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The effect analysis of EVC system in project cost control

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ABSTRACT

The internationalization of large company now is to make a profit by project contracting, so as to maintain the company operation, engineering project cost control is an important part of project contracting. Here is the project cost control in the whole process of all costs, including a lot of things, and control of each link. So there is a lot of questions to maximize corporate profits can't reach. This paper use EVC system related evaluation index such as deviation of cost and schedule variance some principles, such as to illustrate some of the cost control of the project related issues, and clearly determine the progress of the project. For a company, the largest part of the project contract is profit, 80% of companies are now using EVC system principle. So the purpose of this study is through the related principle of EVC system which is used to explain the cost control in the company cannot be maximized the benefits. So as to better help the company achieve more profits, we can also be more convenient and effective to promote the project.

KEYWORDS

EVC System; Earned value principle; Basic value; Engineering project cost control.



INTRODUCTION

All international big companies are now to make a profit by project contracting, so as to maintain the company operation, engineering project cost control is an important part of project contracting, here is the project cost control in the whole process of all costs, including a lot of things, and control of each link, such as the different design may affect project cost of the project budget, project bidding and related investment, and the personnel of the cost of change. Especially now the procurement is the more cost of the entire project.

Now since reform and opening up, China's economic develop. Various enterprises is developing like spring. It will certainly make the larger scale of modern engineering, engineering construction of the system in our country also in unceasing reform and the deepening of China. If you want to develop it must increase supervision dynamics, so both technically and from personnel changes have put forward new requirements. As the country of the supervision and management of the project is more and more strict, and engineering are more complicated and the content of the difficulty is increased. This is right in front of everyone a big problem, what principle should be applied to analyze the role of the engineering project cost control? Some scientists through scientific analysis of the EVC system principle. Application of this principle can maximize the benefits. At present in China are widely used in many industries and has achieved good results. Domestic many scholars have put forward the relevant theories about EVC system principle, the scholars have proposed many very good point of view, the domestic scholars have Wang Yan medium (2003), they mainly used EVC principle and in view of the current construction engineering supervision system such as some frequent problems in some parts of the possible engineering science is poorer, staff efficiency is low, into several key links in the construction supervision information management mode of the in-depth research^[1]. Li Shipin (2013), they deeply understand the principle of the earned value in the engineering project cost management plays a considerable role. So it mainly expounds the coal chemical projects the characteristics of project management in EPC management mode, and combining the actual situation according to different concrete methods and contents of the enterprise cost control is given[2]. Ma Chenggnag (2003), they mainly studied how to do in the project contract to the cost management and control problems, and puts forward the principle of how to reasonable use of EVC system flexible[3]. Sun Shoubin (2005), and other scholars has EVC system principle can be applied on what specific problems are discussed in this paper[4]. This article first to the EVC system overview, specific introduction of EVC definitions and some basic value system principle, and then introduces some of the specific conditions of the engineering project cost control in China. So the purpose of this study is through the related principle of EVC system is used to explain the cost control in the company cannot maximize the benefits, so as to better help the company achieve more profits. It can also be more convenient and effective to promote the project.

EVC SYSTEM OVERVIEW

EVC system definition principle

Referred to the EVC system principle, we may not be very familiar with, but if mentioned the earned value concept, many entrepreneurs are not strange, earned value theory is widely used in many ways. Earned value principle is the English name of earned value management so general usually referred to as "the theory for the EVC system principle. This is a kind of method which can be all levels of management in many aspects. Everyone, of course, this theory can make the company fully understand the status of the company's cost, mainly through the funds to reflect. Other names of earned value principle is the earned value method. And its unit of measurement is money. Below a picture to explain to you specific details shown as Figure 1.

