

Study on Large Power Grid Construction Projects Whole Process Cost Management Modes

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Abstract

Cost management is an important part of power grid construction project management, reasonable cost management should start from project decision-making stage and end at completion acceptance stage, namely whole process management. This paper expounds the connotation of whole process cost management, at the same time, puts forward proposed plans as to its application in large power grid construction projects, and makes interpretation about meanings of power grid construction projects whole process cost management.

Keywords: large power grid construction projects, whole process cost control, cost control methods

1. Introduction

With sustained and rapid development of China's national economy, the power demand is also growing rapidly. To meet the needs of society, the speed of the power grid construction also accelerates in various regions, the scale of investment is expanding gradually. At the same time, our country makes the development direction of "resource saving and environment friendly", which puts forward higher request towards power engineering projects. Power grid construction projects cost relates to power grid enterprises' benefits and long-term development, involves the enterprises' prestige and construction external environment, therefore, strengthening cost management of power grid projects is the need of power grid enterprises to realize sustainable development, also is the concrete reflection of enterprises to undertake social responsibility initiatively, is the important and basic work to implement the scientific idea of "shifting power grid development mode".

Cost management is a very important content in power grid projects management work, its aim is to control project costs and expenses in the scientific and reasonable scope, use the human, material and financial resources to avoid project risks, apply the accounting systems legitimately in order to obtain good economic and social benefits. In other words, if without effective investment control management, the results will appear "San Chao" phenomenon, that is project estimate exceeds estimate, budget exceeds budgetary estimate, settling exceeds budget. Even affects projects' quality and time limit, and will severely restrict engineering project investment returns, then cause a country's waste of resources.

2. Whole Process Cost Management

Whole process cost management is one of the advanced methods, controlling and managing projects cost dynamically, which was introduced from abroad at the beginning of 1990s. China engineering cost management academia puts forward project whole process cost management, which refers to cost management starting from the cost forecast at project feasibility study stage to project cost control, economy demonstration, contract and contractaward price determination, construction funds application, to actual engineering cost determination and as-built post evaluation so far (Dong Hongchang, 2010).

The core idea of whole process cost management is to determine and control projects cost in accordance with a set of methods based on activities. Projects cost determination method based on activities is a kind of cost-determination technique method which is according to cost accounting principles based on activities. First, it will resolve all operations of a construction project comprehensively and get a project activity list; Then analyze and determine required resources of each project activities, collect and determine the market prices of resources; Finally, determine the cost of one project from top to bottom (Xiao Liping, 2010).

3. Power Grid Construction Project Whole Process Cost Management

3.1 Connotation of Power Grid Construction Project Whole Process Cost Management

Power grid project whole process cost control is to meet the premise of reasonable quality standards, at investment decision-making stage, design stage, execution contract stage, construction stage and completion final accounts stage, control the projects' cost into approved limits, correct the deviation at any time, to ensure the realization of targets about projects management, try to utilize human, material and financial resources reasonably in every project, then achieve better investment benefits and social benefits (Chou Fei & Liu Lingfu, 2009).

3.2 Meaning of Grid Construction Project Whole Process Cost Management

Implementing whole process management in the grid construction projects, that is to change the traditional management modes fundamentally, realize maximum efficiency and minimum cost in the whole process of power grid construction, improve the grids' management level, its main meanings are:

- (1) To the benefit of making feasible goals. Compared with traditional grid construction, whole process management is putting much more emphasis on building the goals of grid projects' function, construction period, and cost and so on, which makes the original target more practical.
- (2) To the benefit of improving projects' safety and reliability. Whole process management makes the overall consideration, clears each link's reliability and safety, and enhances the security and feasibility of power grid construction as well as operation further. On one hand, the requirements of operation stage obtain full considerations in the early process of decision, which reduce the possibility of potential safety hazard at the planning, design, contract and construction stages and other early stages greatly; On the other hand, in the operation process, using all kinds of management method based on whole management concepts can help raise the level of management.
- (3) To the benefit of achieving saving and environmental projects. Whole process management requires to implement the policies of land saving, material saving, water saving and energy saving from the early stage to construction stage the whole process, then reduces the consumption of resources, lowers operating energy consumption, which has the demonstrative effect about building a saving-type society.
- (4) To the benefit of realizing maximum overall profits of electric power enterprises. Through taking all things about construction as well as operation into consideration from planning, design, bidding and other stages, whole process management makes achieving the lowest construction cost as the goal, join every link in the whole process effectively, lower power grids whole cost significantly, raise the property efficiency.

