

Exploration of the Role of Engineering Technology and Economic Analysis in Engineering Cost Control

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Abstract: Engineering technology economic analysis has a wide range of applications and a wide range of applications, which can be combined with construction projects and efficiently run through the entire construction project. This article conducts an in-depth analysis of the role of engineering technology and economic analysis in engineering cost control. Engineering technical and economic analysis contains a wide range of content and runs through the entire construction stage. It involves enterprises using scientific and effective methods to calculate, analyze, compare, judge, and evaluate the financial situation of projects, in order to obtain practical, feasible, and reasonable empirical evidence, providing scientific decision-making basis for the project promotion of enterprises. On the premise of ensuring engineering quality, select materials reasonably and prepare and review material procurement plans to keep cost differences within a reasonable range and avoid changes in cost control caused by changes in raw material prices. Starting from the technical and economic analysis of engineering, improving the economic rationality of the project while ensuring its quality, and maximizing the comprehensive benefits and goals of the project.

1. Introduction

In recent years, with the rapid and steady development of China's market economy, construction projects have mushroomed, and such a prosperous scene is the result of the active pursuit of economic interests by all participants. Engineering technical and economic analysis has a wide range of applications, which can be combined with construction projects and run through the whole construction project efficiently, including design, implementation and maintenance. According to the current construction process of engineering projects in China, and under the background of macro-control by the government, independent quotation by enterprises, price formation by market competition and comprehensive supervision by the society, engineering cost management is the most important means, that is, cost determination and control are carried out from various stages such as planning, construction and completion acceptance [1]. This paper analyzes the function of engineering technical and economic analysis in engineering cost control. Engineering technical and economic analysis contains many contents and runs through the whole construction stage. It is a scientific and effective way for enterprises to calculate, analyze, compare, judge and evaluate the project finance, so as to obtain practical and reasonable evidence and provide scientific decision-making basis for the project promotion of enterprises [2-3]. Engineering technical and economic analysis plays a very important role in the whole construction process. From preparation to project acceptance to formal use, engineering technical and economic analysis runs through the whole construction process, which can control the project cost within a certain limit and ensure that the whole construction can achieve greater economic benefits [4]. By means of engineering technical and economic analysis, we can comprehensively screen and analyze the construction scheme and actual design situation, and effectively deal with the problems such as engineering change and construction claim from a scientific perspective. Only by making full use of the advantages of engineering technical and economic analysis can the project cost be effectively controlled. If we want to build a superior quality project and improve the economic benefits of enterprises, we must strengthen the control of project cost. At all stages of the construction project, it is the engineering technical and economic analysis that plays an important role in guiding and regulating, and constantly helps the construction unit to do a good job in budgeting and checking. Therefore, the

engineering technical and economic analysis plays a very important role in project decision-making, design, contracting and construction [5]. If we want to ensure the scientific nature of the project cost, we need to fully proceed from the technical and economic analysis of the project, improve the economic rationality of the project on the basis of ensuring the quality of the project, and realize the comprehensive benefits and objectives of the project to the greatest extent.

2. The Importance of Engineering Cost

2.1. Improve engineering management level

Engineering cost, as a key aspect of engineering management, can not only help engineering enterprises achieve the goals of cost management, but also promote the achievement of engineering quality and progress goals, enabling efficient implementation of various construction operations. Generally speaking, the investment time of a construction project is relatively long, and the amount of investment is relatively large[6]. Therefore, when planning and implementing the project, a phased, comprehensive, and full process engineering cost control process is generally conceived. As shown in Figure 1, the recognized construction projects in China are divided into five stages: decision-making, design, contracting, construction, and acceptance. They are both independent and mutually constrained.



Figure 1 Engineering Cost

Although the phased implementation of engineering cost control has been recognized by the industry, the situation of prioritizing each stage is severe, which affects the quality of the project. Engineering technology economic analysis is an effective means of achieving engineering cost control, providing economic and technical support for its role. That is to say, engineering technology economic analysis is a method that utilizes technological and economic means to influence and interact with each other[7]. Through this method, multiple engineering cost control schemes can be compared and analyzed to achieve the best results.

