research.

3. ANALYSIS AND DISCUSSION

a. BCWS, BWCP and ACWP Analysis

After analyzing the weekly report 's' curve data using the concept of yield values in the first week to the 20th week, it can be seen that the differences in BCWP, BCWS, and ACWP values are shown in the graph below.

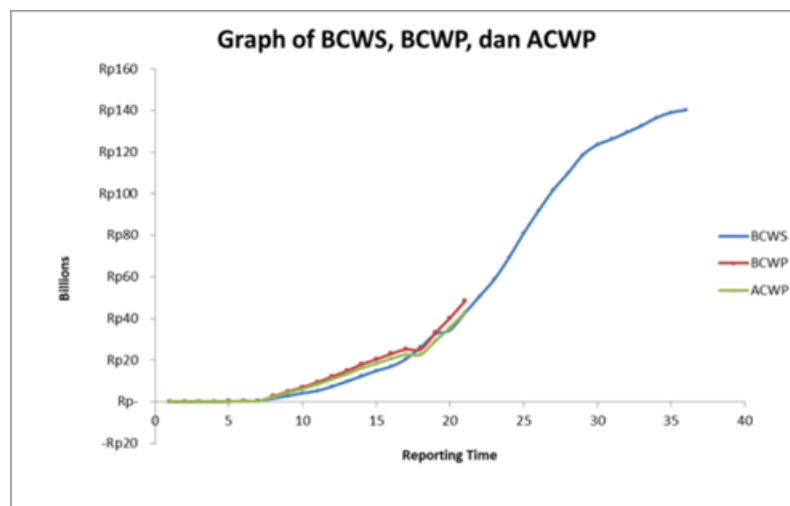


Figure 1. graph of BCWP, BCWS, and ACWP value

b. SV and CV Analysis

SV and CV analysis did after the value of BCWS, BCWP, and ACWP was known. To calculate the SV and CV formula used are:

Schedule Variance (SV) = BCWP – BCWS

Cost Variance (CV) = BCWP – ACWP

So, after getting the BCWS, BCWP, and ACWP values, the SV and CV values can be calculated. By using that formula the value of SV and CV in the first week until the 20th week can be known that shown in the table 1.

Table 1. Table of CV and SV calculation

No	Periode	BCWP	ACWP	BCWS	SV (BCWP-BCWS)	CV (BCWP-ACWP)
1	1st Week	Rp 1.674.969	Rp 1.567.000	Rp -	Rp 1.674.969	Rp 107.969
2	2nd Week	Rp -	Rp -	Rp -	Rp -	Rp -
3	3rd Week	Rp 74.223.939	Rp 66.370.572	Rp 14.027.352	Rp 60.196.587	Rp 7.853.366
4	4th Week	Rp 35.832.246	Rp 32.766.857	Rp 1.402.735	Rp 34.429.511	Rp 3.065.389
5	5th Week	Rp 44.790.308	Rp 40.791.357	Rp 91.177.786	-Rp 46.387.478	Rp 3.998.950
6	6th Week	Rp 166.364.000	Rp 149.467.357	Rp 187.966.513	-Rp 21.602.512	Rp 16.896.643
7	7th Week	Rp 2.268.106.680	Rp 2.043.305.882	Rp 1.256.850.712	Rp 1.011.255.968	Rp 224.800.798
8	8th Week	Rp 2.319.528.216	Rp 2.090.151.360	Rp 1.255.447.977	Rp 1.064.080.239	Rp 229.376.856
9	9th Week	Rp 2.024.896.711	Rp 1.824.080.215	Rp 1.262.461.653	Rp 762.435.058	Rp 200.816.496
10	10th Week	Rp 2.375.119.066	Rp 2.139.775.090	Rp 1.182.505.748	Rp 1.192.613.318	Rp 235.343.977
11	11th Week	Rp 2.814.286.781	Rp 2.534.918.784	Rp 2.074.645.316	Rp 739.641.465	Rp 279.367.997
12	12th Week	Rp 2.679.478.970	Rp 2.414.218.427	Rp 2.411.301.757	Rp 268.177.213	Rp 265.260.543
13	13th Week	Rp 3.204.812.503	Rp 2.886.525.461	Rp 2.545.964.334	Rp 658.848.169	Rp 318.287.041
14	14th Week	Rp 2.369.559.981	Rp 2.134.780.249	Rp 2.585.240.918	-Rp 215.680.937	Rp 234.779.732
15	15th Week	Rp 2.644.734.689	Rp 2.383.323.234	Rp 2.052.201.554	Rp 592.533.135	Rp 261.411.455
16	16th Week	Rp 2.159.704.523	Rp 1.945.403.559	Rp 3.613.445.798	-Rp 1.453.741.275	Rp 214.300.964
17	17th Week	Rp 7.938.373.380	Rp 6.585.427.654	Rp 6.298.280.913	Rp 1.640.092.467	Rp 1.352.945.726
18	18th Week	Rp 7.219.877.920	Rp 6.504.495.774	Rp 2.017.133.174	Rp 5.202.744.746	Rp 715.382.146
19	19th Week	Rp 8.026.450.643	Rp 7.231.182.575	Rp 8.105.003.812	-Rp 78.553.170	Rp 795.268.068
20	20th Week	Rp 9.276.081.933	Rp 8.356.830.619	Rp 8.138.669.456	Rp 1.137.412.476	Rp 919.251.314

