The Research of Data Mining in Grid Life Cycle Cost Control

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Abstract. In the background of the gradual improvement of the information technology and the socialist market economic system in, the entire life cycle cost management has replaced the entire process project cost management, therefore, high power investment projects such as grid construction, should strengthen project cost management, to adapt to the new era development requirements. The paper, from the perspective of data mining, analyzed and assessed the grid entire life cycle cost, and put forward reasonable proposals for cost control.

Introduction

In recent years, our country advocated strongly the market-oriented reforms on the grid, on this basis, building the power grid construction cost data mining model, achieve cost control and project cost variance analysis based on data mining, which can further strengthen the power grid construction management. However, project cost control is not an once thing, the management activities throughout the whole process of the project from planning to acceptance. Life Cycle Cost Control is an the method of implementing the total cost minimization of the project life cycle including of the various stages, to achieve scientific decision-making, and ensure quality, safety and meet the functional, then achieving the targets of reducing Project Life cycle cost.

The Importance of Project Cost Control

Project Cost Control Problems Existed

There is a direct link between the cost control of architectural Engineering and the economic efficiency of construction enterprise, the present stage cost control in china, over budget and so widespread, these phenomena largely affected the construction enterprise management rationalization, specific questions are as follows.

Project cost members did not meet the standard of professional skills. For grid companies, the cost sector is necessary, it is a necessary prerequisite for getting on smoothly tender and improving profitability. However, at present, the problem that economic and technical separated on the construction field is widespread, Technical staff believe the project cost is the responsibility of financial officers, ignoring the project cost; On the other hand, the cost members generally do not understand the technical knowledge about the engineering technology, so the construction cost would be difficult to determine reasonably and controlled effectively.

Tendering and bidding is not standardized. Bidding irregularities mainly show the manual operation, deliberately suppressed project cost, which in the cost administration was unable to correctly judge the cost of the project, and pose a serious threat to the engineering quality and safety, increase the difficulty of the work of relevant departments.
Enterprise quota is not standardized. Different construction companies, there is a big difference between different building projects and different construction companies. Grid as a special industry, in the construction process, the selected equipment, technology, capital and raw materials have special requirements, these requirements often require large amounts of data as a basis for analysis, but in practice, companies often ignore this, resulting in quota happening deviation, affecting the liquidity of enterprise capital.

Subjective waste phenomenon is more serious. We usually unable to determine the fixed standard to limit the late work in the design phase of construction projects, which in the waste phenomenon occurs sometimes. Designers change design, impacting the authenticity of project cost.

**Significance of Project Cost Control**

Construction project cost control is closely related to the interests of business. After selecting the project, investors begin to carry on a series of investment management activities: assessment decision, bidding design, bidding, contract, organization of construction, completion and acceptance. All expenses paid in investment activities constitute a project cost, so the success of project cost control is directly related to the profitability of the enterprise. Strengthen cost management enables effectively control cost, reduce investment and operating costs, enhance the company's operating capability and competitiveness.

Building construction is a job that involves many fields, it has many features, such as long construction period, the variety and technical demanding production factor prices change frequently, compared with other industrial products, its cost more difficult to control. Construction unit project cost control is not only to prevent the investment from exceeding the limit, more positive meaning to promote the construction, design and construction units to strengthen the management, human, material and financial resources and other limited resources are fully utilized, to achieve best value for money. Especially the power grid and other major projects, because of its large amount of investment, its project cost management is more important. In the course of the project implementation, reasonable cost control measures and strict cost management are guarantee of quality and efficiency of project [1].

In essence, the perfect construction project cost control efforts are not just make the project investment capital is controlled within a limited range, but also make full use of resources to obtain more economic benefits. However, the traditional management model lags, many management does not implement radical reforms, which have a certain influence to construction project cost and cost control [2]. If construction enterprises want to obtain economic benefits in construction, achieve their own development, they need to take effective measures to solve the existing problems and good construction project cost and cost control efforts.

**The Content of Grid Project Cost Control**

The entire life cycle time grid construction projects is very long, and the contents in the various phases of the project are not the same, therefore, in the course of its cost control, we should scientifically divide the whole process on the basis of analyzing the relevant data. Similar to other construction projects, the whole life cycle of the power grid construction project also includes a plurality of stages: investment decision-making, design, bidding, construction, completion and acceptance, operation and maintenance and so on. To better achieve grid construction project cost
management and achieve maximum benefit, we should control all aspects of the whole process \(^{[3-5]}\).

![Figure 1. Flowchart of construction costs control under date mining.](chart)

**The Cost Control of Investment Decision-making Stage.** Exist between the various aspects of a close relationship, and thus the cost of the project cost control must proceed from the initial construction project, namely investment decision-making stage, permeate all aspects \(^{[6]}\). Cost control in this phase is the premise cost of each of the other stages. When making estimates, there are certain to reserve fund to guard against the risk, with the aim to achieve a minimum cost of total project, a more rational use of human, material and financial resources, finally achieving the maximum investment returns.

