Analysis of Key Points and Countermeasures for Cost Control in Construction Engineering Management

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Abstract: In the new market environment, the construction industry is undergoing transformation, and market competition is fierce. Engineering cost management has become one of the essential factors affecting a company's competitiveness. In view of the current problems in construction engineering, such as overly rough cost control and lack of real-time monitoring, this paper proposes detailed and systematic rectification suggestions for improving cost management through further research. By analyzing the key points of cost control at different stages from design, procurement, construction to completion, it puts forward countermeasures to strengthen construction engineering management and control. Different control methods are applied at each stage to achieve effective cost control.

1. Introduction

As the market becomes increasingly mature, construction enterprises are facing growing pressure. Producing high-quality products with limited funds has become a crucial factor determining whether construction enterprises can gain an edge in the competition. Enterprises need to actively implement the concept of refined cost management during the construction process and conduct a comprehensive and in-depth analysis of the funds required for the project to ensure the rational use of funds. This involves aspects such as cost prediction, budget formulation, and fund utilization plans for the project. Through appropriate and scientific use of construction project costs, the goal of increasing revenue and reducing expenditure can be better achieved while ensuring quality and safety. For current construction enterprises, only by improving the level of project cost management through scientific methods and technological innovation can they gain a firm foothold in today's competitive market and promote sustainable and stable development of the enterprise.

2. Key Points of Cost Control in Construction Engineering Management

2.1 Key Points of Design Cost Control

The cost control at the design stage is a critical phase in engineering management because reasonable design can save huge costs for subsequent construction projects and operation links. Adjusting the construction plan can significantly reduce project costs [1]. Designers should strictly control design changes and go through the approval process for design change applications to avoid design rework and additional costs caused by design errors and improper design methods. Meanwhile, by utilizing high technology to conduct comprehensive modeling from project initiation to the completion of the entire project, design accuracy can be improved, material selection can be accurate, and material consumption can be reduced. In addition, investment estimates should be made for preliminary designs and construction drawings to ensure a balance between structural reliability and economy [1-2]. It is also necessary to establish unified design specifications, clarify cost requirements, eliminate over-design and excessive functions, and improve investment efficiency. At the same time, communication and collaboration among different departments should be strengthened to ensure smooth link between the architectural department, structural department, electromechanical department, and other departments, reduce interface conflicts, make the project feasible, and avoid uncontrolled investment in later-stage construction due to inadequate

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preliminary design [3].

2.2 Key Points of Procurement Cost Control

The procurement work for construction projects is one of the important links that determine the cost of materials and equipment. Optimizing procurement work can effectively save the overall project cost. When selecting suppliers, factors such as quality, price, delivery time, and service guarantees should be considered, and a complete set of supplier evaluation and entry mechanisms should be established to avoid procurement risks. Centralized purchasing can take advantage of economies of scale to obtain better unit prices, reduce process links, and improve the efficiency of fund utilization [4]. The procurement strategy should be in line with the construction process, and the optimal procurement batches and quantities should be achieved to avoid excessive procurement, which generates warehousing costs and ties up funds. When signing contracts, a pricing formula should be clearly defined to facilitate risk assessment and handling of procurement in case of market fluctuations, such as the potential impact of the price and uncertainty of bulk items on large project costs. In addition, throughout the procurement process, raw material testing methods that meet design requirements should be adhered to to ensure that the purchased products meet design standards and avoid the waste of repair and replacement costs caused by product defects. Furthermore, to ensure construction quality and reduce future operating costs, it is recommended to use green, energy-saving, and new building materials [5].

2.3 Key Points of Construction Cost Control

During the construction stage, due to the high investment cost, it is necessary to maximize the scientific application and scheduling of various resources such as manpower, materials, and equipment at this time. To achieve this goal, it is essential to coordinate and optimize the construction process to prevent human waste or redundant labor and improve the utilization rate of manpower. In terms of material costs, it is necessary to strictly follow the principle of quota material requisition and supplement materials according to the project progress to prevent excessive material consumption and waste [6]. At the same time, we need to strengthen on-site supervision to reduce waste caused by improper storage. It is necessary to manage the frequency of equipment use, coordinate and allocate equipment properly to prevent idleness and secondary investment, and regularly maintain equipment to reduce additional maintenance costs. Information technology means, such as using BIM + smart construction sites, can also be employed to obtain real-time data analysis, which is conducive to improving the professionalism and controllability of cost control [7].

2.4 Key Points of Acceptance Cost Control

After the construction is completed, all cost information generated should be sorted out to ensure that all data meet the pre-set budget standards, including checking problems during the settlement stage, finding out the reasons for differences, and forming an effective feedback mechanism to guide later construction projects. In addition, during settlement, the increase or decrease in engineering quantities should be strictly checked against the contract to prevent unnecessary problems, disputes, or cost increases caused by incorrect values. All data should be processed using unified standards to ensure more convenient operation and maintenance management in the later stage [8]. Meanwhile, to ensure a longer service life of the building, changes should be made to the equipment management mode, such as reducing energy consumption and improving equipment maintenance. Finally, cost control after the completion of construction is not only related to the direct benefits of the entire project but also determines the overall long-term benefits of the company. Under the condition of reasonable formulation of business plans, the economic benefits of assets can be significantly improved to ensure the optimal cost effect throughout the entire life cycle [9].

