



Research on the Whole Process Cost Control of Infrastructure Projects in Colleges and Universities Based on DBB Model

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Abstract: Cost control runs through the entire process of infrastructure projects in colleges and universities, and is a dynamic management process. In order to achieve comprehensive and effective control over the cost of infrastructure projects in colleges and universities, it is necessary to master the construction laws of infrastructure projects in colleges and universities and be familiar with the key points of cost control at each stage. This paper analyzes the necessity and feasibility of the whole process cost control in terms of the management of infrastructure projects in colleges and universities, introduces the principles that should be followed in the whole process cost control and the key points of cost control at each stage, and proposes effective measures to reduce the cost of the whole process of infrastructure project management.

Keywords: infrastructure project, cost, whole process, control

Introduction

With the pace of reform and opening up, China's economy and society have made great progress, and China's socialist construction has entered a new era. As the main output unit of construction talents, colleges and universities have developed rapidly after entering the new century. The scale of investment of infrastructure projects in colleges and universities has increased day by day. The high construction costs of infrastructure projects have brought a serious impact on the financing of colleges and universities, which has hindered the sustained and stable development of colleges and universities. In order to effectively save construction costs and increase funding for teaching and research, colleges and universities need to implement effective cost control for infrastructure projects. Efficient control of project cost is crucial to good project management. Based on the perspective of construction units in colleges and universities, the following is a detailed analysis of the whole process cost control of infrastructure projects in colleges and universities.

1. Necessity of whole process cost control of infrastructure projects in colleges and universities

The whole process of infrastructure construction is divided into five stages: decision-making, design, bidding, construction and completion acceptance. The construction unit is the core, and the cost and contract are the core link between the construction unit and each participant in the construction. The investment of the construction unit at each stage will have an impact on the project cost. Only by implementing effective cost control in the entire process, rationally allocating the proportion of resource input at each stage, and fully mobilizing the resources of each participating construction unit with the best cost performance is it possible to control the construction cost of infrastructure projects within the most reasonable range, and to give full play to the economic and social benefits of infrastructure projects. Therefore, it is very necessary to do a good job in the whole process cost control.

2. Feasibility of whole process cost control of infrastructure projects in colleges and universities

2.1 Human factors

The management level of university leaders is generally high, and it is easy to communicate and reach consensus. The infrastructure management team of colleges and universities is well-staffed, with high professional level and strong comprehensive ability, which can meet the requirements of the whole process control.

2.2 Institutional factors

Colleges and universities implement performance appraisal and financial budget execution appraisal systems, with

clearer appraisal objectives and more refined fund management. Strengthening the whole process cost control of infrastructure projects in colleges and universities can make the use of capital construction funds more efficient, save more school-running funds for teaching and research, and provide more adequate logistical support for school development and construction.

3. General principles for the whole process cost control of infrastructure projects in colleges and universities

The principles are as follows: the construction unit intervenes in the role of the chief consultant; change from passive response to active control; take overall consideration to clarify the weights; grasp the key points of project cost control at each stage.

4. Key points of the whole process cost control of infrastructure projects in colleges and universities

4.1 The key points of cost control in the investment decision-making stage

Research and analysis at home and abroad have proved that the impact of each stage of an engineering construction project on the cost of the entire engineering construction project is: 75% to 95% in the investment decision-making stage, 35% to 75% in the planning and design stage, 5% to 35% in the construction stage, and 0 to 5% in the final accounting stage of completion. The investment decision-making stage has the greatest impact on the overall cost. At this stage, university leaders should increase their energy investment.

The first is to comprehensively evaluate the feasibility of the proposed project based on the actual situation of the school and according to the overall plan of the school, and clarify the project positioning. According to the capital budget and own strength, do a good job of investment estimation, and lay the foundation for project cost control. The second is to adjust and reasonably determine the estimated project price according to the previous project cost data of the same or similar projects. Combined with the current price information of the building materials labor service market, conduct a strict review of the estimate to ensure the accuracy of the cost information. Due to the limitations of time and space in the acquisition of information by people, college leaders should conduct centralized training and learning according to the situation before making collective decisions on major projects, form the latest and most accurate cognitive points, make scientific decisions, avoid empiricism, and clap the head works. Leaders should pay attention to listening to and adopting the suggestions of professionals, and professionals in charge of infrastructure work should provide detailed information for leaders to make decisions.

4.2 The key points of cost control in the design stage

Engineering design is a process item that specifically realizes the coordination and unification of technology and economy, and is a key link to influence and control engineering cost. After the decision is made, the design becomes the key factor in project construction and cost control. After the decision is made, the design is the most beneficial stage to optimize the project, ensure the quality and control the cost.

