# Discussion on Whole-Process Cost Control in Construction Project Management

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**Abstract:** Whole-process cost control is the soul of construction project, it runs through all stages such as decision making, design, tendering and bidding, construction and completion settlement. Whole process cost control is to reasonably determine and effectively control the project cost in the whole process, thus improving the economic benefits and social benefits of construction projects. This paper expounds the characteristics of cost control in different stages of construction project management, and puts forward some strategies to strengthen whole-process cost control so as to provide theoretical basis and practical guidance for the cost management of construction projects.

## 1. Introduction

Due to large investments, long cycles, and many players in the game, construction projects have always been volatile with respect to cost. Due to the emphasis on controlling costs during construction, traditional cost management models break the cost benefit logic chain between project cost control and preliminary and design stages. Whole-process cost control refers to a mode of project cost management and control starting from the decision-making level that emphasizes comprehensive and systematic management. It helps to maximize the investment benefits of the project by reasonably setting cost targets for each stage and controlling well.

## 2. Analysis of Cost Control Characteristics in Various Stages of Construction Project Management

### 2.1 Decision-Making Stage

The main function in the decision stage is to carry out feasibility studies of the project, defining essential elements like scale, standards for construction and site location. The crux of cost control here is the scientific preparation of the investment estimation report. Instead of a bare fundamentals, an investment estimation consideration must take risk factors into full consideration. Project costs can also be affected by changes in market prices, modifications of policies and regulations or issues regarding the natural environment. Inclusion of all these risk factors is required for ensuring the correctness and justify-ability of estimates of investment An accurate and justifiable projection of investments works as a "compass" for the decision points in projects hence it is transparent people can rely on it. If the investment estimation is too low, it will lead to project disruption due to funding shortages during construction; by contrast, an excessively high estimation may waste resources and reduce the efficiency of investment. Hence, reasonable investment estimation can help avoid waste of capital and determine the viability of investments economically [1].

### 2.2 Design Stage

The design stage is the critical phase in which project decisions are converted to specific engineering solutions. With a good design scheme, the cost will be reduced to an appropriate level within the scope of functional requirements; while poor design will not only make project costs grow more and hidden quality problems. A vital part of controlling costs at this point is quota-based design (designing with defined cost constraints). This issue uses quota-based design as a method to provide practical productivity improvement – in this case, the anticipated design for the project is limited according to approved investment estimation and then, when going into detailed

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construction drawing design, it will reduce budget estimates based on what was already agreed upon budget of preliminary designs. This dictates that designers must manage costs tightly at every stage of the design process so as to prevent project expenses from escalating out of control. Designers should apply themselves to the greatest extent possible and use their professional skills to best optimize the design scheme while ensuring relevant functional needs are met. For example, costs can be reduced by planning buildings rationally, by choosing the right materials for construction, and proper form of structure. Do keep in mind, design changes usually change cost so these should be avoided and minimized. Establish strict approval procedures for critical changes The reasons and responsibilities for the change (e.g. design flaws, modifications in owner requirements or other shortcomings) should be analyzed comprehensively during approval, as well as the effect of the cost, which has to be evaluated in detail to ensure controllability of the revised cost.

### 2.3 Tendering and Bidding Stage

The tendering and bidding stage is a critical necessity to establish the project contract price through competition. Control of cost at this stage relates to being able to prepare proper tender documentation and Bills of Quantities (BoQ). The tender documents are the foundation of the bidding process and must clearly identify key components like scope, specifications, pricing, etc. The accuracy of the BoQ determines how reasonable project costs are when using it as the basis for bid pricing. Tender documents and BoQs are prepared with extreme care to avoid ambiguity or calculation mistakes that can lead to disputes or cost escalation at a later point of time. Practical Imposition Of Bid Evaluation Methods & Criteria Here. The bid to quote based on price only should not be the basis for evaluation; this will require a more comprehensive approach including factors like that of the reputation, track record of the contractor and construction plan. A qualified contractor with a fair price will help you execute the project without hurdles and improves cost management [2].

### 2.4 Construction Stage

Because the cost as much during construction stage is less than decision and design stage. But because the time taken to build is so long and there are so many things involved, cost overruns occur typically. One of the key focuses in cost control during construction is to strengthen contract management. Contracts are very important legal documents that set the manner in which both parties should operate and must be followed to the letter when controlling variations and claims. The variations must be approved after investigations, defining the why and who caused the event, and determining the cost of variation in an equitable manner. Changes arise for reasons of construction (e.g. new risks caused by the contractor itself) should be treated as liability leading to compensation burden; changes due to poor design or modified requirements from owners during the contract period, those should deal with in accordance with contract terms such appointment or adjustment factoring in either overhead cost if prices are fixed. In addition, progress payments should only be based on work performed, so the payment amounts are correct. You will have to adhere completely to the contract clauses and the details of project delivery during this review process in order to ensure that the organization does not pay more or less. Another thing that also shows up here is keeping control over material and equipment purchasing. Given that the cost of materials and equipment represents a substantial part of project expenditure, it can be concluded that by opting for high-quality materials/equipment at competitive prices through tendering and optimized procurement strategies; procurement costs can effectively be minimized leading to better control on overall project costs [3].

### 2.5 Completion Settlement Stage

The completion settlement stage is the construction phase of the project and obtains the final project cost. At this point, effective cost control involves meticulously reviewing completion settlement documents for their legitimacy, completeness and accuracy. The review might consist of checking for the correctness of general quantities, the reasonableness of unit rate applications and

making sure that fee calculations are compliance with regulations. If issues are identified during the review, then they should immediately be discussed and negotiated with the contractor for adjustment and correction. The ultimate outcome of the settlement should therefore be independent and impartial, accurately representing the genuine total cost of work done. Only by controlling costs at completion settlement can we determine a reasonable project cost and provide reliable data for the ultimate economic benefit evaluation of the project. The control of cost through all the phases of marijuana construction project management is a combined and dependent process. A successful project requires in-depth understanding on saving characteristics of each stage, and effective control measures to achieve whole-process, comprehensive cost control that can maximize the overall benefits of the project [4].