Generally speaking, when construction begins, due to differences in the difficulty of the construction process at each stage, the phenomenon of actual cost not matching the budgeted cost often occurs. During the entire construction process, the difficulty of initial cost control is the greatest, and in the actual construction process, construction companies have certain requirements for the accuracy of cost control [8]. In the process of engineering cost control, cost personnel need to ensure the quality of the project and strive to achieve the maximum economic benefits with the minimum engineering cost. In engineering cost management and control work, relevant personnel need to comprehensively manage all elements and processes on the project site, and this process helps to improve the level of engineering management.

2.2. Improve the competitiveness of construction enterprises

The application of engineering technical and economic analysis method in engineering is to combine economy with technology, which is the core of engineering and an important guarantee of engineering quality. With the development of science and technology in China, the construction

technology in the project has been greatly improved. In order to create more economic benefits for the project, we can combine the two perfectly, inject economic ideas into the project construction management, and provide development opportunities for the project construction [9]. Because the construction stage of the project is different, the accuracy of the corresponding project cost will also be different. In the whole project of building construction, combined with the determination and control of the project cost, the corresponding investment estimate, preliminary design estimate, construction drawing budget, contract price and settlement price for later completion will be generated. Considering all aspects comprehensively, the optimal solution is selected to ensure that the construction cost is within a reasonable and controllable range, so as to avoid the occurrence of cost out of control [10].

Using engineering technical and economic analysis, a new type of energy-saving power equipment can be provided for managers, which can effectively solve the problem of resource waste, and at the same time, intelligent frequency conversion power supply technology can be realized to automatically adjust the flow of water and electricity, thus reducing the loss of resources [11]. Extract the characteristics of each stage, calculate the accuracy according to these characteristics, and then form a consideration range based on these characteristics, so that the investment amount, the preliminary budget of design, the budget of construction drawings, the contract price, the quality standard of completion stage and so on can be clear and accurate, and all the subjects involved in the construction can know fairly well. If engineering enterprises can carry out fine and whole-process cost management and control in actual engineering construction, they can gradually enhance the comprehensive competitiveness of enterprises and help enterprises win greater competitive advantages in the same type of enterprises.

3. The specific role of engineering technology and economic analysis in modern engineering cost control

3.1. Enhance the scientificity of project design

The average proportion of design fees for general projects is 2-3%, which is significantly different from the international design fees accounting for 7% to 10% of the total project cost. According to information released by relevant institutions, the control during the design phase directly affects 76% to 93% of the overall project cost quality. Therefore, the economy and rationality of the design phase plan are one of the key points of the project's overall process control. In the stage of engineering contracting, if effective and scientific technical and economic analysis can be conducted, the bidding party can scientifically determine the bidding plan based on the characteristics of the provided project project and the situation of potential bidders. Bidders can summarize the bidding method according to the characteristics of the bidding plan, which can enable the bidding party to select high-quality winning enterprises based on the quality of bidding document information and even the comprehensive strength of the bidder. Ensure the quality of the project according to specific design requirements, while also ensuring that the quantity and cost of the project are within the design limit. On the one hand, the project cost limit should be determined according to the construction design drawings, in order to scientifically estimate the project, control the cost within a certain range, and ensure the smooth progress of the project.

3.2. Ensure long-term economic benefits

In the project decision-making stage, the tasks that need to be completed include investment opportunity research, preliminary feasibility study, feasibility study, project evaluation, and decision-making. This includes studying the construction area and scale of the engineering project, the available resources in the surrounding environment, and the measures taken to protect the environment, a detailed plan for the equipment and technology used in the construction project, and the financial rationality and feasibility of the engineering construction project. This work constructs the macro framework of the project. Effectively regulate the factors that affect cost control, such as rising material prices and changes in human resource prices. On the premise of ensuring

engineering quality, select materials reasonably and prepare and review material procurement plans to keep cost differences within a reasonable range and avoid changes in cost control caused by changes in raw material prices. Based on many current examples, it can be seen that in the design stage of a project, preliminary design accounting is generally used to design the project investment. Therefore, enterprises should analyze the economic performance of each stage of project design based on engineering technology and economy, and coordinate the relationship between project design technology and economy to ensure the advanced technology and reasonable economy of the design engineering project to the greatest extent.

