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Historical Analysis and Current Status Study on Chinese Construction Participants Views from A Case Study

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Abstract: After the reformation of China, Chinese construction industry has an accelerated improvement. However, what should pay attention is that illegal operations still frequently happen, and quality and safety accidents are main problems the contractors have to face. As a consequence, it is very important to pay attention to a lot of factors such as technology, skills of the labors and so on. While in this paper, the improvement of the duties and obligations of project participants were raised. Since the participants of construction projects play important roles in the successful achievement of project objectives, the research on this field has important values. This paper concludes the development of Chinese construction industry and construction project management after the foundation of the P.R China. With a typical case study, this paper propose a comprehensive understanding of current status and features of Chinese typical construction project organizational structure and its main problems that influence the smooth and successful of project progress. By studying the duties and responsibilities of project participants, this paper gives 6 key aspects for construction project management improvement.

Key words: Chinese construction industry, construction project management, the duty and obligations of project participants, Current status

INTRODUCTION

When it was planned economy in China, central economic planning by the government was so extensive that it controls all major sectors of the economy and formulates all decisions about their use and about the distribution of income, Especially, in construction industry. There is no bidding system and competition system in construction industry at all, the ministry planners decide what kind of project should be constructed and which national owned company to process construction.

At that time, there are no private owners of projects. Managers of construction companies were appointed by the ministry leader, and there is no project management during construction as well. The operation of the project was strongly controlled by a temporary group whose members came from the administrative department and ministry. The construction company did not practice economy since all of the resources are distributed by the government owner. There is no cost control in construction, which is harmful for avoiding waste or reducing expenditures.

After the reformation of China, Chinese economy began changing to the market –orientation economy, besides the public owners; there are private owners of project now.

Construction companies changed a lot as well. The managers in construction companies should be on behalf of the owner to compete for market and practice economy. With the bidding system set up and the modern project management theories and methods were introduced into China, the construction licenses system set up in succession as well.

With about 20 year's rapid development in construction industry, there have improvement. At the same time, new problems have been emerged. As consequence, the research on this field has important values (Zhang, 2010).

THE DEVELOPMENT OF CHINESE CONSTRUCTION INDUSTRY AFTER 1949

From the Fig. 1, we could find that when it was planned economy in China, all of the resources were under highly centralized controlled by the government. In construction industry, there is no bidding system and competition system in construction industry at all, the ministry planners decide what kind of project should be constructed and which national owned company to process construction.

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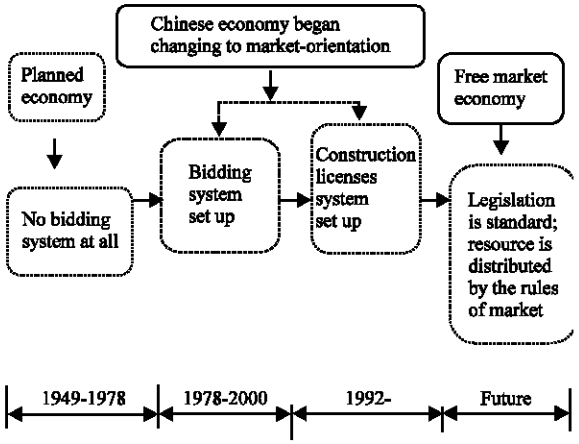

Fig. 1: The development of Chinese construction industry

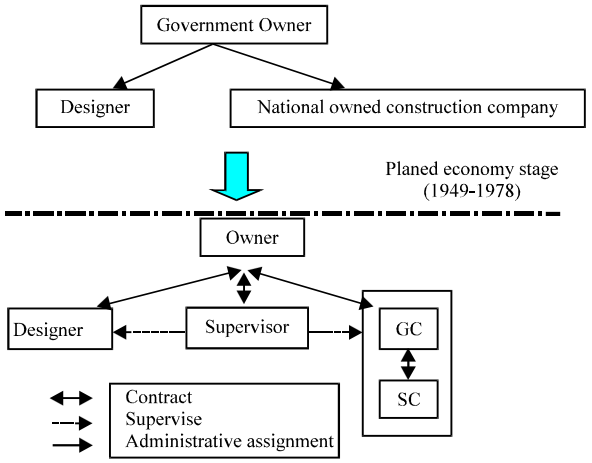

Fig. 2: The development of the relationship of Chinese construction participantsw

projects as well. Different from the other advanced countries, proprietary rights of land and other important resource are still strongly controlled by the government, while private owner of the project only have the right to make use of land at a period of time. The biggest different between Chinese planned economy with the market –orientation economy in construction industry is in the organization of the project participants and the operation of the construction companies.

