

# *Analysis on EPC Project Management Points and Countermeasures*

Lu Wenzhe

*Zhejiang Urban and Rural Planning Design Institute China Zhejiang 310007*

**Keywords:** EPC; general contracting mode; structural design; maximization of benefits

**Abstract:** From the analysis of the EPC (Design-Purchasing-Construction) general contracting mode, the most critical point and core of the model is the structural design and management of the project, which has a direct and significant impact on the quality, duration and cost management of the project. In this study, the author combines his own experience, from the perspective of changing concepts, strengthening communication, controlling progress, strengthening quality, and improving the site, to analyze how to avoid the risks of the engineering projects to the greatest extent and maximize the benefits.

## 1. Introduction

In the past two decades, the EPC general contracting model in the international market has been relatively well studied. More and more owners have also chosen the EPC model to bid and construct projects. This model requires contractors to have good capabilities of procurement and construction, and to be able to figure out design drawings and detailed construction drawings. The contractor's carrying out EPC general contracting model can effectively reduce the friction among design, procurement and construction, and can effectively shorten the construction period of the project, and the owner can also control the total price to a more reasonable range, which ultimately promotes the development and application of EPC general contracting mode in domestic and international markets. In the domestic market, the competition in the exploration and design industry has become increasingly fierce. Domestic design institutes with the characteristics of large and medium-sized have gradually improved their system reforms in the industry competition, and have gradually transformed from design companies to engineering companies by combing with their own superior resources. After the transformation, EPC general contracting can be provided for the proposed project, commonly known as "turnkey" project, whose specific work includes pre-consultation, design, construction, procurement and installation, and control of the quality, safety, construction period and cost of the overall project.

## 2. Design Concept should be changed under EPC General Contracting Mode

In the traditional concept of a single design project, structural safety is considered to be the most important thing in structural design. Some young structural engineers in modern times have insufficient field experience and deep understanding of design specifications. Therefore, structural

safety is often guaranteed at the expense of economic benefits. Under EPC general contracting mode, structural engineers should consider the economic benefits of structural schemes on the premise of ensuring structural safety when carrying out structural design work, so that the overall structure can be economical, and their own design can be limited design, fine design, scientific analysis and optimization from design specifications, technical standards and design methods. In order to reduce the cost of the project, more attention should be paid to the comparison of different schemes. For example, a general contracted project is a factory building, and various schemes should be compared in design. According to the actual situation of the construction site, replacement of composite foundation with column hammer and dynamic compaction is finally selected to replace the composite foundation. This scheme can overcome the potential safety hazards and construction difficulties of pile foundation caused by large stones in the filling foundation, and can also improve the safety performance of the infrastructure. This model can save about 10 million RMB and the construction period can be shortened by 60 days, which can maximize the benefits of engineering projects.

### **3. Communication Management should be strengthened under EPC General Contracting Mode**

The EPC general contracting mode requires better communication between structural specialty and process specialty, and between structural specialty and procurement department.

In the professional design of the structure, the structural forms of various sub-projects of the industrial project are all carried out according to the requirements of the configuration and use of the craft. The biggest feature is that the form is complex and variable, the load is large, and the dynamic and static combination is more, and the number of embedded parts will increase significantly. Therefore, it puts forward higher requirements for structural specialty. It not only needs to meet the use requirements of the main process, but also should give support to the use of water, electricity, heat, ventilation and other specialties. In the light of the above factors, if each profession cannot get effective communication, it will directly lead to contradictions. Only through sufficient communication, effective prediction of possible errors in construction can improve the accuracy of construction. Specifically, each relevant professional should firstly conduct research on its own needs, and will have deep suggestions and feedbacks to form a preliminary draft. The structural professional judges whether there is a problem according to the first draft. If there are major problems, it will be fed back to the project responsible manager and continue to modify and feedback again; if there is a general professional problem, it will directly feedback to the professional to modify the design of the construction drawing.