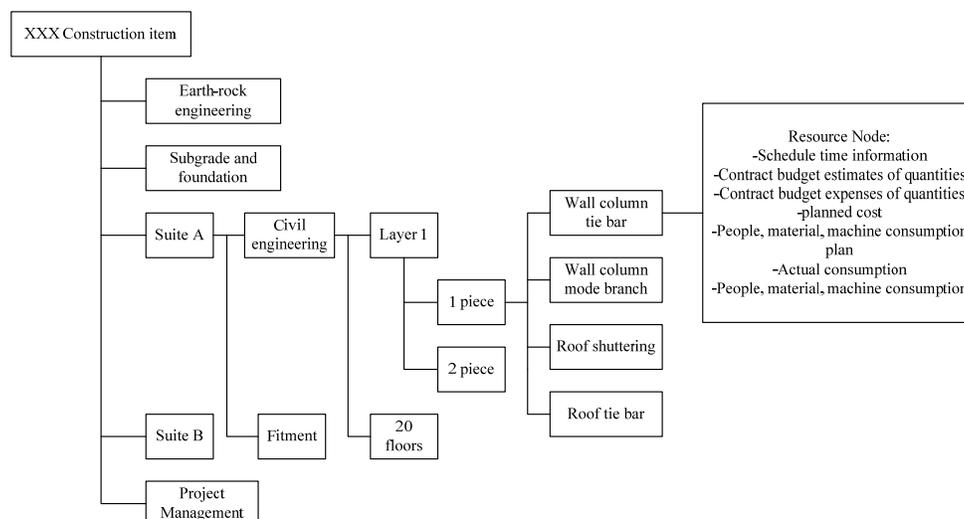


Figure 1 : WBS decomposition of tree structure and the resources to hook up

EVC system principle of basic parameters

EVC system principle has been widely used in many industries and has achieved good results. By using EVC related principle to explain in the cost control in the company cannot maximize the benefits, so as to better help the company achieve more profits, can also be more convenient and effective to promote the project.

Introduce already finish work budget value (EV), used for comprehensive evaluation of project cost/schedule, is the owner for the work of the budget, is based on previous similar cases before the project owner of the enterprises and their own estimates of funds for the operation of the project.

That at any moment in the project implementation process, comparing the value "" completed project budget to evaluate and measure the work schedule, and will" already finish work budget value "and" actual resource consumption value "compare, to evaluate and measure the execution effect of resources. Now's detailed analysis the EVC system budget value "and the time work task" of the principle of basic parameters.

EVC system principle have already finished the work of the parameters of the budget, is the owner, according to some people finish the work within a period of time has some of the costs of the specific circumstances to give.
 Completed work budget = completed work * budget unit price

EVC system principle of basic parameters include planning the budget, just as its name implies is the owner for the work of the budget, is based on previous similar cases before the project owner of the enterprises and their own estimates of funds for the operation of the project.

BCWS=Plan the workload of * budget unit price

EVC system principle of basic parameters include the actual cost of the project work completed, actually say a bit more clear is cost, to a specific time to the actual cost of work completed.

EVC system principle is not like you imagined with the actual cost as the reference standard, the reference standard of quantization is amount to reflect the results of the transformation project of funds, and other methods to than, therefore, it is a more complete method of regulation project. The above said three basic parameters can make you a better understanding of the specific conditions of projects.

EVC system principle of the three basic values

Cost deviation CV (Cost Variance)

No matter what cost deviation is very normal, in a project, the owner according to some people finish the work within a period of time has some of the costs of the specific circumstances to give the budget of this is finished work, because the actual operation is expected and sure there is a gap, so will produce cost deviation.

Cost deviation = already finish work budget - already work out the actual cost

$CV = BCWP - ACWP$ or $CV = EV - AC$

When the cost of deviation is negative, it indicates that the cost of projects run over budget, this time you need from the procurement or personnel adjustment is to make certain changes. So instead cost when the deviation for the timing. It means the actual cost not beyond the budget. This time also can not treat STH lightly, should supervise the budget. The Figure of Error is shown as Figure 2.

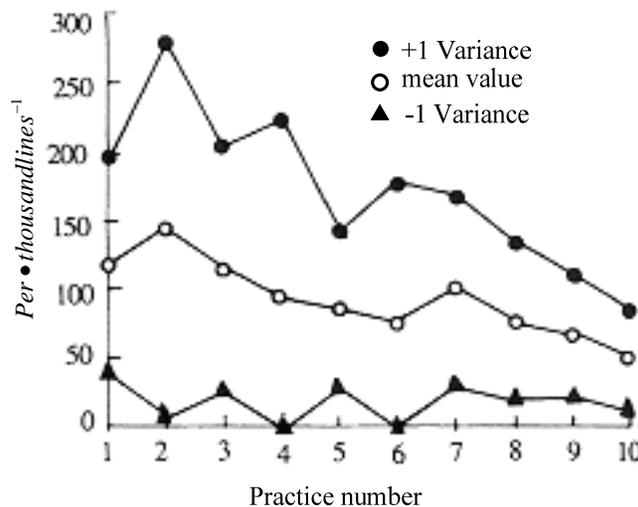


Figure 2 : The figure of error

SV(Schedule Variance)

Because there are a lot of unexpected circumstances occurring could make engineering accident resulting error, so in this case, the progress deviation is time has finished the engineering practice and when the owner plans has the difference between the project time. This difference is normal, degree of progress deviation is the actual time and has the engineering plan the deviation degree of the time. While the owner has done well before the project for budget, both time and money. But in the actual situation is because the weather or other reasons can cause problems.

