A STUDY OF CONSTRUCTION SAFETY MANAGEMENT IN GANZHOU, CHINA

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A project report submitted in partial fulfilment of the requirements for the award of Master of Sustainable Construction Management

Faculty of Engineering and Green Technology

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DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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APPROVAL FOR SUBMISSION

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ABSTRACT

Safety is a fundamental requirement for the stability and development of human society, and safety production is the basic guarantee for the life and health of employees. In recent years, although the safety management level of China's construction industry has been continuously improving, major safety accidents in engineering construction projects still occur from time to time, resulting in huge economic losses and casualties, and extremely negative social impact. Therefore, this study aimed to study and analyze on the current situation of construction safety supervision and management in China and Jiangxi Qichen construction company through literature review, questionnaire survey and interview methods A detailed analysis was conducted on the problems existing in China's construction safety supervision system from the perspectives of government supervision and management, industry supervision and management, enterprise supervision and management, and social supervision and management. The experience of construction safety supervision and management in developed countries abroad was summarized and used for references. Then, a more in-depth study has been conducted on the operational mechanism, current situation and problems of the construction safety supervision and management system in Jiangxi Qichen construction company, causes of construction safety accidents in the company, followed by, proposing optimization measures and suggestions to improve the safety management system of the company. This article analyzes the shortcomings of the current construction safety supervision and management system of construction companies. At the same time, this article found that Jiangxi Qichen Construction Company is lack of effective implementation measures and tracking mechanisms, which may lead to false

appearances in supervision and management. The role of industry organizations in supervision and management has not been fully utilized, and Jiangxi Qichen Construction Company's enthusiasm for participating in safety supervision and management for its own interests is not high. As a conclusion, the legal and regulatory mechanisms, organizational mechanisms, cultural mechanisms, and information management mechanisms for building safety are jointly needed to build a guarantee platform for the smooth operation of the building safety supervision and management system in a company.

Keywords: Construction Safety, Safety Supervision and Management System, Operational Mechanism

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CHAPTER 1

INTRODUCTION

1.1 Overview of China's Construction Safety Management

1.1.1 General Situation of Construction Safety Production

In recent decades, China is having rapid development in the construction industry in the history. The total output value of the construction industry had increased rapidly from 1515.1 billion yuan in 1999 to 6114.4 billion yuan in 2008, and 22581.7 billion yuan in 2019 (National Bureau of Statistics, 2023). The number of employees engaged in the construction industry also increased rapidly from more than 30 million in 2004 to more than 50 million in 2008. The employee in the construction industry account for about 1/3 of the total number of employees in the industrial enterprises in China. Although there is rapid development of construction industry in China, the situation of construction safety management is not optimistic. The Ministry of Housing and Urban-Rural Development (2023) pointed out that due to the high labor intensity and high security risk, the construction industry has always been one of the top industries with high incidence of safety accidents after the traffic and mining industry. According to the statistics of the Ministry of Construction, from 1999 to 2007, China had an average of 1018 construction safety accidents every year, with an average annual death toll of 1167 (shown as Figure 1).

