Analysis of the Problems in the Whole Process of Engineering Consultation

--Take the M6 highway in West Midlands as an Example

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Abstract

Since the reform and opening up, the construction industry has mushroomed rapidly. In recent years, in order to better improve the construction environment and promote the transformation and development of engineering consulting industry, the comprehensive requirements for engineering consulting are higher and higher, and the application of whole process engineering consulting in China's construction industry comes with it. In the traditional construction project, the construction mode is to divide the design, construction and supervision into different links. This traditional construction mode increases the unnecessary investment cost and cuts off the internal relationship between the construction parties. Inadequate coordination among all parties in construction projects is prone to safety and quality problems. These series of problems lead to great difficulty in the construction project management. Aiming at these problems, the whole process engineering consulting service not only integrates service loopholes, but also saves project investment cost, shortens construction project duration, improves project service quality and effectively avoids project risks.

Keywords

The Whole Process; Engineering Consultation; M6 Highway; Problems; Solutions.

1. Introduction

With the advancement of China's comprehensive reform, in 2017, the general office of the State Council issued the *Opinions on promoting the sustainable and healthy development of the construction industry* [1], which proposed to encourage investment consulting, survey, design, supervision, bidding agency, cost and other enterprises to develop the whole process of Engineering consulting through joint operation, merger and reorganization, so as to cultivate a number of enterprises with Chinese characteristics International level whole process engineering consulting enterprise. In 2019, the national development and Reform Commission and the Ministry of housing and urban rural development pointed out that we should fully understand the significance of promoting the development of the whole process engineering consulting service. It can be seen that in the process of the continuous development of the construction industry, the promotion of the whole process of engineering consultation will play an increasingly important role, but there are bound to be some problems in the introduction and practice of the whole process of engineering, so finding and solving these problems has become one of the problems to be solved.

2. Meaning of engineering consultation

Engineering consulting refers to the consulting unit using economic knowledge, legal knowledge, management knowledge and other multidisciplinary knowledge to provide engineering consulting services for the client. The work mainly focuses on engineering consulting. As far as the essential service of the industry is concerned, engineering consulting belongs to the intellectual service unit, and the service time of engineering consulting should cover the whole process, content and aspect of engineering development. Engineering consultation includes the ideal stage, survey and design stage,

construction stage, project decision-making, management and evaluation after commissioning and delivery. Engineering cost consultation is the most important content in engineering consultation, which is highly professional and involves many factors. It is an important support to ensure the smooth development of the project. The scope of engineering consulting service mainly includes four aspects: standard service, project service, evaluation service and whole process servic.

3. Case analysis

3.1 Background and overview of the project

With the development of economy, the main road of M6 highway in the West Midlands metropolitan area has been congested. It is urgent to build a branch road (namely M6 toll road) to relieve the traffic pressure. Due to the lack of government funds, in 1991, the British government decided to try to use PPP to introduce social capital, and planned to realize the project output through Design-build-finance-operation-maintenance (DBFOM) franchise. M6 toll road is the first road built through PPP mode after the British government launched the "private financing initiative" in 1992. According to the franchise contract signed in that year, the social capital side is responsible for the design, construction, financing, operation and maintenance of the project during the 53 year franchise period. However, due to the opposition of local people and legal obstacles, the project was not officially started until September 2000, and was officially opened to traffic in December 2003. The franchise period lasted until 2054.

3.2 Project process

3.2.1. Project scope

The M6 toll road is a 27 mile (44 kilometer) six lane slip road in the West Midlands metropolitan area with a total construction investment of about US $1.7 billion (about 900 million pounds). The north end of the M6 toll road is near kannock, Staffordshire, and connects with the No. 11 intersection of the M6 toll road. It passes through Staffordshire, West Midlands and Warwickshire, and connects with the existing A5, A38 and A446 highways. The south end of the M6 toll road is near colnshire, Warwickshire, and connects with the No. 4 intersection in the east of the M6 toll road.

The tolls for passing vehicles are paid at toll booths at both ends of the road or at exit toll booths along the road. The fees vary according to the type of vehicles and passage time. Cash, credit card and electronic toll collection (ETC) can be used for payment.

3.2.2. Main participants

(1) Government: Highway Bureau. Irving Williams limited, on behalf of the government, is responsible for the construction of the West Midlands highway system including the project;

(2) Franchisee: Midland highway Co., Ltd. Macquarie Infrastructure Group shares accounted for 75%, highway company shares accounted for 25%.