The first is the selection of the design bidding scheme. According to the characteristics of the project, reasonably determine the bidding scheme, and decide whether the scheme design and construction drawing design will be bid at the same time. Within the scope of the design bidding control price, the focus of the design bidding competition is to screen the quality of the design scheme and the ability of the design team rather than the level of the design service fee. The second is to implement the quota design. On the premise of ensuring functional positioning and safety and quality, avoid blind design behavior that blindly strengthens "high and high" regardless of cost; strictly formulate and implement a limit design management system; from investment estimation, to design budget estimates, to construction drawing budgets, and finally To the design professional and business departments, layer by layer decomposition, transmission and implementation, so as to ensure the effectiveness of cost control. The third is to use value engineering to optimize the design. Value engineering formula: $V(\text{value})=F(\text{function})/C(\text{cost})$. Using value engineering to achieve a reasonable match between cost and function; choosing the design scheme with the highest "value" is an effective scientific method to optimize the design and control the cost. The fourth is to strengthen the joint review of drawings. Review the economy, applicability and operability of the design scheme; check the rationality of the design; improve the design quality; reduce design errors and omissions. Fifth, make full use of new technologies, new processes, new equipment and new materials. Use the latest technologies, new processes and new materials to improve the "value" of the entire life cycle of infrastructure projects.

4.3 The key points of cost control in the bidding and contract signing stage

The process of bidding and contract price formation is the process of mutual game between the issuing and contracting

parties. After the bidding, bidding, bid evaluation, winning the bid, negotiation and contract signing, both parties of the issuing and contracting parties reach a balance of rights and interests with each other and determine the construction contract.

The first is the bidding agency bidding. Especially for large-scale projects, the bidding agency must bid. Through bidding, selecting an agency with complete professional equipment and strong business ability to organize the bidding work can give full play to the advantages of professionals. According to the latest policies and regulations and market information, the bidding and the bill of quantities are compiled to control the price, thereby reducing the disadvantage of information asymmetry between the sender and the contractor. The second is to standardize bidding. Bidding documents are the key to the whole process cost control of infrastructure projects. The quality of the bidding documents, whether the bidding can be successfully conducted, and whether a high-quality contractor is selected will directly affect the whole process of project cost control. Set up a professional team with high comprehensive quality, strong sense of responsibility, understanding of policies and regulations and familiar processes. The bidding documents should use templates as much as possible, and the contracts in the bidding documents should also use templates as much as possible. Pay attention to the scrutiny of key terms, avoid omissions and cause disputes, and use them after modifying and improving according to the characteristics of the project. The third is to carefully compile and review the bill of quantities. The bill of quantities is the embodiment of the design content, the basic basis for bidding quotation and project completion settlement, and an important part of the whole process cost control. Entrust a cost engineer who is familiar with the pricing specifications of the bill of quantities and familiar with the construction process and technology to compile the bill of quantities. Check whether the bill of quantities reflects the specific requirements of the design drawings, whether it is consistent with the bidding documents, whether the work content and requirements of the list items and their sub-items are completely and accurately expressed, whether the pricing and fees are reasonable, whether the preparation instructions are standardized and complete, and whether there are omissions or omissions. or multi-count subheadings. Based on this, the rationality and completeness of the list are preliminarily judged. The fourth is to reasonably determine the bidding control price. Do not deliberately lower the bidding control price. The guiding ideology of the current bill of quantities pricing specification is "the government's macro-control, the independent quotation of enterprises, the market formation of prices, and the effective supervision of the society". The winning bid price should be the project value plus the monetary performance of the market supply and demand relationship after the game, which is determined by the market after full competition. Due to the excessively low bidding control price by the tenderee, the winning bid price is lower than the cost price, which has laid a great hidden danger to the project management. Fifth, strengthen the review of tenders. Legally, the bidding document is an invitation to offer, and the bidding document is an offer and a response to the bidding document. In the process of contract performance, when the bidding documents are inconsistent with the bidding documents, the bidding documents shall prevail. Therefore, during the bidding evaluation, the user side participates in the evaluation work, and it is necessary to strengthen the review of the bidding documents, and increase the verification and analysis of the unit price of the project with a large amount of work, and select the best candidates to determine the winning bidder. Sixth, the whole process of dynamic contract management. Check at every level, and establish and improve the system of contract review and signing. The construction contract adopts the template as far as possible, strives to be standardized and comprehensive, fully considers the laws of the university itself, and takes into account factors such as various test stoppage losses and delays in the construction period. A construction contract is a typical long-term contract. Due to the incompleteness of the contract, the bounded rationality of people, the uncertainty of risks and other factors, the parties cannot make a complete contract that is fully agreed upon. This requires the principle of supplementary contract signing in the main contract. Rebalancing is achieved by reasonably sharing potential risks. When the factors affecting the cost management appear, take the initiative to respond, deal with them in a timely manner, and summarize and adjust them in a timely manner, so as to achieve the whole process control.

