

Brief Discussion on the Role of Whole-process Project Management in Engineering Construction

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Abstract

Engineering project management is to carry out effective planning, decision-making, organization, coordination and other management activities within the life cycle of the construction project using the theory, perspective and methods of systematic engineering, so that the quality, duration and investment control goals of the project can be achieved under the established resource and environmental conditions. Project management is an important part of construction project planning, feasibility study, site selection, survey and design. It is an important factor to ensure the smooth implementation of construction projects, ensure the quality of construction projects, and improve economic benefits. The accuracy and science of project management have a great impact on construction projects.

Keywords

Quality Control; Progress Control; Cost Control; Safe and Civilized Construction; Special Construction Plan Construction Management.

1. Introduction:

In the 1990s under the good situation of reform and opening up, in Pudong, with rapid opening up and development, the 88-story Jinmao Building, built by Shanghai Construction Engineering (Group) Head Office, with a height of 420m and a total construction area of 290,000 square meters, ranking first in the country and third in the world. The completion of Jinmao Building has provided valuable experience in many aspects, marking the leap of high-rise buildings in China. In addition to answering the question of whether ultra-high-rise buildings can be built on Shanghai's soft foundation, it has created the successful experience of domestic large-scale building owners and contractors in decision-making, organizing design and construction bidding, and project management throughout the construction process of buildings for the first time. It is worth borrowing and has good practical reference value.

2. The Role of the Whole Process Management Model

Jinmao Building is a super-large, ultra-high, multi-functional and comprehensive civil public building, and the construction difficulty of ultra-high-rise buildings is self-evident. In particular, the design of five-star luxury hotels on more than 53 floors adds technical difficulties. The architectural, structural and electromechanical system design of SOM uses a large number of the most advanced equipment, materials and technologies in the world today, and puts forward higher, updated and more convenient requirements for project management. Common engineering project management models mainly include engineering general contracting (EPC), project management service (PM) and project management general contract (PMC)

2.1 General Engineering Contracting (EPC) model

EPC means that the company is entrusted by the owner to contract the whole process or stages of the design, procurement, construction and trial operation of the project in accordance with the contract. Usually, the company is responsible for the quality, safety, cost and progress of the project it contracts under the conditions of the total price contract.

2.2 Project Management Service (PM) Model

PM is a project-oriented system management method. Through a temporary and dedicated flexible organization, the project is efficiently planned, organized, guided and controlled to achieve dynamic management of the whole process of the project and the comprehensive coordination and optimization of project objectives. The project supervisor or project manager is mainly responsible for the overall planning of the project progress and product life, and his work functions are directly responsible to the senior management of the company.

2.3 Project Management Package (PMC) Model

The PMC model refers to the hiring of a strong project management contractor by the owner through bidding. Integrated management of the whole process of the project. In this mode, the PMC contractor signs a contract with the owner. And work closely with the owner's consultant to plan, organize, coordinate and control the project. PMC contractors generally have supervision qualifications. If they do not have supervision qualifications, they need to hire another supervision unit. Whether it is Jinmao Building or other buildings, the implementation of the whole process management mode of construction projects can not only refine the division of labor of construction projects, but also realize the effective integration of various construction resources. Before the construction begins, through reasonable planning and design, integrating the resources in the construction, and paying attention to the self-inspection after the completion of the construction, we can ensure the quality and safety of the project, realize the effective control of the construction cost, and ensure the improvement of the overall economic benefits of the project. A large number of personnel are needed in the implementation of construction projects. For the integration and distribution of labor, it can effectively improve construction efficiency and lay a solid foundation for the efficient and high-quality completion of construction production goals.

3. The Significance of the Whole Process Management in the Engineering Management of Construction Projects

Although there are many types of project management models, their functions are generally the same. It is mainly divided into the following points:

- (1) Project decision-making: The specific function is to assist in the preparation of project proposals and the approval of project approval.
- (2) Design management: assist in the selection of survey and design units and sign contracts, and the management control of design changes will be involved in the later stage.
- (3) Procurement management: carry out reasonable planning and management of the contract system of the whole project, and formulate procurement plans that meet the actual needs.
- (4) Document management: All documents in the project need to be collected and preserved, and after the completion of the project, the technical materials, construction drawings and other documents should be handed over to the owner in good condition.
- (5) Post-evaluation stage: When the project is completed, it is necessary to submit the post-assessment comprehensive evaluation report involving project material procurement, project survey and design, etc. to the owner in a timely manner.

As for the mode of project management of Jinmao Building, the main leaders of the owners are very cautious about this. In the process of preparation, they strengthen investigation and research, actively explore, and gradually explore the management mode that is not only in line with the general

customary practices of the international construction market, but also in line with the actual situation of the Jinmao Building project, which The Jinmao model has the following five characteristics:

- (1) Set up a capable and efficient preparation team, and always take the initiative in the construction of engineering projects.
- (2) Hire multiple experts to ensure that the construction of the building reaches the world's leading level.
- (3) Complementary advantages, optimized combination of general package
- (4) Introduce the concept of designated subcontracting
- (5) Sign the contract in accordance with the law and establish and improve the restraint mechanism

This Jinmao model can promote the scientificization of project management, rational allocation of engineering resources, ensure construction quality, and further improve the completion quality of projects.

