

Problems and Measures of Civil Engineering Construction Management

Zhifang Tian^{1, a *}

Department of Civil Engineering; College of Architecture Engineering; Yunnan Technology and Business University; Kunming, Yunnan Province, China

^{a *} 619617877@qq.com

*Corresponding author

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Abstract: With the acceleration of the urbanization process, the construction industry has achieved unprecedented development. At the same time, construction safety emergencies, especially large civil engineering projects, not only cause huge casualties and property losses, but also give economic development and Social stability poses a great threat. Civil engineering construction project management research has large topics and a wide range of issues. It is difficult to systematically study and obtain results. This article is based on the construction project management from project bidding, successful bidding, construction preparation, implementation to completion settlement. The main problem studied is how to do the best state and best combination of various management elements in the management process. This article analyzes the problems and causes in project management, adopts a systematic approach of induction and reasoning, and combines theory with practice to demonstrate and study and discuss systemic issues in construction project management. Through the analysis of the characteristics of emergencies, it leads to the theory of emergency management and interprets the definition, connotation and principles of emergency management. Classify large-scale civil engineering construction safety emergencies, reveal their common characteristics, and construct a basic theoretical framework for emergency management of large-scale civil engineering construction safety emergencies.

1. Introduction

The management of civil engineering projects is the management of the entire operation process of construction projects. This process involves many different stages of feasibility study design, construction and so on. Among them, the management of the construction phase (that is, from the beginning of the bid to the completion of delivery) is the key to the overall management. Project quality, safety, timing and cost control will have a significant impact. At this stage, the construction company has undertaken the basic task of implementing the project, that is, the vision and design of the project will become a reality. Therefore, the project management carried out by the construction company at this stage has become the first priority of the entire project management.

Studying the characteristics of construction project management is of great significance for revealing the laws of construction project management and diagnosing the importance of project management. Construction project management, as an important part of machinery project management, is a very important stage in the whole process. The overall characteristics of the two are different, and the main difference is the management field. The management of mechanical projects is the whole process of construction projects, while the management of construction projects is limited to the construction stage.

In this paper, the principles and methods of system engineering are used to analyze the main problems and causes of project management on the basis of grasping the basic concepts, basic characteristics, main contents and basic processes of project management. Conduct research on prevention and preparation before construction safety emergencies. Combined with the characteristics of large-scale civil engineering construction safety emergencies, design an

implementation system for construction risk monitoring and early warning. Based on an in-depth analysis of the types and manifestations of large-scale civil engineering construction safety emergencies, risk factors are identified, classified and refined, and questionnaire surveys are used to compile a large-scale civil engineering construction risk monitoring list. Study the preparation and maintenance of emergency plans, and propose emergency resource guarantee measures.

2. Method

2.1. Project Management and Construction Project Management

The management of civil engineering projects is the management of the entire operation process of construction projects. The process involves many different stages, such as feasibility study, research, design, construction, etc. Among them, the management of the construction phase (that is, from the beginning to completion and delivery of the project) is the key to managing the entire project. Its management is good or bad. Project quality, safety, timing, and cost control will have a significant impact. At this stage, the construction company has undertaken the basic task of implementing the project, that is, the vision and design of the project will become a reality. Therefore, the project management carried out by the construction company at this stage has become the first priority of the entire project management.

2.1.1. One-off one-time management

The unified characteristics of the project determine the one-time characteristics of project management, such as the nature of project construction and product development and other industrial products and the repeatability of other production processes. The permanent characteristics of engineering projects further emphasize the importance of one-off management of engineering projects. Once an error occurs in the management of an engineering project, it is difficult to correct and the loss is severe. Due to the unity and permanence of the project, the only success of project management is the key [1]. We should pay close attention to every link in project construction; selection of project managers, development of project personnel and determination of project organization, etc. They become the main problem of project management.

2.1.2. Comprehensive management of the whole process

The unity of the project and the one-time management process determine the project management cycle, that is, the time limit of the project. The entire project management cycle is divided into several stages: for a construction project, it is divided into feasibility, research, design, supply and construction stages, and for a construction project, it provides engineering, contract and construction offer [2]. Preparation, construction implementation, construction completion inspection and other stages. Each stage includes management of progress, quality, safety, and cost. Each stage has certain time requirements and specific target requirements. It is the premise of the next stage of growth and is also a sensitive part of the entire cycle. The entire life cycle has a decisive influence. We can see that project management is a complex project of the system and a complete management of the entire process [3].

2.1.3. Controlling management with strong constraints

We can see that project management is a complex project of the system and a complete management of the entire process. An important feature of project management is how the project manager is good at making full use of these conditions within a certain period of time, but will not exceed these conditions to complete the established tasks and achieve the expected goals. Therefore, project management is a limited limited management.

