Construction Cost Control Research Based on BIM

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Abstract **– BIM technology as the emerging field of engineering industry, has grown in recent years, applications from models, simulations, to deepen in an increasingly complex and large projects have achieved good economic benefits and efficiency, which shows the great potential value of BIM technology applications. BIM technology in the application of cost management in this paper.**

Index Terms **–BIM, construction, cost control**

I. Introduction

In traditional of construction project in the often exists following phenomenon, construction enterprise to low price bid again to changeable more claims profit, large project to should change calculation cost changes and progress changes, construction process in the cannot by time, and content, and space, requirements completed cost calculation, these phenomenon are reflect has traditional construction cost management in the exists of problem and dilemma, BIM technology of parameter of features, and multidimensional degrees data, and accurate simulation is can help construction cost management personnel effective control project progress status, Solve problems previously.

II. Cost control

Cost control method has many, this text choose earned value method as example for research, past earned value method application in the is not cannot distinguish key route and non-key route, but past of technology means often to reached timely response of requirements, and engineering change frequently occurred Shi route distinguish is is not so important and to account, BIM technology can on route distinguish efficient corresponds to, also more can for cost control caught focus and core, on project cost control and progress control of integrated effect more better, Treatment can also put forward some more specific recommendations and solutions.

A. Establishing a baseline

Earned value monetary amount planned costs, actual costs and budgeted cost of work performed, establishes a contact representation in terms of cost and schedule performance. First need will project cost by work decomposition structure by Shang down decomposition to work package, its calculation order by work package within activities occurred statistics, work package as most bottom units to statistics calculation select has fixed time interval of different time node as monitoring points, for example time interval for two week or each months of last day, select on project team right of time interval is important, time interval too short cannot is cannot timely collection data, interval had long cost deviation has been so occurred, cannot save; second, Need calculation plans cost, by artificial fee, and mechanical Taiwan class, and material equipment costs, and management fee and the other composition, actual cost is by construction site actual occurred costs said, has been finished work of budget cost by has been finished work engineering volume and budget price multiply and have, need note of is has been by began but not actual completed work of measurement, on its according to completed part percentage for measurement;

B. Difference between critical and non-critical path

In the traditional application of earned value method in the budgeted cost of work BCWP budgeted cost of work scheduled BCWS for the cost difference between CP and judge progress by deviation of plus or minus or control, if the deviation is actual duration beyond the scheduled duration, that is ahead of schedule; negative deviation indicates that actual duration is less than the scheduled duration, progress lags behind. But there is a defect in this kind of judgment, schedule variance analysis object for the entire project, said the overall progress of control effectiveness, when the overall schedule variance is positive, does not mean that local progress remains ahead of schedule, it is possible some progress ahead of the performance evaluation data coverage part of lagging progress performance measurement data.

So a simple summary of data causes this phenomenon exists, that is, beneath the surface in the General project normal, partial performance control imbalance exists. Was therefore unable to determine the specific parts of the deviation, and take corresponding measures to improve it. That managers tend to be accepted as a whole earned value is positive, but can't solve problem when earned value is negative. In order to address this shortcoming with partial emphasis on key routes, discriminant analysis of critical and non-critical path activities earned value, only critical path activities completed projects can be completed in the

scheduled duration.

At earned value method of improved application more is difference out different path of earned value completed analysis, specific achieved need following several steps, first confirmed project activities implementation of key route and non-key route, then for key route and non-key route respectively completed earned value evaluation, in precise analysis cost deviation and progress deviation of control object, analysis key route whether change or different route beyond control range, then take measures improved.

III. PROJECT COST CONTROL BASED ON BIM

A. Proactive cost plans

In BIM model in the completed construction simulation, intuitive visual judge process in the potential of risk, avoid may occurred of cost loss, in project actual construction Qian completed virtual construction plans and the take feasible of optimization measures, for example reasonable construction site layout reduced two times costs of produced, this for cost plans of rationality and as control standard has directly effect, and by cost model calculation out labor input curve, and mechanical Taiwan class input curve, as construction site task arrangements of according to. Also, for project cost curve may be concerned about the beginning of project costs a large proportion of project, project cost curves forward towards early in the project to recover funds, reducing enterprise financial pressure.

Material costs accounted for actual engineering total cost 60-70 of proportion, directly constitute project entity, is construction stage cost control of focus, consumption calculation accuracy and the different time paragraph of demand is is guarantee engineering material efficient using of key means, BIM technology can prior calculation out in any a specified time paragraph within, and regional within completed points items engineering by need of various material needs number, precision, and fast of calculation avoid has by past experience estimates subtle deviation small but Summary cost deviation big of situation, Save profits in detail for the construction unit, management information and materials with BIM platform capable of timely feedback to mandate-holders or other participating units, while ex-post back to confirm the material demand, help to inventory management information and help control unit checks on materials of construction.

B. In the matter of cost control

In project implementation process in the, frequently occurred of engineering change on completed settlement has larger effect, is thing in the cost control of focus, exists design change, and engineering volume change, and construction conditions change, and progress plans change, and engineering volume listing increased items reduction items,, corresponds to Yu cost model, is is update model within need adjustment of related data, for example layer high; added work range; added construction cost of measuring; adjustment different route Shang activities of resources configuration and construction process, compression activities continued time, Increases or decreases points items engineering volume listing and amounts, these engineering change are can with cost model achieved, cost changes data easily get, project management personnel timely face complex changeable of status also can targeted completed decision task, follow-up processing means also can into cost model update, and reality keep consistent sex of cost model also can continued dynamic support cost control, detection project cost implementation situation and progress implementation situation, will update data records and feedback to cost model, Project management personnel can directly according to BIM model determine plans cost and actual cost Zhijian of difference and plans progress and actual progress of gap, analysis progress deviation derived from key route or non-key route, cost deviation derived from Yu which activities project, to out corresponding data report, this need project all participation party communication coordination, common provides model application of related data, project cost management in the exists of problem more early to solution also help other participants maintenance itself interests.

C Ex post cost control

Last resort in settling stages cost control, simple and effective settlement helps contractors achieve huge profits, and to prepare materials prior to the settlement: contract materials, drawings, engineering data, payment information, quality assurance, and other information. Integrated has above information of BIM model itself is can as completed delivered Shi eventually results, due to its information transparent public easily search, project participation parties are can search himself need of information, participation units Zhijian also reduced has due to on drawings communication not Chang led to of push floor wrangling, but currently weizhi to b IM model as completed delivered results also late became mainstream, related legal regulations and the Government file are late can clear be confirmed. BIM models by its completeness, accuracy guarantee settlement efficiency and smooth, meanwhile has been completed project enriches enterprise database, the accumulation of costs based on BIM technology management experience and skills, whether to participate in individual, participating departments have a very good reference for learning.

IV. CONCLUSION

By grandsoft BIMSD software 5D cost model, combined with identifying the costs of earned value method of the route completed integrated control practices, in the course of project implementation can be more accurately control the cost and schedule variance, a good early warning control effect, corrective measures to meet the expected requirements.

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