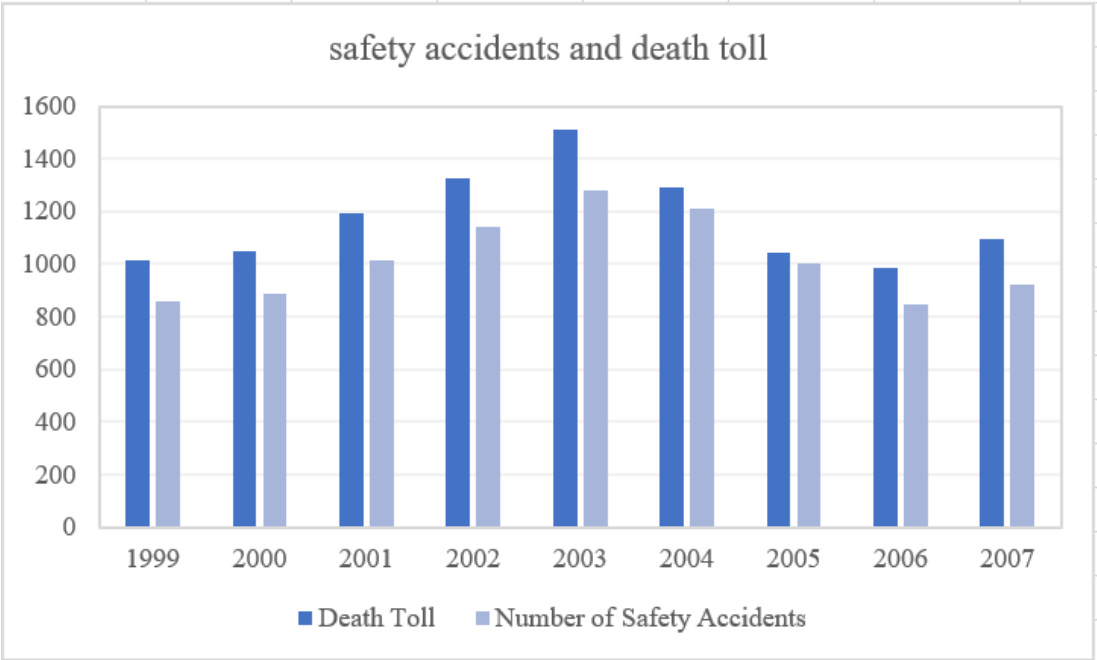

Figure 1 Safety accident and death toll (Source: National Bureau of Statistics, 2008)

Over the years, the China's governments have put the safety production problem in the construction industry at the top of the priority list. As the situation of safety production in the construction industry is getting severe, the relevant government departments have continuously taken countermeasures, and have achieved some profound results recently. For example, the death rate of output value in China in year 1999 have generally declined from 10 billion yuan to 2 billion yuan in year 2007 (Figure 2). Although there is declining trend of death rate in China Construction industry, major and malignant construction safety accidents still occurred frequently in China, resulting in an increasing number of casualties and economic losses (Li & Su, 2022). Therefore, the current situation of construction safety production in China is still very serious, which needs great attention from the government, industry, enterprises and society to cooperate in solving the issues.

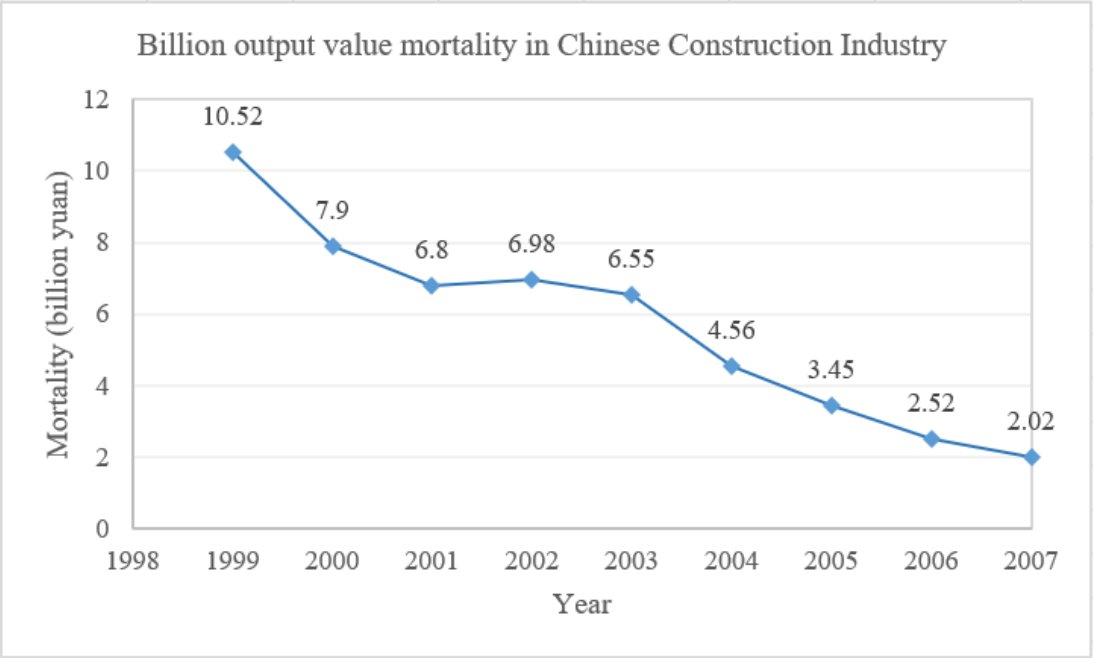

Figure 2: Billion output value mortality in Chinese Construction Industry (Source: National Bureau of Statistics, 2008)

1.1.2 Problems of Construction Safety Management in China

Although the China's construction safety management level has been improved, the construction safety management in China still consider relatively inadequate, which is mainly due to the following aspects:

(1) Deficiency in the laws and regulations of construction safety.