## 3. Strategies for Strengthening Whole-Process Cost Control in Construction Projects

### 3.1 Establish and Improve Cost Management Systems

Construction entities ought to place emphasis on putting in place and refining internal cost management systems within the construction chain. First, we should clarify the division of roles and powers of different departments in cost management, so as to form a rigid management mechanism composed of interlocking links that restrain each other and supervise each other. For instance, finance department manages the allocation of funds and payment review at all stages confirming that expenditures meet the cost budget; engineering department responsible for managing project progress with quality assurance and highlighting impact of variations on costs on-time, respectively; while cost management department would focus on cost accounting, analysis and control providing professional guidance and oversight to other departments. Secondly, processes, operational approaches and quality standards must be defined for each step—preparing the investment estimation report at the pre tender stage, checking budget estimates during design, establishing tender bases and agreeing on contract prices in terms of contracts followed by checking progress payments and variation costs at construction then finally reviewing settlement after completion. Standardized and formalized management processes prevent cost overruns caused by human factors, ensuring that cost control is rule-based and orderly. It is also prudent to have an assessment and evaluation mechanism for cost management. Frequent assessments of the performance of departments and individuals in cost management tasks can encourage proactive implementation of their responsibilities on timely basis, as well as a collective commitment to maintaining their costs consistent with company targets [5].

### 3.2 Enhance the Professional Competence of Cost Personnel

Construction organizations should think of that they needed to control the know-how competence of charge specialists, First of all, on the one hand the cost personnel must carry out systematic training and education capacity building. This involves opportunity to robust education about the fundamentals of construction costs (such as cost basis, pricing methodologies and quantity determination principles), along with updating them on topics in adjacent fields such as construction law, engineering technology and project management. As cost management is tightly coupled with these disciplines, only a broad knowledge base will allow those working in cost to assess and address the many cost challenges present in complex project environments. However, cost personnel ought to be big on the learning of their communication, coordination, problem-solving and analytical skills. In whole-process cost control, the cost personnel need to constantly cross-coordinate and communicate with internal departments, design institute, contractors, supervision companies and other external parties. Good communication ensures the right information reaches the right person, in a timely manner thus avoiding misunderstandings and conflicts. Third, cost personnel must have high professional ethics by maintaining honesty, integrity, objectivity and fairness in performance of duties. To ensure the uniformity and authority of cost control work, it is necessary to follow professional conduct and reject irregularities and commercial bribery [6].

### 3.3 Strengthen IT Infrastructure

The advent of information technology has rendered the strengthening of IT infrastructure inevitable for construction projects to enhance their whole-process cost control. Construction companies to stay ahead of this trend and invest more in IT. To begin with, it is important that advanced construction cost management software should be implemented. This software provides advanced features that facilitate information-driven management of project expenses. It enables fast and accurate quantity calculation, costing compilation and review of projects, greatly enhancing work efficiency and accuracy. Second, it is necessary to build an integrated cost information management platform, and seamlessly connect the real-time transfer and sharing of cost information between construction entity, design institute, contractor, supervision company and other participants. This enables all involved parties to remain updated on real-time fluctuations in cost, as well as detect and mitigate problems quickly while preventing timeline-induced cost overruns. Moreover, advanced technologies such as big data and artificial intelligence allow deep mining and analysis of huge volumes of cost data. Often comparing historic and actual data reveals patterns or trends in increasing or decreasing prices over time, which provides a scientific basis for making project decisions regarding cost [7].

### 3.4 Strengthen Communication and Collaboration Among Departments

Whole process cost control requires the close cooperation of multiple stakeholders, including construction entities, design institutes, contractors and supervision companies, and requires collaborative work among multiple departments. While construction entity construction affairs should be coordinated and participate as a major role of the project organizer manager, and enhance communication and coordination with all parties. First is, you must set up the communication mechanism, i.e., figure out how and how often and what to communicate. Secondly, in terms of design phase, the construction entity should strongly conduct comprehensive and full communication with design institute. A clear expression of the project function, construction standards and cost objectives helps the design institute to fully consider various cost factors in the design stage, making full use of them to optimize the solution scheme so as to reduce costs while meeting functional needs. Note that the construction entity should also monitor and supervise the design process, in a timely manner based on changes to emphasize cost control comments about the impact of this change. In the construction phase, engagement with contractor and supervision company focused on constructibility. Reduce management of variations and claims: review all contractor-initiated change requests with relevant personnel to discuss the need and cost implications; only approved changes are allowed to proceed The investigation and resolution of claims should be carried out in a timely manner as stipulated in the contract and in accordance with state laws and regulations to ensure that the interests of all parties are reasonably safeguarded. A true synergy emerges by working together to tame the costs of a project whilst getting the best out of an investment [8].

## 4. Conclusion

Whole-process cost control is the key to controlling project costs and improving the economic and social benefits of construction projects. Construction units should pay full attention to its organizing them, the construction cost management throughout the whole process of decision-making, design, tendering, construction and completion settlement respectively strengthening its cost management system as well as personnel performance capability for cost management; strengthening information technology framework systems Intelligent level standardized integration and technical measures necessary for interdepartmental communication coordination. It provides overall cost control over the whole process, with guaranteed completion of projects within budget. With the changes in construction market, whole-process cost control need to keep innovating with the development of new situation specific for position under new stage of cost management.

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