He results of the SV calculation show that from the first week to the 20th week in several weeks the value is <1 which is marked on the graph with a red line.

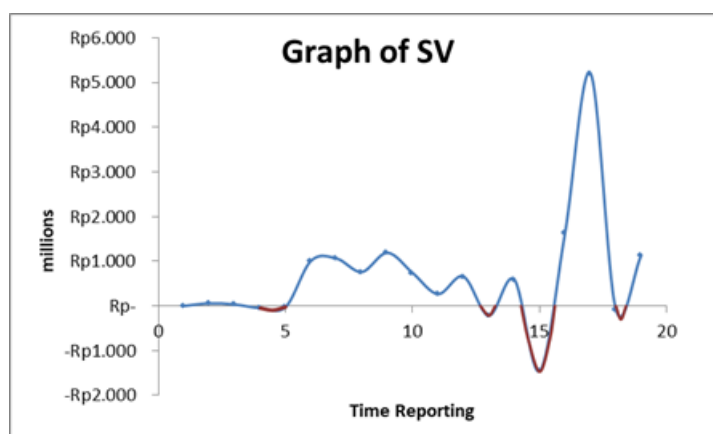


Figure 2. Graph of SV value

In contrast to the SV value which several times has a value of <1, the CV value in the first week to the 20th week is always >1. The following is a graph that displays the CV values from the first week to the 20th week.

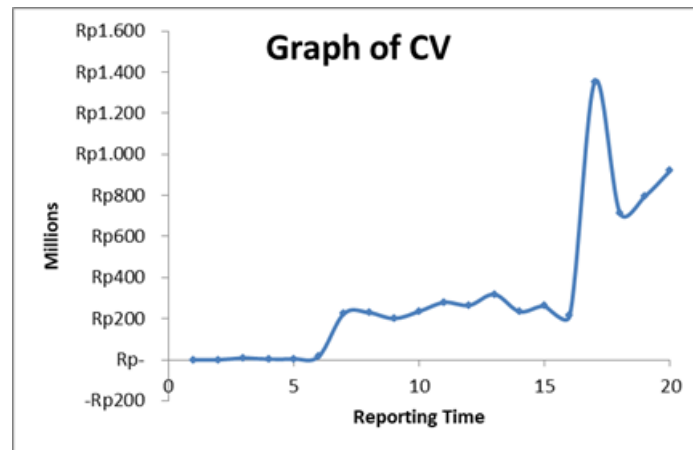


Figure 3. Graph of CV value

c. CPI and SPI Analysis

After getting the SV and CV values, with the same data used to calculate SV and CV the next step is to calculate the SPI and CPI. The formula used to calculate of CPI and SPI are:

$$CPI = BCWP/ACWP$$

$$SPI = BCWP/BCWS$$

The CPI value for the first week to the 20th week is > 1 .

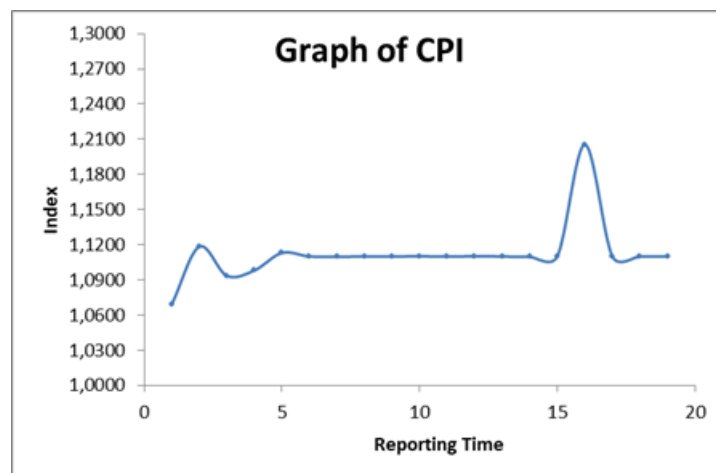


Figure 4. Graph of CPI value

For the SPI value, after calculating the yield value concept, it shows that the SPI value for several weeks is < 1 which will be displayed in the graph below.