The construction safety related laws and regulations in China have some flaws and still need to be improved. For example, the safety responsibilities of all parties involved in construction industry in the relevant laws and regulations are stated, but not detailed (Ouyang & Luo, 2022). Moreover, some construction safety technical standards and specifications are lack of mandatory and operability, and it is difficult to ensure these standards are being implemented at the construction safety production. Besides that, the punishment provisions for the construction enterprises and individuals who violate construction safety production, are not specific enough, or the punishment is too light, Therefore, these could result in the government cannot effectively manage the safety production behavior of the construction enterprises (Zhu, 2022).

(2) Employees have low cultural quality and poor awareness of safety production.

Rapid economy development in China has accelerated urbanization which result in a large number of rural surplus labor force has been transferred or migrated to these large cities. Most of these migrant workers have been employed to work in the construction industry. At present, the number of migrant workers in China's construction industry has reached more than 40 million, accounting for 80% of the total construction system employees and one-third of the rural migrant workers (Zhang, 2022). Most of these migrant workers have low cultural and education level, weak awareness of safety protection and poor operating skills, which lead to difficulties in meeting the needs of safe production in construction industry.

(3) Weak foundation of safety management in construction enterprises

Generally, the China's construction enterprises prioritize economic benefits over safety of the employee. These enterprises do not fully understand the importance of construction safety management, resulting in insufficient investment in safety production, outdated or not well-maintained construction machinery and equipment, low standardization and industrialization (Jin, 2022). The safety management foundation in the construction enterprises are relatively weak. Problems such as insufficient personal protection equipment for workers at the construction site, violations of safety technical specifications, safety operation procedures and safety precautions among the employee are relatively common besides other serious issues found during the construction phase of the project. To save costs, some enterprises cancelled the safety production management organization and reduced the number of safety management personnel that need to be employed. Besides that, the safety education and trainings provided to the employee are not detailed or comprehensive, which result in poor safety knowledge and awareness among the construction workers.

(4) Deficiency in construction safety supervision and management system

There is still a big gap between China's construction safety supervision and

management compared with the international advanced safety management mode. At present, China’s supervision and management of safety production in the construction industry is still basically on the basis of the sudden safety inspection, which is not a long-term safety measure and continuous supervision and management system. The phenomenon of "substituting punishment for management" is common, and the effective mechanism of construction safety supervision and management has yet to form (Li & Wang, 2018). The current safety supervision methods and management methods cannot effectively manage safety issues and not suitable to the rapid increasing scale of construction industry. Besides that, it is difficult to carry out the construction safety supervision work in depth. Chang (2018) believed that among the problems affecting China's construction safety management, the imperfect construction safety supervision and management system is the most important factor. Unclear supervision and management relationship between all parties who involved in the construction safety supervision and management system, unclear responsibilities, backward supervision methods and ineffective supervision methods are the key factors that cause the overall low performance of China's construction safety management .

1.1.3 Necessity of Research on Construction Safety Supervision and Management System

(1) It is conducive to the development of the construction industry

With the expansion of China's construction industry, the field of construction safety management needs to constantly explore the construction safety supervision and management system that suitable for China's national conditions and the long-term development of the construction industry (Tian, 2018). Emerging of diversified investment and construction entities in the construction industry; change of safety supervision and management responsibilities between the administrative departments; improvement of safety supervision behavior of industrial organizations; and the strengthening of safety responsibilities of construction enterprises, intermediary agencies and insurance institutions, all these are the factors that urging the China's construction industry to carry out safety production supervision and management

system (Wang, 2018). The current safety production supervision and management system would need to be reformed and build an international scale of management system and operation mechanism (Wang, 2018). Therefore, this study is essential and compatible with the current development requirements of China's construction industry.

(2) It is beneficial to improve the safety management of the construction industry

First of all, laws and regulations and social supervision and management are taken as the guarantee. The construction safety supervision and management situation with government supervision and management as the main task and industry supervision and management as the coordination. The joint supervision and management between enterprise and the whole society can promote the legalization, specialization and socialization of the China's construction safety management. At the same time, it can also effectively prevent and reduce the occurrence of safety accidents, and significantly improve the safety management level of the construction industry (Wang, 2019).