Due to the strong limitations and limitations of the project, effective project management control is also a key element. The effectiveness of the audit is based on optimizing the project management plan, thereby optimizing and controlling the project management plan [4].

2.2. Construction Project Management

In the entire construction project management process, the content of the project management system is extremely rich, and the content should be reflected in: "One planning, four control, four management, one coordination".

2.2.1. Preparation of construction project management plan

Before submitting the bid, the company management prepares "project management plan" (such as "overall design of the construction organization") as one of the important contents of the bid document, and the bidder completes the comprehensive plan and plan. within warranty period. Before construction, the project management department will organize the preparation of the project management implementation plan (such as "construction organization design", etc.). This application document can guide the project management from start to completion and acceptance [5].

2.2.2. Control

In the whole process of project implementation, control the progress, quality, safety and cost objectives (that is, "four controls") to achieve the various constraints of the project.

2.2.3. Production factors, contracts, information and construction site management

Production factor management. Throughout the project implementation process, optimize the distribution and dynamic management of production factors, such as labor, materials, machinery and equipment, capital, technology, etc., to ensure that the project goals are achieved.

1) Contract management

Throughout the project implementation process, the construction contract will be executed, and the construction contract and other contracts related to the construction project will be used as management tools.

2) Information management

Throughout the project implementation process, make full use of computers to collect, classify, store, and use various project-related information to improve the scientificity and effectiveness of project management.

3) Construction site management

Effectively manage the construction site, achieve civilized construction, establish a good corporate image, and improve the level of construction management.

(4) Organization and coordination

It smoothly coordinates the relationship between indoor and outdoor units during the construction process, reduces the occurrence of various contradictions and problems during the construction process, and creates a relaxed indoor and outdoor environment for the construction.

2.3. The Basic Process of Construction Project Management

2.3.1. Bidding and signing stage

After the management personnel make a decision, they must first design and draft a "project management plan" and prepare bidding documents based on the bidding documents and the "project management plan". Submit the quotation after winning the bid, and sign the construction contract with the developer after winning the bid. The project manager in question must participate in the bidding process in order to fully understand the situation and lay the foundation for the implementation of the project after the bid [6-7].

2.3.2. Construction preparation stage

After winning the bid and signing the contract, the company's legal representative will formally appoint a professional project manager according to the nature and characteristics of the project. The project manager established the project management department with the support of the relevant departments of the company, and coordinated with the project manager, and signed the "Project Management Objective Responsibility Letter" to clarify the responsibility objectives and various management tasks that must be performed. The project management department organizes

the preparation of the "project management implementation plan" based on the "project management responsibility letter" and "project management plan" to determine the control objectives and specific management arrangements of the project manager's management plan. And application control. And according to the "Project Management Implementation Plan" to do a good job of management preparation before the start of construction, creating various conditions for the start of construction [8].

2.3.3. Completion inspection phase

The project management department manages the completion of inspection work, cleans up various receivables and debts, completes completion arrangements, delivers materials and analyzes the economic activities of the project, drafts a project management summary report, and submits it to company management [9-10]. The company management organized an evaluation team to evaluate and evaluate the project management work of the project manager and the project management department, and fulfilled the promise of rewards and punishments in the "Project Management Objective Responsibility Document". After completing the above procedures, the project manager announced the dissolution.

2.3.4. Return to the warranty stage

After dismantling the project management department, the business management staff manages the return visit according to the construction contract (or project quality assurance).

3. Experiments

(1) Comparative analysis method. Comparing the experience and methods of risk management, crisis management and emergency management in Western developed and developing countries, as well as practical areas such as engineering construction, natural disasters and public health, revealing their connections and differences, and analyzing their respective benefits and Disadvantages, to provide a reference for the establishment of emergency management system.

(2) Theoretical research method. Based on the principles of management science and safety system engineering, the theories of risk management, life cycle and emergency management are used to analyze the causes of emergencies, discuss emergency management ideas, and form a basic theoretical framework for emergency management of large-scale civil engineering construction safety emergencies.

(3) Field survey method. Risk analysis requires a lot of data. Extensive collection at the construction site has many participants and large amounts of data, and some deviations are inevitable. Clarify the data collection and collation standards, and patiently screen them to remove the false and store the truth, and remove the roughness and fineness, so as to ensure that the selected data is true and effective.

(4) Questionnaire survey and expert interview method. Through questionnaire surveys and other methods, grasp the influencing factors of construction safety and the types of common emergencies, logically summarize the core elements reflecting the safety of large civil engineering construction, and compile a scientific, reasonable and practical risk monitoring list. Through questionnaire surveys and expert interviews, a large-scale civil engineering construction safety emergency management system detection index system was constructed.

