

# THE INFLUENCE OF CONSTRUCTION PROJECT BUDGET ESTIMATION ON PROJECT COST

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**Abstract:** The impact of construction project budgeting on project cost is a complex and important issue. Analyzing construction project budget estimates. The definition and preparation method of the construction project budget estimate, and the influencing factors and mechanism of the construction project budget preparation on the project cost. Research indicates, The accuracy and comprehensiveness of construction project budgeting play a vital role in the control of project cost, and at the same time, there are many influencing factors. The diversity and interaction also have an important impact on the fluctuation of project cost.

**Keywords:** Construction project budget estimate; Compilation method; Project cost; Influencing factors; Mechanism of action

## 1. INTRODUCTION

With the development and progress of construction projects, more and more attention has been paid to the influence of construction project budget estimation on project cost. The estimated construction project budget refers to a rough project cost budget obtained through the calculation and analysis of various construction costs in the construction project design stage, which has high reference value and guiding significance. The project cost refers to the total cost of a construction project from design, construction to completion, including labor, materials, equipment, management and profit. Therefore, the impact of construction project budgeting on project cost is a comprehensive issue involving all stages, links and factors of the construction project life cycle.

## 2. DEFINITION OF CONSTRUCTION PROJECT BUDGET ESTIMATE

The construction project budget is a rough project cost budget obtained by calculating and analyzing various construction costs during the construction project design stage. It is the first step in the budgeting of construction projects and one of the important means of project cost control. The estimated budget of construction projects involves all aspects of construction projects, including construction materials, labor costs, machinery and equipment usage costs, civil engineering costs, decoration costs, etc. Through detailed calculation and analysis of these costs, a feasible budget can be provided for the entire project for subsequent construction planning, contract signing and financial management. The preparation of the estimated budget for construction projects needs to consider many factors, such as the engineering structure and building functions, the geographical location and environmental conditions of the building, relevant laws and regulations, etc. When preparing a budget estimate, it is necessary to select appropriate building materials and construction methods based on actual conditions and needs, and determine the corresponding construction period and labor costs. At the same time, the quality requirements and safety standards of the project also need to be considered to ensure the smooth progress and completion of the entire project. Budget estimation for construction projects is an overall system that needs to be analyzed and evaluated scientifically and rationally. It can not only provide an approximate cost budget for construction projects, but also provide basic data for progress control and cost control in the construction process, and provide reference for contract signing and financial management. Therefore, in the process of architectural engineering design and construction, the preparation and evaluation of architectural engineering budget estimates is of great significance.

## 3. PREPARATION METHOD OF CONSTRUCTION PROJECT BUDGET ESTIMATE

### 3.1 Historical Data Method

The historical data method is a commonly used compilation method, through the statistics and analysis of the historical project cost data, based on which the estimated cost is calculated. This method is suitable for similar construction projects, especially those with the same or similar structure. By studying historical data and making reasonable corrections and adjustments, a more accurate cost estimate can be obtained. However, this method has problems such as incomplete historical data and poor timeliness, which requires reasonable correction and adjustment.

### 3.2 Detailed Valuation Method

The detailed valuation method is a detailed and precise compilation method. Through detailed analysis and calculation of construction engineering design drawings, design instructions and other materials, various project quantities and costs are calculated, and various factors are comprehensively considered to obtain an estimated cost. This method requires careful evaluation and calculation of all aspects of the construction project implementation process, and requires a wealth of technical and professional knowledge. The advantage of this method is that the budget results are more accurate, but the disadvantage is that it takes a lot of time and effort.

### 3.3 Parameter Estimation Method

The parameter estimation method is a preparation method based on reference parameters. According to the scale, type, geographical location and other factors of the construction project, some reference parameters are determined, and the estimated cost is calculated by combining historical data and statistical methods. This method is relatively simple, suitable for similar projects and standard buildings, and can quickly obtain an estimated cost. However, the accuracy of this method is relatively low, and it needs to be adjusted and corrected according to the actual situation.

### 3.4 Empirical Estimation Method

The empirical estimation method is a preparation method based on experience and practice, and calculates the estimated cost through the cost of similar projects, construction environment and other factors, combined with professional knowledge and experience. This method is suitable for unconventional construction projects or projects without historical data for reference, and can quickly obtain an estimated cost. However, due to its lack of science and reliability based on experience and practice, there may be large deviations in the budgetary results.

## 4. INFLUENCING FACTORS AND MECHANISM OF CONSTRUCTION PROJECT BUDGET PREPARATION ON PROJECT COST

### 4.1 Influencing Factors of Construction Project Budget Preparation on Project Cost

There are many factors that affect the project cost in construction project budget estimation, including the accuracy and comprehensiveness of the estimated cost, construction project planning, design and construction and other factors.