3.3 Control Methods of Grid Construction Project Whole Process Cost Management

Power grid projects whole process cost management is an entirely new management mode of construction projects cost, namely use professional, technical expertise and methods to plan and control resources, costs, profits and risks effectively in the entire projects from a to z.

(1) Investment decision stage

Decision stage matters the investment returns and investment success or failure about construction projects. At decision stage, decision-making content is the basis of deciding projects cost, which has direct impact on the scientific and reasonable determination and control of other stages afterwards. Improving decision levels effectively can be started with the following aspects.

- a) Make well feasibility study of construction projects. The results of feasibility study affect projects' success or failure directly; furthermore, the formative investment estimate is an important foundation to determine limited design gross values, also it will influence primary cost estimate and working drawing estimate, so making well feasibility study is the key of controlling cost.
- b) Carry out feasibility study of bidding system. Introduce competition mechanism into the feasibility study of construction projects, and then choose the programs with most advanced technology, economic rationality, safety reliability, highest profits, which makes investment estimate reasonable, to improve the accuracy of investment estimate, and achieve the goal of effective control.
- c) Determine investment estimate accurately. Investment estimate is the investment ceiling of the entire construction project, and the source of cost control. Accurate investment estimate relies on reliable data, scientific project decision and reasonable investment estimate index. Good investment estimation needs seriously reading and referring to all kinds of cost or quantities files and so on, which were saved at the diagram budget

stage before; Also needs collecting necessary intelligence materials of the project, more important is to analyze the influence of market changes towards project cost, consider the unforeseen cost appropriately, and strive to the fact that the estimate can reflect the true situation of projects, makes the investment estimate really play the role of controlling engineering cost; Also needs setting up scientific decision-making systems, clarifying decision-making responsibilities and rights, drawing up estimate index of high quality.

4) Supervise project approval strictly, and promote project legal entity responsibility system. Strengthen project approval and examination management; Establish investment projects experts evaluation demonstration and consultation assessment systems, towards the projects which don't meet the conditions, will not pass the approval. After the project approval, project legal entity responsibility system will be implemented, which is international practice, and is good to establish legal entity investment subject, form the operation mechanism of self-decision, self-discipline, risk on one's own, self-development.

(2) Cost control at design stage

After investment decision, design will become the key to controlling cost, the design level and quality are the pivotal links influencing engineering project investment.

1) Do well optimization jobs of design schemes

Optimizing alternative design schemes is the first step of design stage, it is also an effective method to control the engineering investment. Design units need combine engineering technique with economy personnel together to prove whether the adoptive design schemes are feasible in technology, meet the need in function, reasonable in economy, safe or secure in application. Especially in economy, design optimization is an important method to control cost; Application of new crafts, input of new materials, alterations of part design and so on always can cause great change of projects cost. As to the same construction project, different design schemes may produce different project costs. So emphasis on optimization job of design schemes can control cost effectively. When determine design scheme, it should be under the condition of meeting use function, apply value engineering to demonstrate technology economy of schemes, and choose design scheme according to economy index and combined revenues index.

2) Give great impetus to quota design, and pay attention to the combination of technology and economy.

Projects should carry out quota design vigorously, control preliminary design according to the approved project commitments and investment estimation, then control budget of construction drawing project at detail design stage according to approved preliminary design and budget, at the same time, each system of engineering construction projects ensures a premise of satisfying the use function at project approval, design according to distribution of investment quota, control unreasonable alterations in technology design and detail design seriously, ensure that estimation and budget play the role of control layer upon layer, make sure that the total investment limitation is not be broken (Su Tianbao & Li Peilei, 2009). Design unit should make design and estimate an organic whole, avoid divorcing from each other.