According to the division of responsibilities, other stakeholders include:

I) Technical consultant: Jacobs Baitai company, which is responsible for the role of technical approval authority, certification engineer and technical consultant of financing party;

II) Construction party: Cambba construction group, funded by Carilion, Alfred McAlpine, Balfour Beatty and AMEC;

III) Operator: Ascom Mon6te company;

IV) Financing parties: Oriental Bank (the main financing party), National Westminster Bank and Barclays Bank;

V) Other consultants: Dresden investment bank, Ashurst Morris Crisp and Berwin Leighton.

3.2.3. Risk sharing and management

(1) Public opposition

Most of the roads built in the 1990s in the UK adopt the shadow charging mode. Users do not need to pay directly for the use of the road, but the government pays the project builders through public

funds and special funds for transport projects according to the road use. Most of the British people are used to the "free" road, so they are resistant to the charging mode directly aimed at users. Although the government decided to build the M6 toll road in 1991, the user payment mechanism aroused strong opposition from the local people, and even led to lengthy legal procedures for the project. In order to appease the public opposition, all participants of PPP actively coordinated and made some concessions and compromises, and finally reached an agreement with the opposition alliance to stop the boycott activities. According to the agreement, the franchisee meets some conditions proposed by the opponents and bears the corresponding increased costs. In addition, considering the sensitivity of the surrounding community environment, noise reduction asphalt is specially used in M6 toll road to reduce the impact of the road on the living environment of the surrounding residents.

(2) Franchise risk

The design and construction of the project started eight years after the franchise contract was signed. During this period, the Highway Bureau revised a number of road design standards, which affected the project cost. As these revisions are caused by the highway bureau and have nothing to do with the characteristic operators, the risk caused by the design standard changes is borne by the government, namely the Highway Bureau.

(3) Other risks

According to the contract, except for the standard change, all other risks will be borne by the franchisee, including planning, delivery, cost, quality, income and even some legal risks. After solving the problem of public opposition, the franchisee effectively managed the above risks, which mainly benefited from:

Franchisor's technical ability and experience; franchisor's long-term investment in the project; franchisor has been granted the right of technical quality examination and approval, so that the structural inspection and examination and approval can be carried out in time to ensure that the project design and construction can start as planned; a complete contract including the delivery of toll system has been signed; franchisor and government (Highway Bureau) have established and maintained positive and effective cooperation We need to strengthen our partnership.

3.2.4 Project status

Two years after the toll road was put into operation, the government released the monitoring reports for the two years, which showed that the traffic volume of cars was basically in line with the expectation, but the traffic volume of trucks was far lower than the expectation.

In late May 2006, the government approved Macquarie infrastructure group to refinance the project through a debt restructuring of US $1.1 billion, so as to better match the project debt with its expected cash flow during the 54 year franchise period. The debt restructuring is expected to bring about $700 million to Macquarie infrastructure group.

As the franchisees led by Macquarie infrastructure group bear almost all the risks of the project, Macquarie Infrastructure Group is different from other PPP projects funded by the government, so Macquarie Infrastructure Group does not need to share the proceeds of refinancing with the government Highway Bureau. However, in order to prove its sense of responsibility for the long-term development of the region and in return for its support to the Highway Bureau, Macquarie Infrastructure Group decided to use 30% of the proceeds from the refinancing to extend the m54 highway to the M6 toll road and expand a section of vertical intersection in the south section of the M6 toll road. The construction of these projects makes the M6 toll road more convenient.

3.2.5 Lessons learned

As the first road in England to charge vehicles directly, the M6 toll road boldly tries to use PPP mode to develop projects, expand financing channels, reduce risks, and achieve a win-win situation between the government and social capital. Highway Bureau realizes the project development without increasing the burden of the government to meet the public demand; Macquarie infrastructure group realizes the income due to the improvement of the convenience of the regional highway network and

the increase of highway traffic flow, and achieves 70% of the debt restructuring refinancing income, and establishes a good public image by supporting the construction of local highway facilities. On the other hand, the public's resistance to the user payment mechanism has caused strong opposition to the M6 toll road, resulting in a delay of up to eight years. It can be seen that one of the key factors for the successful implementation of PPP project is to strengthen publicity to the public and strive for social understanding.

