

The Notable Problems and Countermeasures of Budget Management in Project Investment Control

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Abstract—Budget management has drawn increasing attention because that is the key to modern project management system. It is not only an important basic for the project investment and prevention of uncontrollable project investment, but also can reflect the level of project managers. In this paper we have described the importance of the project budget management, analyzed the problems that come easily during the project budget management and put forward the corresponding countermeasures to improve budget management to ensure the project investment is under control.

Index Terms—projects, budget management, investment control, problem, countermeasure

I. INTRODUCTION

Project budget is the primary basic for cost management which previously calculates and determines the investments are needed for the new construction, expansion, renovation, reconstruction projects, etc. Project budget management plays a very important role and runs through the stages of project management, because it will vitally impact not only the determination of the projects investment and the signing of the project contracts, but also the economic accounting and investments cost controlling. Therefore, it is particularly important to strengthening the management of the construction project budget for either the construction companies which want to control the total investments or the general contractors who want to control costs.

Here in this paper, after illustrating the importance of budget management, we analyzed the problems arise easily at different stages during the project budget management and then put forward the corresponding countermeasures to solve the problems.

II. THE ROLE OF THE BUDGET IN PROJECT MANAGEMENT

A. *Project Budget -The Important Basic Which Measures the Design Scheme*

It is one of the important basic which measures the design scheme economical and reasonable or not. In

order to optimize the design scheme of construction project, we can make an economic comparison by using the total cost index of the project budget, the cost index of each project, the cost index of unit area, the cost index of unit production and other indicators.

We can also make technical economic analysis on the consumption and design of the main materials of the project budget to identify deficiencies of each design scheme by prompting the designers to further improve the design and then completing and optimizing the design.

B. *Project Budget-The Basic of Determining Project Investment*

Projects generally have the following characteristics: bulky, complex, varied shapes, multi-purpose, fixed location, long cycle, and high consumption of varied materials, etc., which cannot be formulated as a unified ex-factory price of industrial products by the government like other products. It must be based on the budget of each construction project which is calculated by each construction design drawings, budget quota, charging standard. Therefore, the budget plays a crucial role for pricing the construction product and determining the amount of project investment.

C. *Project Budget-The Basic of Tendering and Contract Signing*

Project budget it's the important basic of construction contracts signing, tendering and bidding, and completion settlement. When signing the project contract, the contractor can determine the economic value based on the capital construction project budgets. And according to the capital construction project budget, the tenderer can make the base price of the bidding project and the tenderer can make the tender offer as reference.

D. *Project Budget - The Key to Accounting and Cost Control*

Enterprise project budget is the key to the companies who accurately make economic accounting, technical and economic analysis and cost control. It can help the companies to strictly implement the allowable cost and expenses standards stipulated by the states, providing

detailed information and basic for the companies accurately make financial accounting and cost control.

It urges the companies to take seriously prepare for the labors and materials preparation and manage the labors and materials in quota, it results saving labor power, saving materials and financial resources, reduce waste, strengthening internal economic accounting, and then keep reducing the costs to improve investment efficiency [1].

III. BUDGET PROBLEMS IN EACH PHASE OF PROJECT MANAGEMENT

A. The Problems of Budget Index Control in Project Design Phase

There are lot of problems in this phase that can influence budget control, for example, the attention and communication of investor and general contractor on unified cost management objectives are insufficient; the general contractor do not take proper measures to promote the design units to design elaborately and make a quota design, but using their own design or designated design units make it difficult to implement design bidding and optimize design programs. If the design management system is not complete, quota design also has not been fully implemented; even though in the design phase the design units have done the project estimate which is, detailed as budget, unilaterally chasing workload and economic benefits of design, lack of constrained control of cost indexes of design proposal is leading to conservative design and exceed the budget control index easily.