4. Discussion

4.1 Analysis of Construction Safety Emergencies

In order to accurately identify the potential risks in the construction process of large-scale civil engineering and further analyze the characteristics of various professional accidents, this paper adopts the method of statistical induction analysis and selects 65 typical cases as the analysis objects, including 33 large-scale housing construction projects and large-scale bridge engineering Examples, 13 large-scale underground projects. Because the emergency management system

constructed in this paper is based on the current state of civil engineering construction in China and reflects the types and characteristics of common and high-incident accidents in China, the selected typical cases are all domestic cases. The experimental results are shown in Table 1 below.

Table 1. Statistical Table of Causes of Emergent Incidents in Construction Safety of Large Bridge Civil Engineering

Subjective reasons	Number	Percentage	Objective reasons	Number	Percentage
Lack of construction plan	13	60.3%	Envirnmental factor	2	13.4%
Illegal operation	11	53.3%			
Poor management	10	49.5%			
Poor management	9	45.4%			
Insufficient inspection	8	42.2%			
Inferior materials	4	21.9%			
The design scheme is flawed	3	17.3%			
The technical level is low. Brutal construction	2	13.4%			

As shown in Table 1 above, from a subjective point of view, the main cause of construction safety emergencies of large-scale bridge projects is the construction plan problem. Accidents caused by defects or lack of construction plans account for 60.3%, followed by illegal operations and poor management the accidents caused by these two reasons accounted for 53.3%. It is worth noting that there are more accidents caused by defects in inferior materials and design schemes, accounting for 42.2% and 21.9%, respectively. Other reasons include low worker skill level and inspection Insufficient and lack of construction plans. From an objective perspective, there are two cases involving environmental factors, one of which is caused by a sudden drop in temperature, with the objective factor as the main factor, but the other one is different. The environmental factor is only one aspect, and the main reason is illegal operation 3. Lack of construction plan.

From a subjective point of view, the vast majority are illegal operations, reflecting the dual causes of poor management and low technical level. The secondary cause is poor rectification of hidden dangers. A considerable number of accidents are caused by lack of risk awareness and are directly caused by poor management due to lack of responsibility There are not many accidents, indicating that poor management is the indirect cause of the accident. Unreasonable construction schemes and insufficient safety training also reflect problems such as low technical level and poor management. The experimental analysis of emergencies in large-scale underground civil engineering is shown in Figure 1 below.

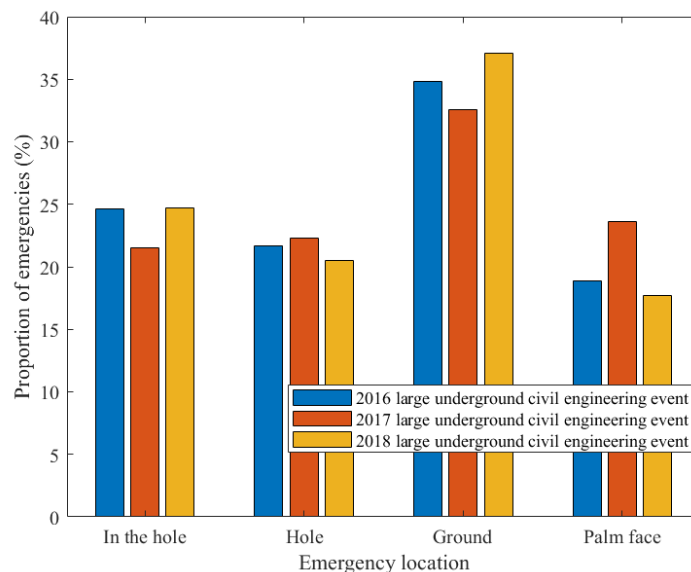


Figure 1 Statistical diagram of the location of large-scale underground construction safety emergencies from 2016 to 2018

As shown in Figure 1 above, from the point of occurrence, it is mainly located on the ground. This is because during the process of shield machine tunneling, due to the insufficient bearing capacity of the weak soil layer, uneven settlement of the ground caused collapse. In other parts, the probability of accidents in the hole, in the hole and on the palm face is roughly the same.

Conclusions

The entire process of construction management is a systematic and organic process, from bidding tasks, the formation of the project manager department, to the preparation of project management implementation plans, to improve schedule, quality, safety, cost control, strengthen production factors, contracts, Information and on-site management are indispensable, and we must attach great importance to the work of each link to improve the overall level and effectiveness of project construction project management.

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