(3) It is conducive to implement responsibilities of all parties on the safety production responsibility system

China's construction industry always implement the production policy of "safety first and prevention first" to strengthen the implementation of the construction industry's production safety responsibility system. Premier Wen Jiabao also stressed in the fifth session of the Tenth National People's Congress that "resolutely curb the occurrence of major safety accidents, and achieve the stable improvement of the national production safety situation (Li, 2019). We should improve the production safety system and implement the responsibility system effectively". At present, the safety production responsibility system of China's construction industry includes the responsibility of administrative, management departments and enterprises. Therefore, in order to improve the construction safety supervision and management system, it is necessary to strengthen and implement the safety supervision and management responsibilities of the government construction safety administrative department and construction enterprises.

(4) It is conducive to promote the joint participation of all parties

At present, China's construction industry has gradually formed a safe production supervision and management system of "unified leadership of the government, legal supervision of departments, overall responsibility of enterprises, supervision of the masses, and broad support of the whole society". This supervision and management system can effectively promote the supervision and management of all parties, and stimulate their enthusiasm to participate in construction safety production (Zhou, 2019). Based on the government's construction safety administrative departments, industry organizations, construction enterprises and the public. In view of the safety management mechanism of Jiangxi Qichen Construction Company, this paper puts forward suggestions on establishing and improving the construction safety supervision and management mechanism. Fully reflecting the enthusiasm of all parties to participate in the construction safety supervision and management, so as to achieve the comprehensive coverage of construction safety supervision and management, To form a long-term mechanism of building safety supervision and management that is “horizontal to the side, vertical to the bottom” (Wang, 2018).

1.2 Technical Route

Based on the objectives of this study, this paper first analyzes the current situation of China's construction safety management and supervision, from the government level, industry level, enterprise level and social level. At the same time, the problems of local construction safety supervision and management and abroad are also studied. After the comparative analysis, the experience and lessons of foreign construction safety supervision and management are used for references. Next, this paper studied the operation mechanism of the construction safety and management system. This paper analyzed the causes of construction safety accidents, which is the outcome of the construction safety supervision and management system. The technical route of this paper is as follows:

