First International Symposium on Mine Safety Science and Engineering

Improvement and application of earned value analysis in coal project management

Shuheng Zhong[a], Xin Wang[a], a*

[a]Faculty of Resources and Safety Engineering, China University of Mining and Technology, Beijing, 100083,China

Abstract

It would have some deficiencies in traditional earned value analysis methodology when were applied into schedule measurement methods and cost measurement methods in a project management, in light of this, the approach to improve cost measurement methods was presented. And, based on property of analysis task total time difference, the conception of weight earned value was introduced to resolve vital path problem of schedule measurement methods; meanwhile, the weight earned value calculating formulas and analysis processes were given in this paper, which could provide a more accurate basis for coal project measurement.

*K*eywords: Earned value, evaluation index, weight earned value;

1. Introduction

It already has more focus on using the theory and method of project management effectively and reasonably to guide actual works. For the manufacture enterprise, cost control and quality assurance have already become the assurance of enterprise survival and development. In order to successfully complete the stated project in a definite time limit and manufacturing cost, the trace analysis and control monitors should be required during the process of its implementation, once problems were discovered, it would be prompted attention to it and avoided a greater loss to the project.

Earned value analysis (EV), also is called deviation analysis, is a project management technique for measuring project performance and progress in an objective perspective. [1,2] It is an effective method of

combination control to the scope, schedule and cost of the project. By measuring and calculating the budgeted cost for work performed (BCWP), actual cost for work performed (ACWP), and budgeted cost for work scheduled (BCWS), the project scheduling and cost variance (CV) were obtained, thereby could measure the project budget and schedule performance. And it is notable for its ability to provide accurate forecasts of project performance by measuring and calculating the budgeted cost and the actual cost of the project.

2. Underlying principle of EV

2.1. Structure

There were three basic parameters of EV implementation, including:
- (1) BCWS (budgeted cost for work scheduled)

BCWS was defined as permissible budgeted cost for accomplish project plan workload at some stage during project implementation. And it mainly reflected regulation workload of plan, not the regulation cost. The calculation formula is:

$$BCWS = Plan \quad Workload \times Quota \quad Budget \quad Price \tag{1}$$

- (2) ACWP (actual cost for work performed)，

ACWP was defined as actual cost at some stage during project implementation. ACWP was mainly used to reflect the values of actual consumption.
- (3) BCWP (budgeted cost for work performed)

BCWP was defined as the calculating cost of the accomplishment of work and quota budget price, which could also called EV (earned value). And it could quantify the accomplishment of the project.

$$BCWS = Accomoplishment \quad Workload \times Quota \quad Budget \quad Price \tag{2}$$

2.2. Four evaluation indexes of EV

- (1) CV(cost variance)

CV was defined as the difference between BCWP and ACWP in inspection of the project, the calculation formula is:

$$CV = BCWP - ACWP \tag{3}$$

CV< 0, means that the actual cost is higher than planned (bad); CV>0, means that the actual cost is less than planned and means under expenditure or high efficiency (good) ; CV= 0, means that the actual cost is right on planned (good).
- (2) SV (schedule variance)

SV was defined as the difference between BCWP and BCWS in inspection of the project, the calculation formula is:

$$SV = BCWP - BCWS \tag{4}$$

SV< 0, means that the project is ahead of schedule (good); SV>0, means that the project is delay of schedule (bad) ; SV= 0, means that the actual schedule is right on planned (good).
- (3) CPI (cost performed index)

CPI was defined as the ratio between BCWP and ACWP in the project, the calculation formula is:

$$CPI = BCWP / ACWP \tag{5}$$