3. Optimization Countermeasures for Cost Control in Construction Engineering Management

3.1 Improve Budget Preparation for Cost Control

Firstly, implement whole-life-cycle management, including all cost expenses from planning, design, construction to operation and maintenance, and conduct a comprehensive assessment to avoid under-budgeting or omission in cost estimation. Analyze the cost structure of the budget at each stage, predict possible additional cost expenses, and preset countermeasures as early as possible. For example, there is a possibility of cost increase in the use of building materials, so when writing the budget, continuous cost considerations should be taken into account to support the long-term economic development strategy of the project. It is necessary to ensure that the project budget includes not only the investment during the construction period but also various costs of the building during the operation period, and establish a more comprehensive and reasonable budget system.

Secondly, make accurate predictions, which refer to a comprehensive assessment of market demand surveys, accumulated project experience, and the current economic situation. By investigating and analyzing the historical situations of similar projects, various expenses can be estimated more accurately. At the same time, market changes, such as changes in raw material prices or labor costs, should be considered to ensure the flexibility of the cost budget to adapt to market changes. For example, the prices of building materials such as steel or cement are susceptible to fluctuations due to changes in supply and demand in the international market. Therefore, when formulating cost budgets, an adjustable range should be set, and the latest market information should be used in the budget according to specific project requirements and local market conditions to ensure the accuracy of cost estimation.

Finally, plan the budget scientifically. The cost requirements of different projects at different stages are different. Therefore, when planning and designing the budget, funds should be allocated reasonably according to different actual situations to avoid problems such as excessive fund accumulation or uneven fund distribution. For example, during the construction period, there are many costs for purchasing building materials and leasing machinery. After the project is completed, more funds are used for operation and maintenance. Funds should be provided to the project in batches and stages according to different construction progress and actual needs to avoid the awkward situation of insufficient funds in the later stage due to a large amount of investment in the early stage, thus ensuring the normal flow and reasonable allocation of funds.

3.2 Optimize Construction Cost Control

Firstly, establish a dynamic cost monitoring mechanism. The stage where cost dynamics are most obvious is the construction stage of the project, so it is particularly crucial to implement an efficient dynamic cost monitoring mechanism. We can use information science and technology means to monitor and statistics various cost data related to the project, such as raw material costs, labor expenses, and machinery rental costs, so that managers can grasp the project's fund investment situation in real time and make adjustments immediately when problems are found. For example, when the price of a specific material in the project suddenly rises significantly, the dynamic monitoring mechanism can immediately detect it and make corresponding adjustments to the procurement strategy after practical consideration. This minimizes the probability of budget overruns and strengthens the clarity and controllability of financial control throughout the project.

Secondly, controlling material costs and labor costs is very important, among which labor costs account for a large proportion of the entire project cost. By strictly controlling the use, storage, and purchase of materials, resource costs can be effectively controlled, thereby reducing fund waste. In terms of material procurement, by optimizing process control, losses caused by overstocking or improper storage can be avoided, further achieving cost savings. For labor, by directly linking factors such as the workload, working hours, and skill levels of all employees with costs, a reasonable task list can be formulated to enable all employees to work at maximum efficiency and reduce costs such as overtime pay, thereby curbing the outflow of ineffective funds.

Finally, adjust the construction progress and cost control in real time. During construction, changes in weather, machinery breakdowns, or plan changes can all cause changes in the project progress, leading to an increase in funds. To avoid this situation, a management system that links

project progress with project funds can be established. When there are changes in project progress, relevant cost plans can be adjusted immediately to maximize the use value of the project cost.

3.3 Introduce Modern Information Technology

Using modern information technology means for cost budgeting and cost management in construction engineering projects is beneficial. It can make cost predictions more accurate and promote the comprehensive and specific implementation of price management in construction projects. Construction enterprises should further strengthen their own information development, build a standardized database system, and continue to collect, process, and analyze market information and construction information. They should understand and control the price trends of various building materials and labor and conduct real-time monitoring of important factors affecting cost budget control, fully demonstrating the advantages of information management, enabling cost budget managers to better tap the value of information and improve the efficiency of using information. In addition, a cost budget management platform can be established with modules as units. The platform has many functional modules, which are conducive to connecting various units, aggregating all resources, and enabling smoother communication among departments through information management. It clarifies responsibilities and jointly carries out cost budget supervision work, disperses the risks in project construction, and ultimately improves the project investment return rate.

3.4 Optimize the Salary System

For construction enterprises, the salary system in each project must be scientific and reasonable. Firstly, attention should be paid to human resource management, especially the optimization of the workforce. An advanced project management backbone team should be built, and a clear and transparent project management system and assessment and reward standards should be established so that everyone has clear task responsibilities and can receive reasonable salary rewards. Secondly, it should be understood that improving the salary system is to mobilize the enthusiasm of employees. To ensure the equality and fairness of the salary system, construction enterprises should formulate reasonable and fair wage distribution regulations and salary standards to prevent disputes between construction enterprises and employees. Linking employees' income with their contributions helps drive the common prosperity and development of the construction and construction industries. Thirdly, construction enterprises should ensure the consistency of performance appraisals. A true and specific result analysis of each employee's work performance should be carried out, and certain rewards or penalties should be given according to the actual situation to encourage employees to develop in a positive direction. This promotes the enterprise to better control labor cost expenditures and ultimately achieve a win-win situation for both the construction enterprise and employees.

4. Conclusion

In conclusion, nowadays, construction enterprises are beginning to focus on construction cost management and construction cost control in their development in the new era. The influencing factors involve many complex aspects. At this time, we need to exert a comprehensive management concept, integrate advanced information technology into effective cost control, make accurate pre-design plans, and treat design changes with due rigor. This paper has described the key points of cost management in construction projects and proposed a series of effective optimization strategy implementation methods to improve the profit margin level of construction projects and reduce enterprise operating costs. Promoting continuous progress in effective and innovative construction cost management is conducive to construction companies obtaining higher financial returns, providing them with a continuous driving force for advancement and achieving high-efficiency development.

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