In construction industry, the owner employs an architectural firm to plan and design the project, and employs a supervision firm, which prepares the detailed plans and specifications for the contractor. The supervisor also acts on behalf of the owner to oversee the project construction. The owner may select a general contractor (GC) either through competitive bidding or through negotiation. The contractor is responsible for the cost/quality/progress of construction itself even though the work may actually be undertaken by a number of specialty subcontractors (SC).It is soon became the main typical construction project organization mode in China. The following Fig. 2 illustrates the developments of such differences.

The operation of the construction companies changed a lot too. The managers in construction companies must be on behalf of the owner to compete for market and practice economy now. In 1980's, with the impact of the Lubuge project which was undertaken by Japanese Taisei company. The biding system set up and the modern project management theories and methods were introduced into Chinese construction industry. After that the project -orientation management in construction practice was widely adopted in China.

With about 30 year's rapid development in construction industry, there have improvement. At the same time, new problems such as poor quality and safety accidence have been emerged. As a consequence, to ensure a smooth and successful project progress and to keep a good quality and safety operation, it is very important to pay attention to a lot of factors such as technology, skills of the labors and so on. In this paper, the improvement of the duties and obligations of project participants were raised. Since the participants of construction projects play important roles in the project and constitute a certain degree of mutual economic partnership. Because of their pursuit of maximizing their own interests, there are conflicts of interest among them, therefore, the project management process is actually also a gaming process among the owner, contractor and supervisor. The behavior of the project participants is closely related with the project risk, while their chaotic behavior is the origin of project risks, because the direct purpose of their behaviors is to prevent project risks and promote the successful achievement of project objectives. From the following case study, a comprehensive understanding of current status and features of Chinese typical construction project organizational structure and its main problems that influence the smooth and successful project progress will be analyzed (Zhang, 2010).

THE RELATIONSHIPS AMONG THE PROJECT PARTICIPANTS VIEW FROM A CASE STUDY

The background of the Project: The project studied in this paper pertains to a newly built, middle-sized steel company. Cutting-edge continual casting and rolling technology was adapted when the company was built. The construction site is about 1,300,000 square-meters, located at the bank of a river.

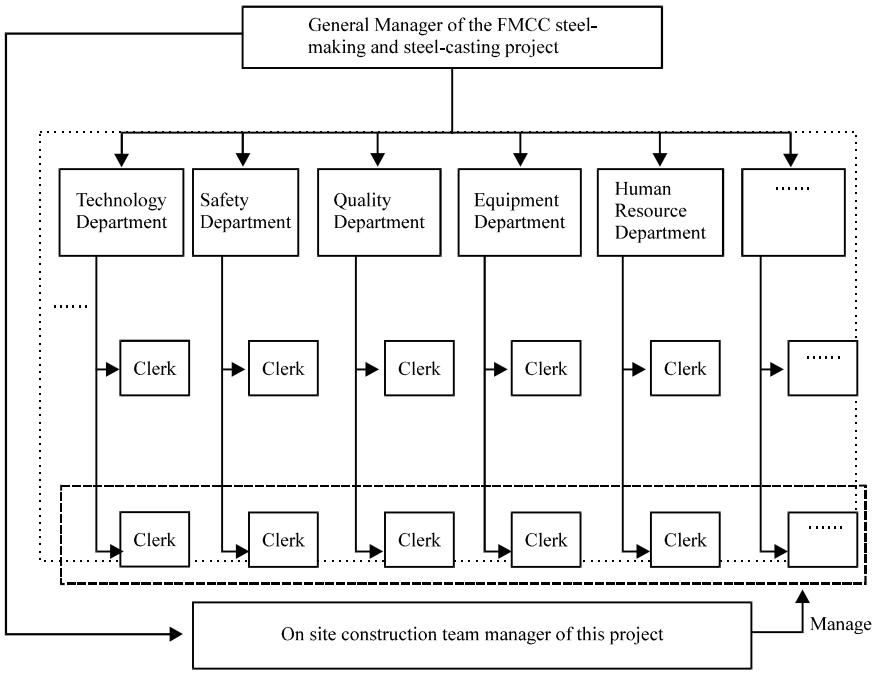

Fig. 3: On site construction team of FMCC

It is also one of the most important construction projects of the city. About 10 billion (Chinese Yuan) was invested in the first phase of construction. The main scope of the project included a 150t super-high powered AC electric boiler, a 150t refine boiler, a set of sheet metal casting/rolling machines, a reversal cool rolling machine, and a set of required accessories. The first bidding package includes two projects, steel-making and steel-casting. The main contract format was formed according to the list in the contract document. The cost of construction and installation was about 6 billion (Chinese Yuan). The project schedule is 3 years. There were three large and government owned construction companies which submitted bids. After the first stage tender, the steel-making project was undertaken by The First Metallurgical Construction Corporation of China (FMCC), whose general company is located in Wuhan city, Hubei province in China. A Matrix Organization was applied to manage this steel project (Zhang and Feng, 2011) (See Fig. 3.)