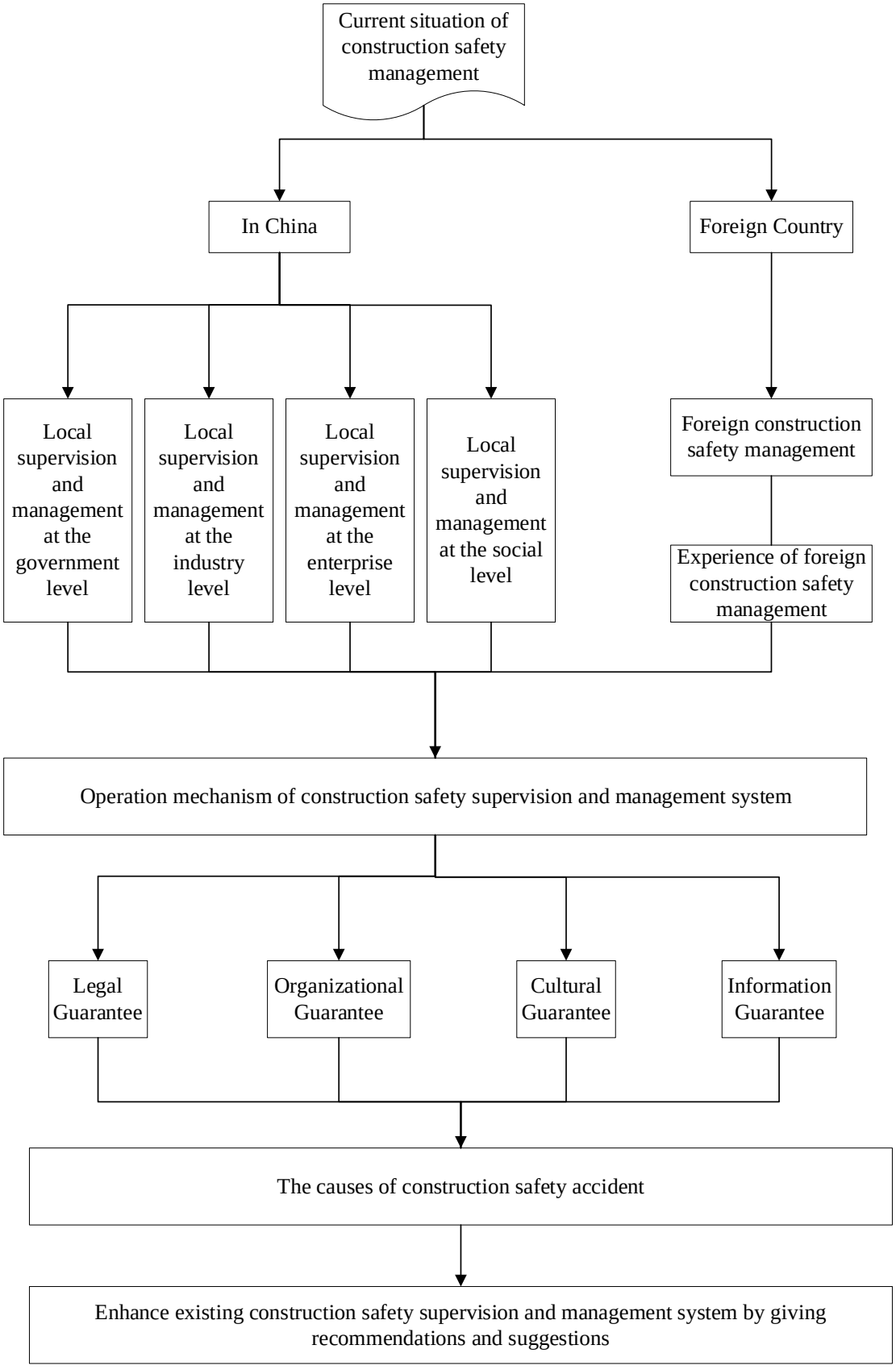

Figure 3 Technical Route

1.3 Research Objectives

The research objectives of this paper were listed as follows.

1. To review analyzes the construction safety supervision and management system of China and foreign developed countries.

2. To review and criticize the current construction safety management policy of Jiangxi Qichen Construction Company.

3. To study the operation mechanism, current situation and problems of the construction safety supervision and management system in Jiangxi Qichen Construction Company.

4. To analyze the causes of construction safety accidents in Jiangxi Qichen Construction Company.

5. To propose optimization measures and suggestions to improve the existing construction safety management system in Jiangxi Qichen Construction Company.

CHAPTER 2

LITERATURE REVIEW

2.1 Research Status Abroad

The research and discussion on construction safety supervision and management in foreign academic circles mainly focus on the macro construction safety management laws and regulations and the micro internal safety production of construction enterprises. Most of the researchers are experts in construction safety management rather than experts in law and they mainly discuss safety legal issues from the perspective of safety management principles. Therefore, the current research status of these scholars will be described below.

In the macro study of construction safety laws and regulations, Huang (2018) analyzed the concept of “self-regulation” mode of British occupational safety and health laws and regulations system, and pointed out that under different laws and regulations supervision and management modes, the enterprises treat safety and health problems differently. Guo et al. (2017) pointed out the problems that should be paid attention to in formulating effective occupational safety and health laws and regulations for all enterprises in the United States, the United Kingdom and Australia, and also put forward many suggestions to ensure the effective implementation of occupational safety laws and regulations. Hong Kuqi and Vincent (2000) compared the labor protection laws and regulations of Japan and the United States, and they believed the best model was the perfect combination of the two. Fang et al. (2020) summarized the development trend of international construction safety and occupational health laws and regulations, and drew the following conclusions: First, the current construction safety and occupational health laws and regulations have developed from traditional

normative laws and regulations which function to perform based on new laws and regulations; Second, the contractor, the owner, the design unit and other relevant parties should bear the safety responsibilities. Therefore, based on the research results of the aforementioned scholars, it can be seen that stakeholders such as contractors, owners, and design units bear extremely important responsibilities for building safety.

In addition to the studies of construction safety laws and regulations, some scholars also studied the economic incentives of laws and regulations. Sanni-Anibire et al. (2020) studied the effectiveness of the Occupational Safety and Health Act of the United States from the perspective of economics, and concluded that the United States Occupational Safety and Health Administration lacked of economic incentives in the process of law enforcement. Awolusi et al. (2018) pointed out that countries which have basically adopted laws, regulations and economic means to manage occupational safety issues, and conducted in-depth research on the roles of economic incentives in construction safety management. Therefore, economic incentives from the government level can also promote construction enterprises to enhance their awareness of safety production to a certain extent.