By using a part of railway construction project as an example that obviously illustrate the impact of design change on project investment, which can be seen from the table below[2],

TABLE I. THE IMPACT OF DESIGN CHANGE ON PROJECT INVESTMENT

The Name of Railway	The Number of Design Change	Extra Investment (Million)	The Percentage of Total Investment (%)
Xinyi-hangxin (I)	10	100	5.7
Shenmu-Yan'an	1912	345	5.3
Xiangyang-Chongqing (Extension)	279	76	8.9

B. Notable Problems of Budget Management in Construction Phase

1) The procurement and supply of equipment and materials

Generally, in the industrial and civil construction projects, the costs of equipment and materials occupy about 60% of the total investment. Even if it's the essential part of construction there are many problems in this part. Some companies overlook easily the connecting relationship between purchasing department

and other departments, especially the design department in the procurement process of equipment as well as the main materials. Beside of that, the professional quality of purchasing staffs is too poor to fully comprehend the design ideas. And also in order to gain benefits, some design departments directly or indirectly designate the products, materials even the manufacturers. All of these phenomena cannot guarantee optimization of products in procurement, make that more difficult to ensure the budget cost and the quality of the project and even add pressure to budget management and control.

2) Engineering design change

Even though the project has been passed a rigorous approval and feasibility demonstration before the implementation, due to the lack of the budget-conscious of some enterprises, the insufficient comprehension of building standards, controlling of investment quota and reviewing of the design depth, it can also lead to the arbitrariness of change request during construction.

In reality, the construction unit are eager to start construction with less preparation, like the communication between construction unit and general contractor is not enough, both of them didn't check strictly on the requests of the investment quota, building standards, design depth, design optimization, the rationality and the perfectness of bidding documents and contract, which also resulting arbitrary change requests during construction; constructing while changing. After receiving the change request, the related department doesn't supervise and demonstrate its necessity and rationality and has no corresponding measures to lay restraints on that, either. During construction, some project departments make unauthorized modifications to the project due to the technological issues, materials and project duration, etc. Because of the lack of mechanism of budget feedback and supervisory control in this process, the additional costs caused to the change has not been effectively supervised, which likely lead to project budget management out of control[3].

3) The problems of construction on-site visa

Construction on-site visa management is disordered. For example, the administrative staffs who belong to whether the construction or the general contractor have the problem of separating technique from economics, which regard construction cost as the responsibility of financial staffs and cost engineers and don't concern that.

Some on-site administrative staffs are not familiar with the contract, budget and the provisions that are not their profession, which lead to misunderstanding or the content of visa documents are not explicit. For example, a visa document of earthwork recorded like "earthmoving 560m³ ", which may confuse the cost engineers: manual excavation or mechanical excavation or manual and mechanical excavation? How to deal with the soil? If move them, then how's the hauling distance which isn't mentioned as well. All of these something inexplicit will lead to some hidden troubles to the settlement.

Individual on-site administrative staffs know that there exist fraud phenomena but still issue the visa so as to

gain benefits, such as the quantities of earthwork, soil categories, the number and the depth of grouting engineering and other concealed works. When they verify the project which has already been hidden, the remaining hidden troubles in the budget control will appear in the stage of project settlement.

IV. MEASURES OF STRENGTHENING PROJECT BUDGET MANAGEMENT

A. Strengthening Budget Control of Design Link

1) Reforming traditional design procedures

For construction units and general contracting enterprises, specially the enterprises that have signed the projects contract with fixed prices, the budget control in the design phase is the key to obtaining the three objectives: expense, progress and quality.

The traditional design procedure in our country divides the design work into two phases: preliminary design and working drawing design. This division method separates design, purchase and construction, which is unfavorable to take the purchase into the design procedure and connect crossly so as to shorten the construction period. Foreign companies divide the design work into three phases: technique design, fundamental engineering design and detailed engineering design, which regards the project construction as a systematic engineering. Design is part of the entire system, which combined scientifically with purchase and construction help to make the progress, expense and quality reach the best effects. The biggest characteristic of the design is to include purchase into the design procedure, thus improving design quality and effective control of project objectives [4-5].