3) Implement dynamic budgets

Construction projects are with huge scale, large investment and long construction period generally, and under market structure, building materials and machinery equipment prices change a lot, which may cause investment of projects under construction to appear large gap for long hours. So executing dynamic cost formation at design phase can solve the questions of investment gap caused by long construction period effectively.

(3) Cost control at bidding phase

Set up reasonable bid evaluation and calibration principles. As to bid price is less than cost and other irregularities, we must formulate bid evaluation and calibration principles. First, evaluate rationality of the whole quotation from contractors based on market price, then pay attention to using time value of money, and assess balance of contractors' quotation accurately.

(4) Cost control at construction stage

1) Strengthen contract management

Construction contract is the direct basis when conducting engineering settlement, paying construction fund as well as dealing with claims. Strengthening contract management is the important and means to improve the level of project cost. So enhance the contract record and examination, check whether the content accords to relevant laws, regulations and rules, whether it is consistent with offer and acceptance in the process of bidding and tendering. In the contract implementation, establish and perfect contract performance track checking system, strengthen supervision, improve contract performance rate, find out problems and correct timely, prevent

disputes from happening, reduce and avoid construction claims.

2) Optimize construction organization design and construction measures

Scientific, reasonable construction organization design and construction measures, firstly, can dominate the overall situation, highlight key issues under the condition of fitting owners' requirements and contracts; Secondly, technology should be advanced, which can

reflect the characteristics of science and technology advance, can use the equipments, facilities and auxiliary systems compactly to improve labor productivity; Furthermore, ensure normal circulation homework at any time, guarantee mining face not free, operation uninterrupted, to realize balanced, continuous operation; Finally, consider second and third phase projects comprehensively, reduce repeated input as far as possible.

3) Control engineering alterations strictly

Engineering alterations includes design alterations, construction condition alterations, timing plan alterations, construction period alterations, underground engineering as well as added projects according to owners' representative or supervision engineers' requirements and so on, every alteration involves project cost. Therefore, it must control design changes in construction process strictly, expanding construction scales and raising construction standards according to design alterations are prohibited rigorously. Towards the necessary changes, it must do change analysis of quantities and cost, with approval of construction units, design units examine and visa, send out corresponding drawings and instructions, then issue change notice, adjust the original contract to determine project cost.

(5) Cost control at completion stage

The completion stage is the last program of project construction whole process cost control, it is also project investment effect testing phase. This stage should carefully examine and verify engineering budget and settlement, review authenticity, reliability, rationality of final accounts, to prevent costs, which are caused by calculating more quantities, high set of unit price, calculating cost repeatedly, raising materials' price, unpractical visa, from counting into construction cost. In addition, it should examine compilation basis of final accounts, such as construction contract, agreement, used budget and expense quotas, material price differences calculation methods, design alteration and drawing examination records, alteration and visa at construction site and so on; Check whether final accounts charging standard is corresponded with construction enterprise level; Whether design alteration and drawing examination records are sealed by design unit; Whether alteration and visa at construction site is confirmed and sealed by both sides.

4. Conclusion

Project cost management is a technical, professional and policy-oriented task, it is throughout investment decision, project design, tender and bid and construction stages. The scope and content of each stage are different though, they are linked very closely from each other; They are with some continuity, can't divorced or replaced from others. At investment control process, the stage before guides and controls the stage after, the after is restricted by the former. Construction project cost control and management is a dynamic process, implement whole process cost control is an inevitable trend about project cost management. Strengthening the active control of engineering cost, intensifying dynamic management and supervision of entire process are the need of market economy development, and have specially important meaning to improve investment benefits.

References

- Chou, Fei, & Liu, Lingfu. (2009). Control and Management of Power Grid Construction Project Whole Process Cost Management. *China Power Education*, 22.
- Dong, Hongchang. (2010). Development and Exploration of Construction Project Whole Process Cost Management. *Management Engineer*, (04).
- Su, Tianbao, & Li, Peilei. (2009). Shallow Talk Construction Project Whole Process Cost Management. *Business Modernization*, 18.
- Xiao, Liping. (2010). Discussion on Construction Project Whole Process Cost Management. *Chinese and Overseas Architecture*, (10).