Relationships among the Project Participants: In this project, the owner employed the Beijing Iron and Steel Design and Research Institute (A/E firm) to do architectural design and structural design. In China, architects (AR) and structural engineers (SE) are the principal designers, while they both do not take responsibility for construction management. The supervisor, which is also called Jianli (JL) in China acts on behalf of the owner to oversee the project operation. The general contractor (GC) of the steel-making and steel-casting project is FMCC, and the works were undertaken by a number of specialty subcontractors (SC_1……). The following Fig. 4 shows the relationship among these project Participants.

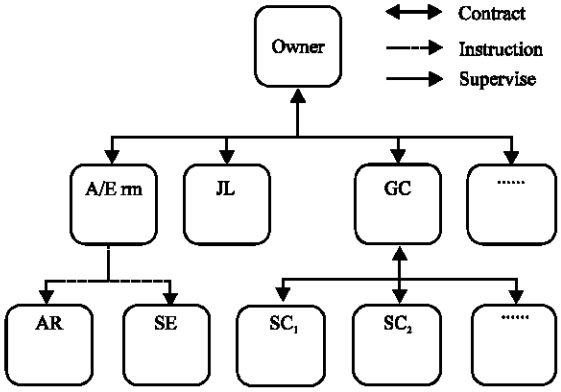

Fig.4. Relationships among this project participants

THE MAIN PROBLEMS IN THIS PROCESS OF PROJECT MANAGEMENT

Owner's payment delay: In previous construction, payment problems arose because of the owner's financial difficulties. For example, in the early stages of the

Fig. 5: The water and earth well up during construction

construction process, a contractor finished the project with high quality on time. But the owner's payment was not very satisfactory. The contractor only received 19.6% of the payment which was supposed to receive in June, 24.6 % in July, 28.2 % in August, and 31.1 % in October. By delaying the payments, the owner transferred financial risks to the contractor, which is harmful for the smooth of the construction (Zhang *et al*., 2004).

Uncertainty of the installation parameters: In order to gain time, some owners are willing to forego thorough planning and feasibility study so as to proceed on a project with inadequate definition of the project scope. In this project, this kind of problem happened as well. The main project of the first phase is to install a 150 Ton super power electric boiler and the CSP assembly line from the SMS Company in Germany. Both of the above types of equipment are bought abroad. Before the equipment contract becomes effective, most of the data are unknown.

Since the owner want to gain time, it began to be invited to biding and design before the equipment contract becomes effective, it brought the contractor a lot of difficulties when the contractor prepare for a bidding price and further construction. It also brought designer risks for designing.

The workload caused by unsatisfied design: This project is located on the bank of a river, the soil belongs to the No. 4 new aggradations soil, which contains liquid silt and sands with low loading resistance, and deformation is big. In additional, the hydraulic relationship between the river and the underground water inside the site is very complex. At the first stage of the design, the designers ignored these problems; they applied the calcareousness piles and cement piles to maintain the stabilization of the foundation, and used the pumps to step-down the water table .But since the three sides of this project site are near river and there is sandiness layer under the ground of the site, after pumping, the water could flow into the site from

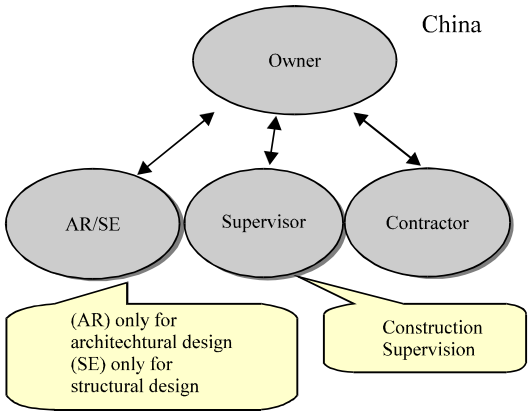

Fig. 6: Relationships of Chinese Project Participants

the sandiness layer. As a consequence, it brought a lot of difficulties to construct. In the stage of construction, much water and earth well up (see Fig. 5).

THE MAIN REASONS OF THE PROBLEMS VIEW FROM THE DUTIES AND OBLIGATIONS OF PROJECT PARTICIPANTS

On construction projects, effective coordination and collaboration is needed at every level of the project organization. At the project management level, the teamwork between the owner, architect, engineers, and contractors are important for project performance—at that level, the main reasons of the above problems view from the duties and obligations of project participants are as follows.