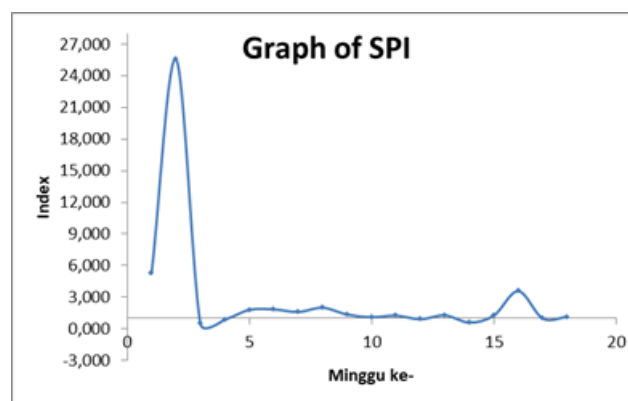


Figure 5. Graph of SPI value

d. ETC Analysis

With the data that has been obtained before, it can also be calculated Estimate Temporary Cost (ETC). The following is an ETC calculation performed on the 15th week.

$$\begin{aligned} \text{ETC} &= (\text{Total Budget} - \text{BCWP})/\text{CPI} \\ \text{ETC} &= (\text{Rp } 140.273.517.000 - \text{Rp } 23.023.209.060) / 1,10968 \\ &= \text{Rp } 105.660.846.685 \end{aligned}$$

The following is a graph containing the results of ETC calculations from the first week to the 20th week.

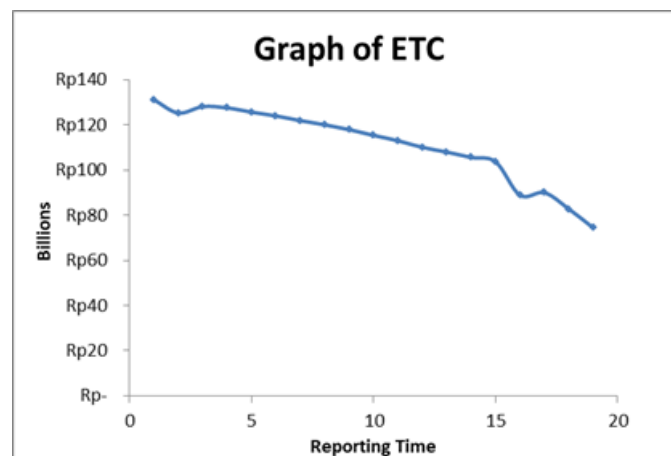


Figure 6. Graph of ETC value

e. EAC Analysis

With SPI and CPI data, the EAC value can be calculated. The following is an example of calculating the EAC at week 20th.

$$\begin{aligned} \text{EAC} &= \text{ACWP} + \text{ETC} \\ &= \text{Rp } 2.383.323.234 + \text{Rp } 105.660.846.685 \\ &= \text{Rp } 108.044.169.919 \end{aligned}$$

In the same way then in the first period to the 20th week.

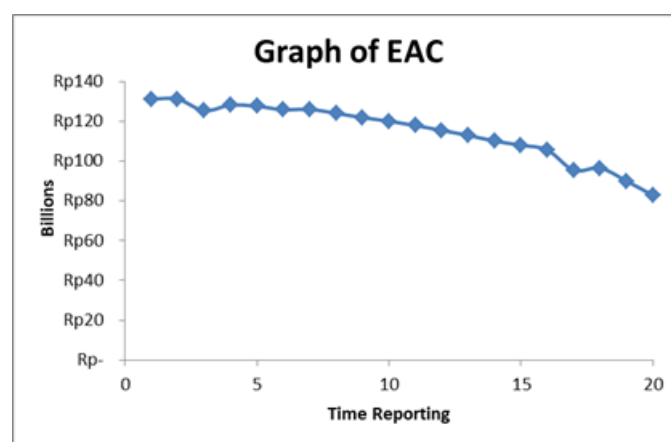


Figure 7. Graph of EAC Value

f. ETS Analysis

After calculating project costs, the next step is calculating the time needed to complete the work (ETS).

The ETS calculation at week 15th is shown below.

$$\text{ETS} = (\text{plan time} - \text{reporting time}) / \text{SPI}$$

$$= \frac{(34-15)}{1,289}$$

$$= 14,743 \text{ weeks} \sim 15 \text{ weeks}$$

In the same way, the first week up to the 20th week can be calculated and displayed on the graph below.