#### 4.1.1 Accuracy and comprehensiveness of cost estimates

Estimated cost is a basic work of budgeting for construction projects, which has an important impact on subsequent project costs. The accuracy and comprehensiveness of the estimated cost are important factors affecting the project cost. If the estimated cost is too high or too low, it will have an impact on the subsequent project cost, resulting in the project cost exceeding or falling below the budget. Therefore, when preparing the construction project budget, it is necessary to consider the influence of various factors, and ensure the accuracy and comprehensiveness of the estimated cost, so as to ensure the normal progress of subsequent projects. For the accuracy of the estimated cost, it is necessary to consider various factors such as the construction scale, purpose, function, and structural form of the construction project. Otherwise, it may cause a large deviation in the estimated cost, which will affect the subsequent project cost. Therefore, it is necessary to use scientific and reasonable methods to calculate the estimated cost to avoid unnecessary errors. For the comprehensiveness of the estimated cost, all possible cost factors (as shown in Figure 1) need to be considered, including labor, materials, mechanical equipment, management costs, etc. If certain cost factors are missed, it may lead to subsequent project cost exceeding the budget. For example, when a construction project in Ningxia was approved, according to the requirements of "2013 Ningxia Hui Autonomous Region Construction Project Cost Valuation Quota", labor costs were not divided into types of work and technical levels. , both are 60 yuan/workday, but the "2019 Ningxia Hui Autonomous Region Construction Project Cost Valuation Quota" has been implemented during construction, and its cost has increased significantly, of which 113 yuan/workday for general workers and 141 yuan/workday for technicians, Senior technicians are 169 yuan/day, which leads to a great increase in actual labor costs. Therefore, when estimating the cost, it is necessary to fully consider all possible cost factors to ensure the comprehensiveness of the cost estimate and reduce the risk of project cost.

#### 4.1.2 Construction project planning and design

Construction project planning and design is also an important factor affecting project cost. The planning and design stage of a construction project is a critical period for determining the project cost. If the project cost is not fully considered in the planning and design stage, the estimated cost may be too high or too low, which will affect the subsequent project cost. Therefore, in the planning and design of construction projects, the factors of project cost must be considered to minimize the error of estimated costs. In the planning and design stage of construction projects, it is necessary to formulate scientific and reasonable design schemes according to the specific conditions of construction projects. The design plan should fully consider the actual needs of the construction project and the project budget to ensure the accuracy and comprehensiveness of the estimated cost. In addition, it is necessary to fully consider the feasibility of construction in the design scheme to avoid the occurrence of excessively high or low project cost. For example, Yinchuan Library made a mistake in predicting the technical requirements for roof grid truss assembly and

welding in the preparation of budget estimates, which led to the need to change the design of the construction method. This design change resulted in an increase of 316,200 yuan in costs.

#### *4.1.3 Construction management*

Construction management is an indispensable part of the construction process of a construction project. It is directly related to the quality and progress of the project, and will also have an important impact on the project cost. If there is no effective construction management, it may lead to delays in project progress, unqualified construction quality, waste of artificial materials, etc., which will make the project cost exceed or fall below the budget. Therefore, in the construction management process, it is necessary to strengthen management, control the project cost, and ensure that the project is carried out according to the budget. First of all, construction management needs to establish a sound management system and strictly implement relevant systems and processes. At the same time, it is necessary to strengthen construction organization and coordination, rationally arrange resources such as construction teams, equipment and materials, maximize construction efficiency, and ensure construction quality. Secondly, it is necessary to strengthen construction quality management to ensure that the construction quality meets the requirements and avoid waste of time and costs caused by construction problems. In addition, it is necessary to strengthen cost control and risk management, and reduce economic losses caused by construction problems by controlling costs and formulating corresponding plans.

### **4.2 The Effect Mechanism of Construction Project Budget Estimation on Project Cost**

#### *4.2.1 Provide basic data for project cost*

Construction project budgeting is the basic data of project cost, including the estimation of various project quantities and costs. In the subsequent project cost budget and accounting stage, comparison and adjustment can be made according to the estimated cost and the actual situation to ensure the accuracy and comprehensiveness of the project cost. Through the construction project budget estimation, the project cost can be estimated in advance, so as to help enterprises determine a reasonable investment budget and reduce economic risks caused by changes in project cost.

#### *4.2.2 Provide reference for project investment decision-making*

In the stage of project investment decision-making, it can be compared and analyzed according to the estimated cost and budget plan to determine whether to carry out the project investment. At the same time, the feasibility and investment direction of project investment can also be determined according to the estimated cost. Through construction project budget estimation, reliable data support can be provided for investment decisions of enterprises, investment risks can be reduced, and investment benefits can be improved.

#### *4.2.3 Provide guarantee for project quality management*

Through the estimation of the estimated cost and the rationality of the planning and design, the possibility of later project changes and rework can be reduced, and the project quality and project efficiency can be improved. The balance between project quality and cost can be ensured only if the project quality requirements are fully considered in the process of budget estimation and corresponding measures are taken.