The main reasons of owner: The owner has duties and responsibilities to contract with each participants, he also should pay for the construction according to the contract. However since the rules on Chinese construction market is not standard in nowadays. In order to save investment and reduce the project costs, many developers tend to lower the bidding price and delay the project claims, and sometimes even ask the contractors to pay for them first. Contractors have no benefit to earn and have to get profits by doing shoddy work and using inferior materials, and even delaying the worker's wage, which is harmful to the quality and the progress of the project. It also easily leads to social problems. In Chinese construction industry, there exists crisis of credits. Payment delay problem is a serious problem in China£¨He, 1999).

The main reasons of contractor: Chinese construction industry and construction management efficiency have great influenced by the Chinese economy and policy.

Different from the free market, lands under Chinese market –orientation economy are not private and resources are distributed by the ministry of governments; it easily leads to privilege power. In most of the government owned public projects, when the ministry leader make decision to construct it quickly, even though the project definition is not finished, all of the social resource could make way for its quick construction. In this case it easily leads high risks for contractor. Though the contractor may face risk, they seldom propose claims to protect their right, for one reason, the litigation fee is too high to pay for; for another, it seldom success since the operation of the legislation is not standard ; for thirdly, it easily lead to lose the potential opportunity. Step by step, a kind of the business relationship which base on privilege power instead of on trust or mutual benefits was formed. Chinese construction companies are laden with a heavy policy-determined burden, resulting in excessive competition and low profitability in this industry (Mitropoulos and Memarian, 2012).

The main problems of designer: In most of advance western countries, the obligation of qualified architect is not only for design, but also for construction supervision. As a consequence, architect should be considerate in design scheme since he should take the responsible for the success of the construction. While in China, architects design are taken by architects (AR), and structural design are taken by structural engineers (SE), while they both do not take responsibility for construction management (see Fig.6.). At the stage of architectural designing, architect takes little consideration about the construction technology and economy because he is not take responsibility for structural design and construction management, which could easily lead to waste and high difficulty of reducing expenditures and technical scheme.

In addition, Chinese construction legislation for qualities management (2000.1.30) stipulates that architect takes responsibility during the period of designing, while the contractor takes responsibility for the whole stage of construction. That means that after working design, there is no responsibility for architect. As a consequence, when the problems happened in construction, most of the risk caused by the poor design is taken by contractor.

SIX KEY ASPECTS OF PROJECT MANAGEMENT IMPROVEMENT IN CHINA

As a consequence, to ensure a smooth and successful project progress and to keep a good quality and safety operation, the following 6 key factors are very important.

Project scope should be defined at the beginning stage of the project life cycle: Well defined scope and extensive early planning are attributed in large part to the uncertainties inherent in construction projects. As a consequence, Project scope should be defined at the beginning stage of the project life cycle.

The duties of the owner should be taken into consideration: When the poor quality problems happened, the first line workers always be blamed with their shoddy work, and contractors always be blamed since they used inferior materials, while ignore the problems of the owner. Since the owner's payment delay is a serious problem in China, when we analysis the quality and safety problems happened in Chinese construction project, the duties of the owner should be taken into consideration as well (Zhang and Li, 2005).

Designers and construction contractors must make better communication with each other: In China, the architecture design, structural design and construction are taken by different engineers. It could lead a lot of problems. As a consequence, Designers and construction contractors must provide better communication with each other in china.

Build long-term relationships with the project participant based on trust: The operation of the construction project involves various participants, whose benefits are different from each other, and are not independent in the process of the construction. Not only cooperation but also competition exists in their benefits. Therefore, they could cooperate to the maximum extent on the basis of mutual trust and understanding. Only by these means can building market in China be improved and rectified. The level of project management could be raised and project quality can be guaranteed (Xiang and Zhang, 2012).

Training among all levels is necessary: Effective coordination and collaboration is needed at every level of the project organization. As consequence, training throughout all levels and train the highest leaders both with the first line workers are necessary (Gould and Joyce, 2006).

Lesson study and continuous improvement should be systematic and dynamic: Continuous improvement means making every job better than the last one. Learn from the lessons and share it with other members of the project team. This attitude of continuously doing a better job can be seen at every stages of project management.

CONCLUSION

The above is the main idea about the research. The findings revealed:

- The participants in construction project are the most active factors, and any of their acts will have a major impact on construction project, so behavioral problem in project management plays an increasingly important role,
- Chinese construction industry and construction management efficiency have great influenced by the Chinese economy and policy. The research of background and feature of the market –orientation economy is very important when we analysis those problems that related with Chinese construction industry, construction management and construction project management,
- Project scope should be defined at the beginning stage of the project life cycle,
- The long-term relationships with every project participants based on trust should be built. Only by improving the social trust and the operation of legislations for the duties and obligations of each project participants, could the project be successfully managed,
- Lesson study and continuous improvement should be systematic and dynamic.

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