2) Advocating quota design

In both traditional design and internationally current design procedure, quota design is an effective technical measure that improves the control and management level of project budget.

For the traditional design work that includes two phases, which is making a preliminary design according to the approved design specification and investment estimation and control the design of working drawing according to the approved total estimation of preliminary design, meanwhile, under the premise that the usage function should be guaranteed, all the majors should design according to the allocated investment quota, strictly control the unreasonable design modification so as to guarantee that the quota of the total investment is not surpassed.

For the internationally current design procedure, control the process design according to the estimation of quotation (or the total construction cost confirmed in the fixed price contract), control the fundamental engineering design according to the formulated and approved control estimation after the process design is finished, then control the detailed engineering design according to the first verified estimation formulated when the fundamental engineering design finished.

Investment decomposition and control of engineering amount are the effective approaches and main methods to implement quota design. On the premise of satisfying the requirements of the contract and quota design step by step, it realized the control of investment norm as well as that of design scale, design standard, engineering amount and various expense indexes.

3) Spreading standard design

Standard design is approved according to stipulated procedures, which is both economic and premium and can be repeatedly used. It also gives full consideration to the requirements in construction, production, utilization and maintenance, it's convenient for industrial production. Hence the spread of standard design can make the cost of construction lower than the individual design construction cost and also speed up design progress [6].

B. Strictly Controlling Purchasing Expenses of Equipment and Material

Purchasing is the most important part of equipment and material purchase. The purchasing process is a tendering and bidding process. For the main equipment and large amounts of scattered materials, enterprises adopt the method of invitational tenders and choose the proper successful bidder strictly according to the bidding procedure. For the low-price equipment and scattered materials, they can adopt the way of inquiry and quotation to confirm the suppliers.

Attach great importance to the connecting relationship between purchasing and other departments, especially the design department. Hand in the index materials including the properties and parameters of the equipment preliminarily provided by the supplier and the finally confirmed ones to design department for review. The design department provides the procurement documents and advancing to their opinions of technical review on the quotations. It also needs to invite the design staffs to attend the coordination meetings of manufacturers and participate in technical coordination. Try to choose the purchasing staffs who know design, which can help to find the substitute products or substitute suppliers more suitable for this project during the purchasing progress and propose reasonable suggestions immediately. Then the person in charge of the project construction should organize the related staffs to inspect and demonstrate the suggestions according to the stipulated procedures in time and finally make the decision. The design staffs shouldn't be allowed to directly or indirectly designate the product brand or manufacturers so as to avoid that the quality can not be compared with the price, except for the exclusive products.

C. Reasonable Control of the Design Change

1) Attaching importance to design quality and guaranteeing the optimized drawings supply.

Conducting investigation before designing and express the operating requirements of the engineering project in a correct, complete and careful way. Give relatively adequate time to the design units so as to finish the construction drawings that can meet the construction

requirements. Then the drawing needs to meet the designed depth and construction requirements as stipulated. Carefully organize drawings review: on one hand, submit the drawings to the drawing censorship units and also meet the requirements of related departments; on the other hand, the construction unit needs to carefully review the drawings so as to guarantee that the drawings can accurately convey the construction intention of the construction units and avoid mistakes and gaps. [7].

2) *Making reasonable changes according to the budget control index*

Generally, even if the change requests may be reasonable in technical economy, they should be given full considerations. Comparing the benefits brought by the changes with the losses due to the claims of construction units caused to on-site changes before making decisions. Judging whether the change scale of the construction cost caused by the engineering changes is controlled within the budget range. More attention needs to be paid to if the changes may lead to excess of budget. For the necessary changes that will increase the expenses, optimize the scheme and try to choose the economical reasonable design change scheme through using the principles of value engineering.

3) *The aspects that need attention on changes*

The construction units need to take notes on the substitute list for the substitute materials in construction, the changes with indefinite contents and material amount even without specific usage must be forbidden. Design change should be as early as possible and can't be better before the constructing. In order to better guide construction, we should review drawings before start constructing, which can reduce the changes. For the necessary changes, conduct them before start to avoid increasing the compensation due to the waste in reconstruction. Design changes should be recorded in details, including the reasons, background, time, the participants, engineering parts and proposing units [8].