Schedule variance = work has finished budget - project budget

$$SV = BCWP - BCWS \text{ or } SV = EV - PV$$

As you think, when the progress deviation is negative, it means schedule delays, the actual schedule behind schedule, at this time requires an let the project completed as soon as possible, so as to achieve the company benefit maximization. So when the progress deviation is positive, it means the schedule in advance, the actual progress faster than schedule. This time is the most want to see all the people.

The analysis work as the main working schedule variance. Key job is something directly affect the progress of the projects, such as the procurement and design, but if there is a deviation of the work as the key work, then no matter how big or small deviation, are sure to follow-up work and more or less impact on the total time limit for a project. This is absolutely not allowed by the company, any delay of time limit for a project are not allowed to happen, then the corresponding adjustment measures must be taken at this moment, to ensure a smooth process of construction schedule. If the work of errors occurring doesn't work for key, need according to the deviation and the total time and freedom, the size of the time difference, the influence degree of the determination of follow-up work and total time.

The analysis is progress deviation is larger than total time difference. As you know is that if a variety of work progress deviation is greater than the total time of this work, it means that the deviation will progress deviation is less than or equal to the total time difference, the work that had no effect on the deviation to the total time limit for a project, but if its impact on the follow-up follow-up work and total time limit for a project, then no matter how big or small deviation, are sure to follow-up work and more or less impact on the total time limit for a project. This is absolutely not allowed by the company, any delay of time limit for a project are not allowed to happen, then the corresponding adjustment measures must be taken at this moment, to ensure the progress of the normal, then the company will have to take some corresponding adjustment measures. If the work has a certain influence, and its influence degree, need according to the comparative deviation and freedom to determine the condition of jet lag.

Analysis the progress deviation is greater than that of free jet lag if working progress deviation is greater than the work of free time, explain this deviation affect the follow-up work, should be how to adjust, should be based on the severity of the follow-up work allows influence. If work progress deviation is less than or equal to the work of free time, explain this deviation has no impact on subsequent work, therefore, the original schedule cannot be adjusted.

After such careful and detailed analysis of some of the company's schedule control personnel can according to the specific situation to specific analysis of the relevant circumstances, and can adjust the work schedule variance and confirmation should adjust the size of the deviation. In order to determine the adjustment measures, obtain new accord with actual progress and goals of the new schedule shown as Figure 3.

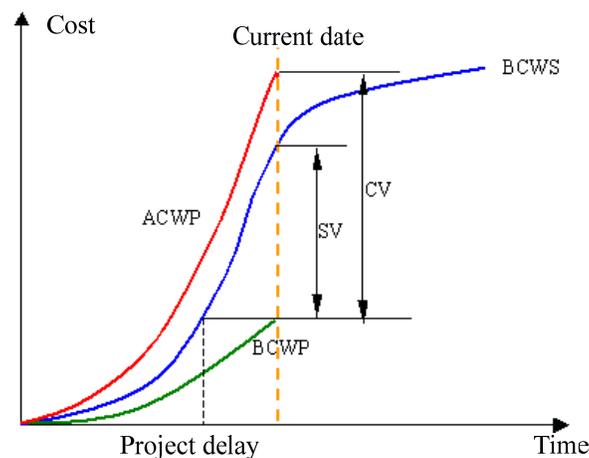


Figure 3 : The new accord with actual progress and goals of the new schedule

Cost performance index, CPI

Cost performance index = work has finished budget/has finished the actual cost

$$CPI = BCWP / ACWP \text{ or } CPI = EV / AC$$

When the cost performance index < 1, said now engineering cost overruns, which is the actual cost is higher than the budget, which is in a project. The owner according to some people finish the work within a period of time has some of the costs of the specific circumstances to give the budget of this is finished work, because the actual operation is expected and there is certainly a gap, it will produce cost deviation. It is the meaning of cost performance index. When the cost performance index > 1, said now project cost savings, which is the actual cost is lower than the budget. Cost performance index reflects the relative deviation, experts say that is to say, cost performance index of the things it is not restricted by any project level, more is not affected by the project time limit. So in the same project and can be used in comparing different projects. The cost performance index, CPI is shown as Figure 4.