4. Problems in the whole process of engineering consultation

4.1 The system is not yet mature

The whole process engineering consulting is in the primary stage of development in China. The engineering consulting system in China has been mature, but now it is "whole process + engineering consulting", and the two have not been fully integrated with the construction industry in China. The general office of the State Council, the Ministry of housing and urban rural development and the national development and Reform Commission have issued the guiding opinions on promoting the development of the whole process engineering consultation in China's construction industry. However, at present, it is only a macro policy support, and there is a lack of clearer and more specific implementation measures in various regions, which is difficult for the construction units to adopt With the whole process engineering consulting mode, enterprises do not have the whole process engineering consulting management system, which has become a key factor hindering the development of the whole process engineering consulting.

4.2 The management mode is split management

Traditionally, first impressions are strongest in the simultaneous interpreting of engineering projects, design, consultation, cost, construction, supervision, etc., which are handled by the corresponding units or departments. The division of labor is very clear. But because our country has always adopted this management mode and the idea is predominant, the management mode is still the same as the traditional management mode in China. Only the work of each stage is mechanically integrated, each department is still only responsible for their own work, the first consideration is the gain and loss of their own interests, in the management of the whole project, there is a fault phenomenon in the work docking, unable to quickly convey the work, the work efficiency is relatively low compared with the traditional way, which belongs to the split management.

4.3 Lack of professional whole process consulting talents

The whole process of engineering consultation involves a wide range, involving survey, design, construction, etc., which requires employees to have professional comprehensive knowledge, not only need to understand the construction technology, but also have a solid economic and management foundation The system is not yet mature, so there is no clear requirement for the employment standard of employees, and the employees only have the professional skills of each stage, lack of knowledge, no overall awareness and overall awareness, and can not grasp the whole stage, so it is difficult to play the role of the whole process consultation in the engineering project. [2]

5. Solutions in the whole process of engineering consultation

5.1 The whole process of engineering consultation should be "small owner, big consultation"

At present, most of the construction units have set up professional departments for project management, which overlap with the project management work of the consulting units, cross the rights and responsibilities, and are unwilling to delegate power, so that the consulting units can not give full play to their intelligence intensive, technology complex, and management intensive management functions, and ultimately weaken their professional management efficiency. For example, most construction units divide the project into multiple bid sections, and set up the engineering department, safety and quality department and other departments as the whole process engineering consulting units, with corresponding full-time personnel to participate in the project management and control work in parallel.

Therefore, the construction unit should abandon the old concept of "who pays, who has the final say", reduce the involvement in the project management, organize the lean strength, and emphasize the work of project organization and coordination, resource integration, project objectives and so on. For example, actively communicate with government departments, promote the handling of important matters such as acquisition and demolition, construction permit, etc. in the process of project implementation, ensure the external environment of the project, form a superposition effect with the participating units, and promote the smooth implementation of the project [3].

5.2 Strengthen the construction of whole process engineering consulting system

Based on the significant characteristics of engineering consulting services, such as non quantitative delivery, professional and efficient processing by professionals, and the content of entrusted services can be determined independently, the construction unit and consulting unit often have the following problems in the whole process of Engineering Consulting:

(1) The construction unit is not fully authorized by the whole process engineering consulting unit. In the face of the whole process engineering consulting, a new engineering consulting service mode implemented by the country, many construction units can not keep pace with the times and adapt to the change, still use the old mode of engineering supervision, and are afraid of hands and feet, dare not authorize, and intervene in the site too much, which seriously limits the role of the whole process engineering consulting units.

(2) The resource integration of the whole process engineering consulting units needs to be strengthened to seek the market with service. At present, in addition to a few comprehensive enterprises with complete qualification and wide business scope, the vast majority of engineering consulting enterprises have single qualification and narrow business coverage. In this situation, seeking to integrate resources through simple and crude merger and reorganization to realize the simple addition of various professional services will often lead to poor internal coordination and cooperation, unsmooth information communication, and even different lines of business The situation of Tao. [4]

6. Conclusion

The whole process engineering consultation will go through a period of exploration, improvement and improvement from the initial "praise" of the industry to the owner's "pay" for the "win" to realize the "real whole process engineering consultation" and achieve the original intention of adding value to the construction project. We believe that driven by a large number of market demand services, the whole process engineering consulting services will shine in the construction management and transformation and upgrading of engineering projects. [5]

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