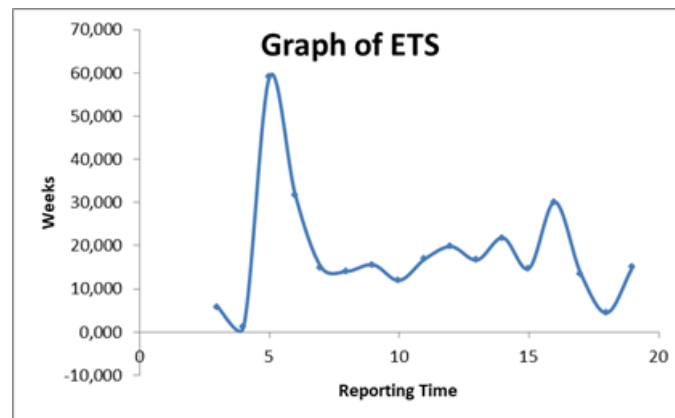


Figure 8. Graph of ETS value

g. EAS Analysis

In the evaluation using the concept of outcome value, after obtaining the ETS value, the Estimate all schedule (EAS) value can be calculated. EAS is the estimated total time needed to complete the job. EAS calculation at week 15 is calculated by the formula below.

$$\text{EAS} = \text{reporting time} + \text{ETS}$$

$$= 15 + 15$$

$$= 30 \text{ weeks}$$

By using the same formula and method, the EAS in the first week to the 20th week can be calculated and displayed in the graph below.

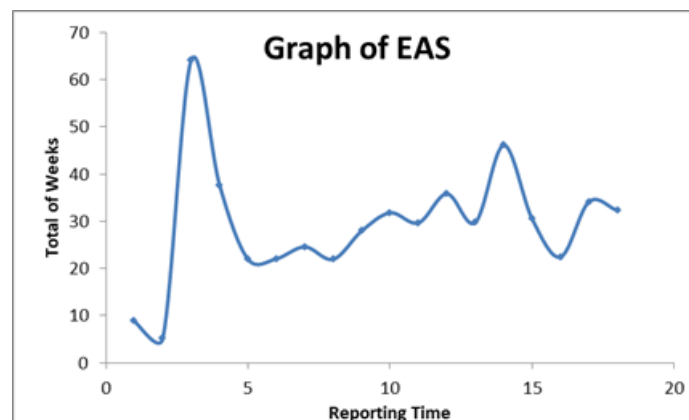


Figure 9. Graph of EAS value

Based on the results of calculations with the earned value analysis the BCWP value in the 20th week is IDR 9,276,081,933, the ACWP value is IDR 8,356,830,619, and the BCWS value is IDR 8,138,669,456. The SV value at the 20th week was 1,137,412,476 and the CV value was 919,251,314.

Based on calculations, it was found that in the first week to the 20th week the costs used in this development project did not exceed the planned costs.

When viewed from the SV value shown in Figure 4, the project implementation time shows that the SV calculation results for several weeks are negative, which means that the actual implementation of the project is slower than planned. This is also supported by the SPI value in Figure 7 which shows that in the same few weeks the SPI value is <1 .

However, the CV shown in Figure 5 shows that the CV value is always positive and also the CPI value is always > 1 which means that in implementing the project the costs incurred never exceed the planned costs that have been made.

The earned value method used shows that project implementation can be completed 2 weeks earlier than the initial plan if the worker's performance is the same as in the previous weeks and the weather in the field supports the existing work.

4. CONCLUSIONS AND RECOMMENDATION

Conclusion

The conclusions drawn from this study are:

1. The implementation of the project from the first week to the 20th week can be carried out properly as indicated by the cumulative percentage of work that exceeds the plan and there is no over budgeting in project implementation.
2. In the implementation of project, there were several weeks which showed that the workers' performance could not be according to plan, such as in the 5th, 6th, 14th, 16th, and 19th weeks. However, this did not interfere with the cumulative performance of the work until the 20th week.
3. The remaining costs needed to complete the remaining work in the 20th week are IDR 82,797,929,739 in 12 weeks. The project can be completed 2 weeks earlier than planned without increasing the number of workers and days if the worker's performance is the same as the previous weeks.

RECOMMENDATION

Based on the analysis and calculations that have been done, the researcher provides the following suggestions:

1. Project implementation evaluation activities as an effort to control costs and time should be carried out intensively every week to determine the performance of project implementation.
2. Work on the critical path must be an important highlight to ensure project performance is in accordance with the planned schedule.
3. This study used the PDM Work Network and Results Value Concepts method. For further research, it may be possible to use several more methods to make it more complex.

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