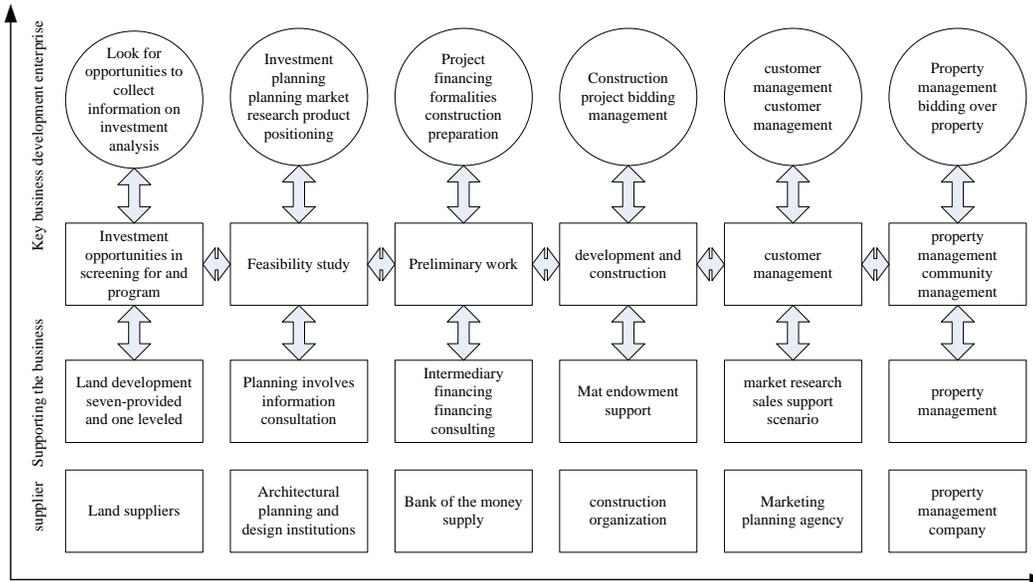


Figure 4 : The cost performance index, CPI

Schedule performance index of SPI

Schedule performance index = Budgeted cost of work completed / Cost budget work plan

$$SPI = BCWP / BCWS \text{ OR } SPI = EV / PV$$

When the schedule performance index < 1, said schedule delays, the actual schedule behind schedule. When the schedule performance index > 1, said ahead of schedule, the actual progress faster than schedule. Both cost deviation or two deviation reflects the progress deviation is absolute deviation, the results of absolute deviation is very intuitive, so in order to better facilitate specific real understanding of the related project cost management cost, the absolute amount of errors occurring, of course, no matter the number is big or small error, this is bad, then no matter how big or small deviation, are sure to follow-up work and more or less impact on the total time limit for a project, this is absolutely not allowed by the company, any delay of time limit for a project are not allowed to happen. Then the corresponding adjustment measures must be taken at this moment, to ensure the progress of the normal, then the company will have to take some corresponding adjustment measures. And take action accordingly. So as to formulate or just little adjustment cost plan and so-called financing plan. But, so that we can't ignore the absolute deviation has its limitations that not allow to ignore. For example in different engineering project is also the cost of 200000 yuan deviation, but in the role of engineering is not the same, a simple example for the total cost and total cost 100 million yuan 10 million yuan project, also the cost of the deviation is 200000 yuan, but its severity is obviously different. For the 10 million project 200000 deviation is big, will cause a great loss to related company, but for a \$1 item, the deviation of 200000 can be ignored. Therefore, whether it is cost deviation or two deviation reflects the progress deviation is absolute deviation, deviation is only suitable for the deviation analysis is done on the same project. (progress) performance index reflects the relative deviation, it is not restricted by project level, also is not affected by the project time limit, so in the same project and comparing different projects can be applied. Using EVC systems related evaluation index such as deviation of cost and schedule variance, some principle to illustrate some relevant problems in cost control of the project, and clearly determine the progress of the project. For a company, the largest part of the project contract is profit, 80% of companies are now using EVC system principle. So the purpose of this study is through the related principle of EVC system is used to explain the cost control in the company can not maximize the benefits, so as to better help the company achieve more profits, can also be more convenient and effective to promote the project.

The meaning of EVC system principle

Earned value method is all to the project personnel expenses and the comprehensive control on the progress, this theory can overcome in previous projects both in engineering science with poor or some parts of the problem of low efficiency of work. And it often appears in the project cost and schedule before separate control defects, even if in the past projects when you find flowers cost overruns, the relevant staff is hard to know what is immediately due to cost over budget or due to ahead of schedule. So if we can't find the specific reason won't know how to improve, this will affect the construction of the project, then with should we find in the project cost is lower than the budget cost, the relevant staff it is hard to know immediately due to cost savings are due to schedule delays. So if you can't find the specific reason won't know how to improve, this will affect the construction project. While using the earned value method can be qualitative quantitative assessment of the effect of execution progress and cost.