4.4 The key points of cost control in the construction stage

The construction stage is the stage with the most concentrated human, financial and material consumption, and it is the link with the largest capital investment. The key points of cost control in this stage are as follows.

The first is to strictly control changes. At this stage, my country adopts the DBB contracting method, and the "change" in the DBB model is the main reason for the out-of-control investment. According to statistics, 35% of the out-of-control investment in the DBB model is caused by changes. There are four common types of changes, the first is a change in the owner's needs, the second is a design error, the third is a construction difficulty or unfavorable site, and the fourth is a contractor rationalization proposal. For the first and second types of changes, the control points have been discussed in the design stage, and the construction unit's work focus should be moved forward to try to avoid such changes. For the third type of change that is actually required by the project, the procedures must be standardized and strictly reviewed, and must be reviewed and signed by the design, supervision and construction parties. The fourth change is beneficial to the overall cost

control, and should be agreed in advance through the contract to encourage implementation. The second is to strictly manage on-site visas. Strictly implement the project visa management system, reasonably authorize, and implement the division of responsibilities to ensure that the visa is objective and true. The third is to standardize the review and accounting of progress payment. Review the payment node and the progress of the image project, review the completed project volume, review the unit price and charge, and strictly follow the contract and specifications. The fourth is to strengthen the management of the supply of materials supplied by Party A. According to the progress of the project, organize the procurement and supply of materials supplied by Party A in a timely manner, and do a good job in the acceptance, handover, storage, use and consumption accounting of materials supplied by Party A. Fifth, do a good job in collecting and sorting information. According to the progress of the project, the on-site representative collects and organizes information in a timely manner, especially the project change and on-site visa information related to cost adjustment; standardizes and improves the procedures; timely conducts investment tracking control; timely compares and analyzes the difference between the actual value and the target value; timely corrects the deviation, and effectively control the cost of the whole process.

4.5 The key points of cost control in the completion acceptance stage

Under the premise of standardizing the construction of the project and meeting the national and industry acceptance quality standards, the construction unit must actively organize and cooperate with the construction unit to do the completion acceptance work, so that the project can be put into use as soon as possible, and the economic and social benefits of the project can be brought into play as soon as possible.

First, do a good job of summarizing the cost data. The construction unit must attach great importance to the data related to the project cost, establish an accumulation system, ensure that the cost data collection and collation work is systematic, standardized and normalized, classified into categories, and a cost database is formed to provide a reference for subsequent similar projects. The second is to strictly review the completion of the project. According to the requirements of contracts, bidding documents, drawings, bills of quantities, changes and other documents, review in accordance with industry and normative standards, review the completion of the project, ensure that all work content is completed, and ensure that the quality meets the contract requirements. The third is the review period. Combined with various adjustment factors for changing the construction period, rewards and punishments will be given according to the contract construction period agreement, which will be included in the project cost settlement. The fourth is to calculate the amount of engineering. The accounting of construction works is a key link in the completion acceptance and settlement. The amount of accounting works is huge. Both parties agree on the form of settlement in advance to ensure that the settlement documents are clear, standardized and orderly, and are easy to review. Focus on the sub-projects that account for a large proportion of investment to ensure that the engineering quantity accounting is accurate. Fifth, review the comprehensive unit price. Review whether the unit price application is consistent with the bidding, whether the unit price application of the changed project is standardized and accurate, and prevent high and wrong application. The sixth is to review the fees and taxes. Ensure that various fees and taxes are reasonable and accurate.

Conclusion

To sum up, the whole process cost control of infrastructure projects in colleges and universities is a complex systematic project, which runs through every link of construction. In order to do a good job in the whole process cost control of projects, it is necessary to have a comprehensive understanding of the laws of project construction management, improve the cost control awareness of all staff, take the construction unit as the core, give full play to the basic role of the market in resource allocation, take scientific, reasonable and targeted measures to comprehensively control the project cost, and improve the social and economic benefits of the project.

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