In the microscopic study of internal safety production in construction enterprises, Jazayeri and Dadi (2017) proposed a compound causal theory model, pointing out that the defects in regulations, management procedures, the effectiveness of supervision and staff training are prone to safety accidents. Benny and Jaishree (2017), the famous American construction safety management experts, conducted a study on "increasing the monitoring in the work is beneficial to the improvement of the safety situation". The main conclusion of this study was that the higher the frequency of supervision and inspection by the company leaders on the construction site, the lower the casualty rate of on-site safety accidents. Ringen et al. (2018) conducted a study on "how the owner selects safe contractors" and concluded that the owner's active select contractors with high safety management level is more conducive to ensuring the safety of construction projects. The overall statistical analysis of Chen (2018) shows that enterprises the

accident rate in the workplace will fall to less than 10% if they fully comply with the supervision and management standards. In summary, if construction enterprises can increase safety production requirements internally, the likelihood of accidents occurring in the enterprise will be reduced.

From the perspective of comprehensive safety management, all construction project participants, including owners, designers, contractors (subcontractors), governments and insurance companies, should be responsible for the building safety (Alruqi, 2018). Gunduz & Laitinen (2018), an American scholar, pointed out that the most important factors affecting building safety include maintaining a safe working environment, conducting necessary safety training, establishing a good safety culture, effectively monitoring subcontractors, maintaining close control over employees and reasonably allocating safety responsibilities. Chen et al. (2021) pointed out that the idea that safety and health are only the responsibility of contractors in the construction industry has been regarded as a major cause of frequent accidents. Therefore, contractors, enterprise safety management departments, governments, and property owners all bear unshirkable responsibilities for safety accidents. Only by working together and assuming their own responsibilities can we effectively curb the occurrence of safety accidents in construction enterprises.

2.2 Domestic Research Status

The research on construction safety supervision and management in China is still in the infancy stage, but due to the increasingly prominent problems of construction safety management in China, this research area is receiving more attention. At present, the research works on construction safety supervision and management in China mainly includes two forms:

The first form is organizing a program or workshop that invites a large number of experts, scholars, business representatives, government departments and other relevant

people to introduce and learn from the achievements of construction safety supervision and management in other developed countries and regions. Chen (2018) put forward the working idea of establishing a safety production supervision and management system which in line with China's national conditions by investigating, analyzing and summarizing the safety supervision and management system of different institutions in Japan. Han (2020) explored suggestions that suitable to improve the engineering quality, safety supervision and management level in China's construction industry by referring and adopting some relevant successful experience from British and German which having relatively mature construction industry development. Zhang (2020) studied the occupational safety and health supervision and management model in developed countries such as Europe and the United States and concluded there is still a certain gap of occupational safety and health supervision and management in China's construction industry compared to the western developed countries. In order to improve the safety supervision and management system of construction industry in China, Ma (2019) proposed to standardize the occupational safety and health supervision and management in the construction industry by strengthening government functions and supporting intermediary agencies.

The second form of papers mainly focus on unilateral research on construction safety supervision and management, while systematic theoretical type of research is still rare. In term of construction production safety supervision and management, Qi (2020) studied the existing supervision and management system of China's construction industry, and construction safety supervision and management mode of China's government on the basis of fully drawing the advanced safety management of foreign developed countries and regions. Zhen (2020), Chen et al. (2021) and others conducted a game study on China's construction production safety supervision and put forward specific suggestions. Liu (2021) and Gao (2021) proposed to apply GIS (Geographic Information System) to macro and micro monitoring of construction projects.

In terms of the construction safety supervision and management organization,

Zhang (2021), starting with the analysis of main problems existing in China's construction safety management organizations, and proposed the concept of building safety management organization system construction and life cycle safety management, as well as the inclusion of different parties in the construction, such as the survey and design units in the survey and design stage, in the construction safety supervision and management organization. Yin (2020) proposed to improve China's construction safety management organization system by strengthening government supervision, establishing construction industrial injury insurance associations, and improving industry management organizations based on the advanced safety supervision and management level of foreign countries which would be combined with China's national conditions.

In the aspect of internal safety production supervision and management of construction enterprises, Chen (2017) proposed that construction enterprises should strengthen their internal supervision and improve their self-supervision and control level. Liu (2019), from the perspective of enterprise safety culture, had discussed the compatibility of Occupational Health and Safety Management Systems (OHSMS) and traditional safety management mode, the mutual promotion and continuous improvement of OHSMS and enterprise safety culture on the role of building industry enterprises in establishing OHSMS, and put forward corresponding countermeasures.