D. Strengthening Management On-site Visa

On-site visa includes several types: technique, economy, project duration and shading, any of which will finally directly or indirectly lead to the cost of on-site visa, further influence the entire construction cost, bringing pressure to control investment. Therefore, it is great importance to strengthen on-site visa management.

1) *Strictly signing and issuing principles of construction on-site visa*

Strictly deal with the on-site visa of outlay. For the shutdown, idle labor, labor visa and machinery shift visa that related to economic expenditure, the on-site representative should carefully verify and then hand out the visa with the reason, background, time and which part etc; the contents in the contract should not be in visa's form; the contents that should be reviewed in the construction organization design, which can't be handled as visa; the representative of the owner should keep an engineering visa list at any time to avoid altering, and ask for visa department to number the reviews so as

to avoid repetitiveness; confirmation of materials' price should be marked whether it is purchasing price or budgetary price to avoid count purchase and storage fee repeatedly. As for the temporary revision of the design schemes and technical measures of some important construction projects, it should be consulted by the design staffs or witness experts' demonstration when it's necessary so that make it as safe, applicable and economic as possible.

2) *Management measures of engineering visa*

Here are some measures that can help us to improve our management of Engineering visa. Constructing complete management systems, confirming the responsibilities, rights and obligations of related staffs and standardizing the management behaviors of the engineering administrators of all levels in construction visa practices. Setting up contract explanation system to make each participant in project management clarified the contract and the economic technical responsibilities of the owner and construction party so as to apply it in actual work.

Strictly distinguishing the design change from engineering visa: for those which belong to the design change should be dealt with according to design change notices which handed out by design unit; for those who belong to engineering visa, the on-site administrators should sign and issue it and handle the expenses according to the occurrence reason. Improving the sense of responsibility and business level, strictly controlling the construction site certification to avoid undesirable certification.

For instance, the meaning of one visa document of earthwork is that the earthwork of the main building is 18,000 m³, the unit-price of earthwork moving is 18 RMB/m³. But the original meaning of this visa is that the unit-price of earth excavation and transport for the main building and podium is 18 RMB/m³ which has been decided by the project developer, supervision and construction organization.

So two loopholes can be clearly found in this document: firstly, neglecting the earthwork of the podium; secondly, the unit-price of earth excavation and transport was regarded as the unit-price of earthwork moving, which distort the original meaning and lead to the extra investment that costs the project developer 650 thousand RMB. From this case, we can learn that every word in the construction visa document should describe explicitly the real intention so that to avoid the unnecessary mistakes[6].

The on-site administrators should carefully learn and comprehend the related stipulations of the construction drawings and the contract, go into the actual construction, know the abnormal conditions in construction so as to timely appraise the influence of changes of construction techniques on construction cost, taking necessary measures when it's necessary, trying to avoid construction site certificate or reduce its costs so as to guarantee all the costs don't exceed the total project budget [9-10].

V. CONCLUSION

Project budget management is throughout project management, involving a wide range area and many departments. In order to better control the scale of investment, the following items need to attach importance to and strengthen.

In the stage of project design, the awareness of investment management should be raised. Strictly implement quota design, and implement standard design on the premise of meeting each function of the project. Pay more attention to the optimization of design scheme, fully forecast and estimate all kinds of factors result in investment increasing during construction, taking them into consideration and trying to solve them at the beginning of project design to avoid or reduce the incidence of unnecessary design changes and construction on-site visa. When the materials and equipment need to be purchased and substituted, in order to control costs, the purchasing staffs should fully negotiate with the design department, make the scheme on the premise of meeting the requirements of the safety, technology and other vital indicators and try to not exceed the total investment. The administrative staffs should strictly regulate design changes and construction on-site visa meanwhile control the increased investment due to these two parts.

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