3.3. Optimize project bidding strategy

A good bidding scheme must be scientific, reasonable and highly targeted. It will combine the characteristics of the project, human resources and natural resources, identify the strengths, weaknesses and opportunities that can be transformed. With the help of engineering economic and technical analysis, a better project bidding strategy can be formulated. After the completion of the project, cost review and accounting should be carried out to reduce repeated useless calculations, so as to control the project cost in the whole construction process, so as to improve the utilization rate of funds and improve the economic benefits of enterprises. As an important part of project investment control, the project adopts technical and economic analysis in the decision-making stage, which realizes effective control of the cost at this stage. Through the project bidding, enterprises with strong engineering strength and abundant capital reserves were screened out. Take the following measures in the project decision-making stage to effectively control the project cost as shown in Figure 2.

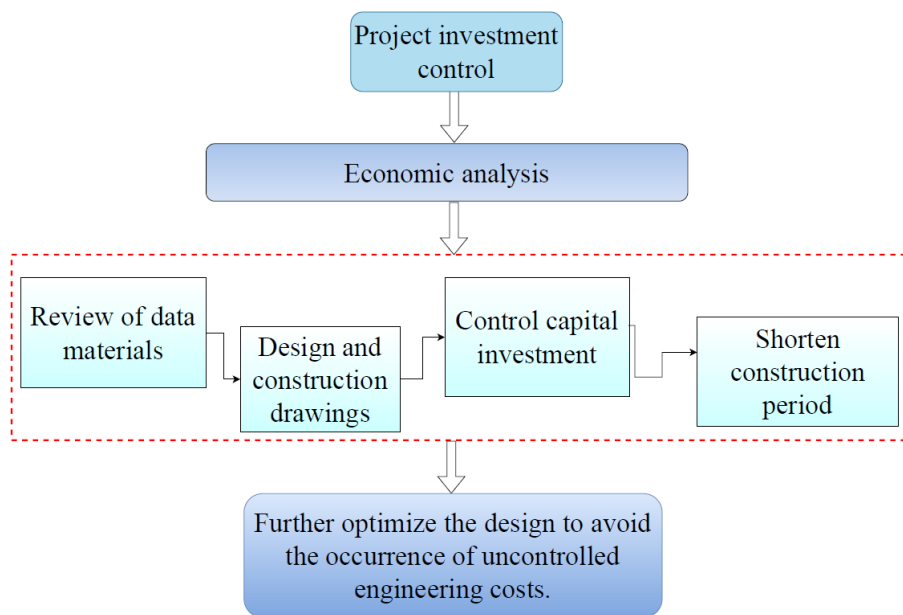


Figure 2 Cost Control in the Decision Stage

Develop corresponding management systems. Among them, integrating safety management, quality management, and other aspects. For example, in order to improve the quality of the project, construction enterprises and construction units should introduce third-party testing institutions to conduct phased audits of construction projects.

4. Conclusions

In construction projects, engineering technical and economic analysis is a very feasible and effective cost control method, which helps to control the project cost within a reasonable range. When the actual price deviates from the target price, the causes of the problem will be analyzed, which can only be solved when the problem occurs and cannot be effectively avoided. Many engineering projects often have many problems when carrying out engineering cost control. If we

want to effectively improve the engineering cost level, we must run the engineering technical and economic analysis through the whole process of the project to ensure the scientificity and rationality of the engineering cost. In this paper, the role of engineering technical and economic analysis in project cost control is deeply analyzed. The implementation of technical and economic analysis can not only determine the best project design and construction scheme, but also control the whole project cost reasonably. Therefore, in the process of engineering construction, we should actively implement engineering technology analysis, promote the development of engineering construction and maximize engineering benefits. In order to improve the economic benefits of enterprises, it is very necessary to control the project cost, the most important of which is the control of the project cost in the construction stage. Therefore, relevant project managers should apply engineering technical and economic analysis methods to predict the whole process of the project in advance and control the cost of each stage, so as to achieve effective control of the total cost.

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