#### *4.2.4 Provide basis for project supervision and acceptance*

Through the estimation of the estimated cost and the plan of the project progress, basic data and reference basis can be provided for project supervision and acceptance, so as to ensure that the project is carried out according to the plan. Only by fully considering project supervision and acceptance can the quality and safety of the project be ensured, thereby effectively reducing the possibility of later project changes and repairs.

## **5. CONTROL STRATEGY OF CONSTRUCTION PROJECT BUDGET PREPARATION ON PROJECT COST**

In order to ensure the control effect of construction project budgeting on project cost, it is necessary to adopt corresponding control strategies.

### **5.1 Reasonably Control the Accuracy of Budget Estimates**

The budget estimate of a construction project needs to consider many factors, including project scale, complexity, construction location, project progress, materials and equipment and other factors. In the process of estimating the cost, the accuracy of the cost estimate is very critical. If the accuracy of the estimated cost is too high, the project budget will be too high, resulting in waste of resources; if the accuracy of the estimated cost is too low, the project cost will be underestimated, which may cause hidden dangers in project quality and safety. Therefore, when making budget estimates, it is necessary to reasonably control the accuracy of budget estimates according to project characteristics and actual conditions. Generally speaking, for large and complex engineering projects, it is necessary to estimate the estimated cost more accurately; for small and simple projects, the accuracy requirements can be appropriately relaxed. At the same time, uncertain factors such as market price fluctuations, insufficient supply of materials, etc. need to be considered when making budget estimates. These factors need to be fully considered in the budget estimates to avoid additional costs.

## **5.2 Strengthen Project Management and Supervision**

In order to control project cost, project management and supervision must be strengthened. Project management refers to the comprehensive, systematic and standardized management of project plans, schedules, quality, safety, and costs. In the process of project construction, advancing various tasks in an orderly manner according to the plan, strictly controlling the progress and quality of the project, and optimizing the project cost are the basis for ensuring project quality and controlling project cost. At the same time, engineering supervision is also crucial. Engineering supervision includes supervision, inspection, auditing, evaluation, etc., and must be timely, accurate and fair. Only by strengthening project supervision can we be able to discover the problems of project cost in time and take corresponding measures to adjust and deal with them. For example, timely discovery of quality problems and potential safety hazards in the construction process, and timely adjustment of construction plans and quality standards can effectively avoid additional costs caused by engineering problems.

## **5.3 Optimizing Engineering Design and Construction Plan**

In construction engineering, optimizing engineering design and construction scheme is one of the important means to control engineering cost. During the engineering design process, the actual situation and needs should be fully considered, appropriate building materials and construction methods should be selected, and the corresponding construction period and labor costs should be determined. In addition, attention should be paid to project efficiency and quality to ensure that the project is sustainable and efficient. During the construction phase, corresponding measures should also be taken for optimization. For example, rationally arrange the construction schedule to avoid additional costs due to delays in the construction period; rationally allocate human resources to avoid affecting the quality and efficiency of the project due to shortage or waste of personnel; optimize the construction process to reduce construction time and costs, etc. By optimizing the engineering design and construction scheme, the engineering cost can be effectively reduced and the engineering efficiency and quality can be improved.

## **5.4 Reasonable Control of Material and Equipment Procurement**

The procurement of materials and equipment occupies a large proportion in construction projects and is the focus of cost control. In order to control the project cost, it is necessary to reasonably control the procurement of materials and equipment. In the procurement process, it is necessary to comprehensively compare and analyze multiple factors such as price, quality, and delivery time to choose the optimal solution. In addition, the management and supervision of suppliers should be strengthened to ensure that the selected materials and equipment meet engineering quality requirements and safety standards. In terms of material procurement, construction materials should be scientifically allocated according to project characteristics and actual conditions, and materials with higher cost performance should be selected, and factors such as material quality and delivery time should be paid attention to. In terms of equipment procurement, it is necessary to select the appropriate equipment type and specification to ensure that the equipment meets the engineering requirements and specification requirements, and the equipment is required to be of high quality, stable and reliable. At the same time, attention should also be paid to the maintenance and maintenance of materials and equipment in the subsequent use, so as to prolong the service life as much as possible and reduce the cost of repair and replacement.

## **6. CONCLUSION**

Construction project budget estimation is an important means of project cost control. It can provide basic data and reference basis for project cost, provide reference for project investment decision-making, provide guarantee for project quality management, and provide basis for project supervision and acceptance. In order to ensure the control effect of budgetary estimates for construction projects and reduce the adverse impact on project costs, it is necessary to reasonably control the accuracy of budgetary estimates, strengthen project management and supervision, optimize engineering design and construction plans, and reasonably control the procurement of materials and equipment. Only by adopting an effective control strategy can we ensure that the project is carried out according to the budget, avoid the situation that the project exceeds or falls below the budget, ensure the rationality and accuracy of the project cost, improve the efficiency and quality of the project, and promote the sustainable development of the construction industry.

## **COMPETING INTERESTS**

The authors have no relevant financial or non-financial interests to disclose.

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