4. The Problem of Cost Management of Construction Projects

In order to ensure that the Jinmao Building reaches the world's first-class level after its completion, the choice of contractors is very important. The owners have adopted the international practice of inviting bids to select contractors. That is to say, according to the content, nature and requirements of each paragraph, go to several families first.

The company issues an official letter for pre-qualification before bidding for the project, and selects 3-5 contractors who have signed up for pre-qualification as the objects of invitation for bidding.

In view of the objective conditions of the Jinmao project, it is impossible to wait for the bidding after all the design documents are completed, let alone to start the construction after bidding and setting of all bid sections. For this reason, the owner adopts a unified planning and step-by-step implementation method to bid in stages. First, the whole project is divided into several bidding sections, and then divided into the following four batches according to the construction procedure:

The first batch: 3 bid sections, including pile driving engineering, general contracting of underground engineering, steel structure production, etc.;

The second batch: 6 standard sections such as upper structure general contracting, exterior curtain wall, elevator/escalator, air conditioning, strong electricity, weak current, intelligence, etc.;

The third batch: 7 standard sections such as water supply and drainage, strong electricity, air conditioning, weak current/fire alarm, kitchen, laundry room, banquet hall lighting, etc.;

The fourth batch: 12 sections of fine decoration of the hotel, 8 sections of hotel painting, sculpture and art display, and 2 sections of logos inside and outside the building.

A total of 38 bid sections in the above four batches are "designated subcontracting" for bidding by the owner, and do not include the bidding sections within the scope of the general contract for underground projects and the general contracting of the upper structure.

The bidding team shall be led by the person in charge of the owner's preparatory office, and its members include relevant responsible engineers, designers, appraisers and business agents.

The bidding documents shall be prepared by the material appraiser, and the designer shall be responsible for providing design drawings, technical specifications, equipment samples and material templates. The bidding documents shall be approved by the owner.

In order to ensure the timely implementation of various measures for cost control in the whole process during the construction process, various supervision measures must be implemented in a timely manner. Due to the lack of relevant management personnel, the construction unit needs to supervise the construction materials and construction progress in all links of construction by hiring professional supervision units, clarify the material differences and equipment in the construction process, and communicate with the design unit and the project cost unit in time to clarify the impact of such

changes on the overall cost of the project, which can effectively improve the quality of cost control in the whole process.

5. Application of the Whole Process Management Model in the Management of Construction Projects

5.1 Application of the Whole Process Management Model in Pre-Construction Preparation

Based on the above situation about Shanghai Jinmao Building, it is not difficult to see that when applying the whole process management model in the early stage of construction, it mainly implements effective management for bidding, contracts and materials. In the bidding process of construction projects, the construction project is analyzed through the application of the whole process management model, the relevant precautions are clarified, and scientific and reasonable construction plans and bidding documents are initially drafted, so as to lay a solid foundation for the smooth development of bidding and bidding. More contracts are usually signed before construction, and contracting contracts are the first to be signed, so construction projects can be regarded as the process of contract performance. Therefore, it is necessary to apply the whole process management model to do a good job in contract negotiation, signing and strengthening management, and improve the level of contract management.

5.2 Cost Management of the Whole Process of Construction Projects

When the whole process management model is applied in cost management, it needs to be based on decision-making, design, construction, acceptance and other aspects before and after construction.

The link is finely controlled. When making investment and construction decisions, managers need to estimate the project capital investment in combination with the current market to provide reliable information support for the decision-making process.

5.3 Full Process Management of the Completion Stage of the Construction Project

In the whole process management, the main tasks to be done in the completion stage of the project are as follows. First, adhere to the standard of completion. Because there are many types of construction in the construction project, the performance conditions and requirements are different. Therefore, in the process of completion acceptance evaluation, the corresponding standard should be selected to measure it. Once the construction of the project cannot meet the corresponding standard, the project will not be allowed to enter the completion quality verification and submission process. Second, in terms of the content of the construction project, it should be strictly in accordance with the regulations. After all the construction projects and processes have been completed, the whitewashing and leveling of the surrounding sites can be carried out. Third, do a good job in the handover of project materials. After the completion of the project, the construction unit shall sort out and classify all the technical data and hand it over to the owner as a whole.

6. Concluding Remarks

Project management is conducive to promoting the rational and optimal allocation of resources, which plays a positive role in the implementation of engineering projects. Optimizing the rational allocation of resources is suspense combined with the reality of the enterprise and the project, the reasonable arrangement of staff, and the planning needs of enterprise human resources. Under the current work background, the work that the enterprise needs to face in the process of work is clearer and clearer, the distribution of benefits between employees is more reasonable, and the cooperation between them is better when the work is carried out, so as to optimize the resource allocation to the greatest extent, further improve the construction management quality of the enterprise, and improve its quality control. Level. At present, China's economic level is constantly progressing and improving, the development of the construction industry is very rapid, and the construction industry has become an important driving force for China's economic development. At present, the market competition in China is more fierce. Enterprises also need to pay attention to the innovation of project management and

management, improve management quality, use advanced management technology, improve construction efficiency, reduce costs, and promote the development of enterprises. At present, in the process of project management, some staff lack a certain understanding of the management work, lack a certain understanding of the specific content involved in the work, and there are certain misunderstandings about its significance and importance, so the quality of management work is not improved, the construction cost increases, and the construction progress The slowdown seriously affects the interests of the final project.

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