Structural specialty, purchasing department and cost control department coordinate each other separately. On the basis of quota design, the drawings are modified according to the actual weight and size of equipment provided by purchasing department. After the difference occurs, the optimal design is carried out according to the actual load and size. The results are given feedback to the manufacturer through the purchasing department in time. If the difference can be controlled or there is no difference, the construction is carried out according to the drawings. Structural specialty and purchasing department should maintain seamless communication. The factors, such as equipment weight, load and size, play a decisive role in the success of design directly. Only after seamless communication can we control the arrival situation and actual factors of equipment. After the arrival of equipment, structural engineers need to compare the original construction drawings according to the actual arrival situation, and further analyze and evaluate whether it is reasonable. Equipment such as floors, platforms, or load-bearing beams should be reconfirmed. If there are differences, adjustment should be implemented immediately to ensure the safety of the structure. If the actual

load is smaller than the design requirement, it also needs to be optimized in time. According to the actual arrival load, the calculation of the structure is carried out again, and the fine design is completed under the premise of structural safety to maximize the economic benefits. When using the embedded parts, the design data of the supplier may be different from the actual products because of the large volume and many reserved holes. If the equipment foundation construction is completed, it will directly face the rework problem. If there maintains better communication among the structural specialty, procurement department and manufacturers, it can further avoid such risks.

#### 4. Optimization of Design Schedule and Quality Management under EPC General Contracting Mode

In the EPC mode, the design progress control requirements are relatively higher. If the design cannot be completed according to the schedule, the bidding work is directly affected. Therefore, in order to better ensure the design progress, we should pay attention to two aspects. First of all, we should try to assign the design task to the engineers with rich experience in the field structure, and select engineers who are good at communication under the same circumstances to ensure the quality of the drawings and the design efficiency. In addition, the design of the construction drawing should be dynamically managed, and the management process should be standardized and programmed. After the design task is determined, the node submitting the construction drawing is established. The reasons for the delay should be found out immediately, and the solutions should be put forward to ensure that the design task can be completed within the plan.

In quality management, the quality of the structural design not only directly determines the quality of the project, it also has a direct impact on the later benefits. Therefore, it is still necessary to strengthen the management of design quality under the EPC general contracting mode. In addition to the routine three-level inspection and audit system, the quality of construction drawings also needs to carry out hierarchical control and management according to the actual situation. The hierarchical control management is divided into three sections, namely, pre-control, in-process control and post-control. According to different time, different control strengths and requirements are given to maximize the benefits.

#### 5. Conclusion

In order to maximize the benefits, companies usually choose EPC general contracting mode, that is to say, integrated design, procurement and construction contracting, which can shorten the construction cycle and reduce disputes in all aspects. It also has a significant advantage in reducing project cost and has a certain share in the international contracting market. Under EPC general contracting mode, we should actively change our thinking concept, pay more attention to the communication and management of structural specialty, and better control the progress. Furthermore, we should use our brains diligently and pay attention to the quality and efficiency of design to maximize the benefits.

#### References

- [1] Zhang Chi. *Selection and Management of Suppliers in the General Contractor Generation Mining Activity under the EPC General Contracting Mode of Coal Chemical Projects* [J]. *Logistics Engineering and Management*, 2018.
- [2] Zhao Ke, Yin Yilin, Chen Menglong. *Strategic Study on Completion and Settlement of General Contractor's Project Price under EPC Mode* [J]. *Value Engineering*, 2018.
- [3] Xiao Wei, Gong Kui, Jiang Xianyu. *Research on Equipment Procurement Management Mode of Hydropower Project under EPC General Contracting Mode* [J]. *Project Management Technology*, 2018, v.16; No.179 (05): 106-111.
- [4] Wu Zhihua. *Discussion on the Design Management under the General Contracting Mode of Railway EPC Project*

[J]. *Shanxi Architecture*, 2018, 44 (9): 243-244.

[5] Liu Jianxin, He Siyan, Feng Xia. *Research on Post-Oriented Practice Teaching of Modern Apprenticeship in Landscape Architecture Based on EPC Contract Model* [J]. *Modern Horticulture*, 2018, No. 359 (11): 163-164.

[6] Wen Mengsheng. *Analysis on Difficulties and Countermeasures of Site Construction Management under EPC General Contracting Mode* [J]. *Engineering Technology Research*, 2018 (1).