EVC principle and in view of the current construction engineering supervision system such as some frequent problems in some parts of the possible engineering science is poorer, staff efficiency is low, into several key links in the construction supervision information management mode of the improvement and further research.

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The diagram of Human together during the month and Human cumulative is shown as Figure 5.

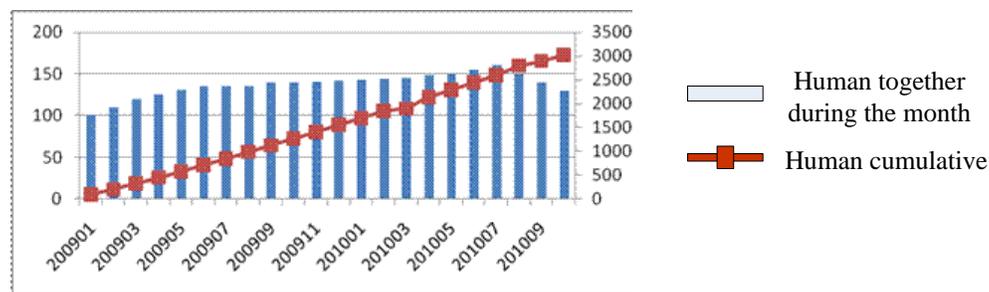


Figure 5 : The diagram of Human together during the month and Human cumulative

OVERVIEW OF ENGINEERING PROJECT COST CONTROL

Define engineering project cost control

Project control refers to the process of the project by some means to monitor and control project, the purpose of this is actually very simple to by some means to manage the whole project. Then EVC system principle can very good play the role of regulation. The application of this theory can make relevant managers to better manage the company's specific conditions, to improve the core competitiveness of the enterprise.

Cost control problems in the engineering project

All international big companies are now to make a profit by project contracting, so as to maintain the company operation, engineering project cost control is an important part of project contracting. Here is the project cost control in the whole process of all costs, including a lot of things, and control of each link. So there is a lot of questions to maximize corporate profits can't reach. This paper, by using EVC system related evaluation index such as deviation of cost and schedule variance some principles, such as to illustrate some of the cost control of the project related issues, and clearly determine the progress of the project. For a company, the largest part of the project contract is profit, 80% of companies are now using EVC system principle. So the purpose of this study is through the related principle of EVC system is used to explain the cost control in the company cannot maximize the interests of EVC system of the principle of innovation, for a project, a number of parameters, were introduced into the theory and with the development of science and technology, and application of the computer and the Internet related knowledge. With the help of high-tech products to otherwise we may not know the clear chart to display the internal law in front of everyone. To better help the company achieve more profits, can also be more convenient and effective to promote the project.

Especially in the engineering project cost control in traditional engineering project cost control method, only in the final by the end of the project funds settlement, it is not reasonable. And you think the difference is that in general the project cost management should not only include cost accounting, although the cost is really special one of the important factors. But because in the actual process of construction project of the production process has the characteristics of one-off, so everyone in the cost of management center of gravity should move to advance precontrol and things in the process control. A project for enterprise is at least a month, or even more, there are many more than a month's worth of projects, the project cost so long time, during this time many of both internal and external conditions, who all unexpected accident may happen, such as continuous heavy rain and even earthquakes. This will certainly affect the construction of the project, make project can't go to everybody to predict the direction of the development and change, resulting in the effective control project. In the actual

project construction will be exposed the lack of full cost management idea, that is to say if the company relevant technical personnel just responsible for the technical research and ensure engineering quality of the project, at the same time, in order to ensure the construction quality of took looks very feasible but actually is not very economic technical measures. If similar project engineering organization staff simply from the production and the progress of the project construction for rushing blindly increase the construction personnel and equipment, etc., these will cause increased costs. This is the problems exposed in project contracting.

CONCLUSION

EVC system of the principle of innovation, for a project, a number of parameters, were introduced into the theory and with the development of science and technology. The application of computers and the Internet also related knowledge, with the help of high-tech products to otherwise we may not know the clear chart to display the internal law in front of everyone. Believe that with the development of the era and the progress of science and technology, with the development of the society constantly, this principle is EVC system to maximize the benefits. And in China are widely used in many industries for the development of enterprises better.

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