**The Cost Management of the Design Phase.** The design phase is a key of construction project cost control, and playing a connecting role. The proportion of design costs of total costs is only 2%-3%, although this percentage is small, but its impact on the project cost up to 75-85%. Design stage construction cost control mainly includes two aspects: First, the design of the tender, good design for the entire project has a guiding role. The second is imposing a quota, reducing unreasonable changes to make sure the amount of investment in a reasonable range \(^{[7,8]}\).

**The Cost Control of the Bidding Phase.** Bidding is essentially competing under market economy conditions, each one of the various stages of project costs amount can be clearly presented in this stage. The work of bidding phase will directly affect the construction project progress and the project cost, and facilitate for enterprises to select construction enterprises which are short duration,
low cost, quality and security. First of all, at this stage, we must do security work, secondly, after winning, the construction side contracts with the construction contract, to regulate the behavior of the parties.

**The Cost Control of the Construction Phase.** Construction phase of the project is the stage that the capital investment is largest, and is an extension and practice of the previous stage. Strengthen the construction cost control, it is to strengthen the management of compliance behavior. At this stage, we are suppose to pay attention to strengthening contract management, improving the supervision mechanism, enhancing the economic and technical means, scientifically selecting the equipment, materials, etc.

**The Cost Control of the Final Acceptance Stage.** The main work of this stage is to truthfully review be completed engineering review, according to national or local relevant regulations, contracts, budgets and fixed costs, completion data, carefully examine the project payment. Making settlement audited truly reflects the actual cost, to achieve a virtuous circle.

**Completes Reasonable Proposals of the Grid Construction project Engineering Cost Control**

**Improve the Relevant Personnel Cost Control Awareness and Professional Skills**

From the early stage of the planning and design, bidding, construction process and completion settlement, each link needs to have the person who has appropriate level to complete the related jobs, cost control of construction cost must rely on enterprise members to strengthen. Of course, it is not enough to rely solely on the staff, but also need to establish a scientific and effective management mechanism for enterprise managers. First of all, enterprises should strengthen the training of all staff and improve the staff's awareness of cost control and professional skills. Secondly, the enterprise management personnel need to develop a sound responsibility management system, the cost target specific to each one-way project even specific to each staff. Finally, the establishment of reward and punishment system, as long as it can effectively reduce the cost should be appropriate incentives to encourage the parties to try to reduce the cost of the project.

**The Use of Information Technology to Strengthen the Construction Cost Management**

With the continuous development of the Internet, big data and other science and technology, cost accounting methods are constantly updated, cost management and control that based on data mining is one of the effective ways. Due to the operating characteristics of the construction project, a variety of project management cost data more dispersed, the staff using the traditional way of working is not only difficult to collect data, and will increasing the difficulty of the work, so the application of information technology is enabling the staff in a short time to collect and intelligent processing of complex data, to improve work efficiency and quality of cost control and management has a positive significance, to ensure the capital cost minimum under the premise of guarantee engineering quality, safety and progress.

**Improve the Project Cost Management Model**

Establishing a sound investment control system, and establishing construction supervision and management mechanism, the pursuit of effective control of investment projects, in accordance with the provisions on the supervision and implementation details, and improving relevant systems, implement the responsibility to establish a sound investment control system from the project.
management mechanism. Reviewing progress payment, the amount of the project that be
determined by the supervising party, according to the contract agreed valuation basis, the material
unit price and the cost of a fixed price to pay the corresponding project progress.

Perfect Contract Management Work

The signing of the contract is carried out before the building engineering construction, the formulation
and signing of the contract must be strictly in accordance with the requirements of the relevant rules and
regulations. When signing a contract need to scrutiny of these projects, and restrain the unbalanced
quotation, reasonable control of price and contract price, detail description of the materials, equipment,
quality, technology, labor costs and other requirements in the contract. In the process of signing the
contract, the terms of the contract need to be objection, it is necessary to negotiate, as far as possible to
the lowest cost of the project to complete the provisions of the contract. At the same time, it is necessary
to have a certain predictability of the contract claims and fully consider the possibility of rising to the
claim controversial point, so as to avoid the occurrence of claims.

Summary

Power sector construction projects typically have a feature that is large investment and long period
of time, etc., thus the space of saving the cost in the process of construction cost control is large; on
the other hand, it requires a lot of data for the support, and should be run through the whole life
cycle, including decision, design, implementation and acceptance. Adjusting the bias, controlling
limits, so making human, material and financial resources to play its biggest utility, while , there are
still many questions about their cost control, it is necessary to strengthen the awareness of staff,
introduce new technologies, improve the relevant regulations and management mode, to reasonably
control costs and maximize efficiency.

References

[1] Pu Jia. Project cost control and analysis [J]. Project quality management and control,
2016.03:182-183.

[2] Guohua Song. The importance of the cost control of construction cost and electrical equipment
installation in cost control in the substation engineering construction process [J]. Management and


[4] Zhiying Xu. Cost control research based on total life cycle theory [D]. Chengdu University of
Technology.2008.

[5] Yinghua Zhao. Discussion on the various stages of civil engineering construction cost control [J].


[7] Lifeng Tian, Xinlun Gao. Project Cost Study Based on Economy Cost Control [J]. China