At this stage, most of the foreign research on the safety supervision and management of the construction industry are on the improvement of the construction safety laws and regulations and discussion of the internal safety production of enterprises. The domestic research on construction safety supervision and management are fragmented, and most of the research are not deep and lack of systematic. They only studied one level, either the government organization supervision and management or enterprise internal supervision and management. At the same time, the research and discussion on the construction safety supervision and management system that integrates and forms a joint force from the government, industry, enterprise, and society

has not yet studied.

2.3 Operating Mechanisms

Fan (2014) explained engineering construction project is a complex system, and the interaction between various elements within the system directly affect the smooth implementation of the engineering project construction due to multiple participants involved in the construction process. The quality of management can affectdifferent aspects of the project, such as cost control, schedule, project quality, technical support, resource allocation and so on, which are directly related to the realization of the internal safety management of the construction project. Yang (2015) believed that construction enterprises should establish corporate legal person responsibility system, safety production responsibility and management system, improve the safety technology assurance measures, improve enterprises' independent safety production capacity, and improve self-restraint mechanism. Yang and Wang (2021) pointed out that in addition to improve the safety supervision and management mechanism of construction enterprises themselves, the external mutual supervision of construction enterprises is also essential. In order to ensure the interests of construction enterprises in safe production, mutual supervision between enterprises should be strengthened. Yan (2019) believes the implementation of the insurance system not only can transfer risks it also able to ensure the construction workers can get a certain degree of compensation after encountering safety accidents. Besides that, it becomes an effective economic incentive to prevent safety accidents. At the same time, insurance company act as a third party that can establish a constraint and supervision mechanism for the construction enterprises. It is urgent for China's construction industry to reform the safety production supervision and management system, and build an international construction safety supervision and management system and operating mechanism due to the emergence of diversified investment entities and construction entities in the construction industry, change of the safety supervision and management responsibilities of the administrative departments, deepening the safety supervision behavior of the industrial organizations,

as well as strengthening the safety responsibilities of various construction enterprises, intermediary agencies and insurance institutions.

2.4 Possible Causes of Construction Safety Accidents

Yang (2022) pointed out that safety accidents will have a serious negative impact on construction projects. Engineering construction enterprises need to sum up experience in construction, find and eliminate potential safety accidents during construction in order to prevent safety accidents and improve project safety and stability. Xu (2017) pointed out that the level of safety awareness, safety concept and understanding on importance of construction personnel on safety work of the general director of the project are directly related to the probability of safety accidents in the construction project. If the safety awareness level and safety concept of the person in charge align with the standard requirement, the investment in safety protection will be increased, and a safety management system with high feasibility and efficiency will be established according to the situation of the project.

Tang (2023) pointed out that if the safety management of the construction project is weak, the quality and progress of the construction project will be affected. Si (2015) stated large number and varieties types of materials and equipment are used at the construction of the project, with the rapid progress of the construction development, these materials and equipment would be stacked at the construction site and resulting in the chaos at the project construction site. Unproper management of the equipment and materials will decrease the quality and performance of equipment and materials during storage, which will increase the probability of safety accident risk during its usage and operation. The attitude of neglect the role of safety production by engineering construction enterprises to a certain extent will result in commonly occurred problems such as lack of safety management personnel at the construction site, multiple positions handle by one person, the dereliction of safety management personnel, and the contracting company bears the responsibility for safety issues.

Safety management of the construction projects would be based on their safety supervision system (Yu, 2022). The construction enterprises do not emphasize safety management in the company will lead to the lack of safety supervision system. If lack of strong supervision system, the safety issues will be handled arbitrary by the construction unit. To sum up, the safety problems of engineering construction enterprises will not only affect the lives of personnel and properties of the enterprise at the construction site, it also has adverse effects on the normal development of the society and national economy. How to ensure the safety of the construction project is a problem that should be put at the first place. With the continuous intense market competition, engineering construction enterprises should consider safety production organization, post responsibility system, construction area, rest area, safety management system and site protection construction in order to improve their market competitiveness that will bring more benefits to the enterprises.

2.5 Current Construction Safety Management Relevant Policies Practicing in China and Ganzhou

2.5.1 Current Construction Safety Management Relevant Policies Practicing in China

The current regulations related to construction safety management in China include the *Safety Production Law of the People's Republic of China*, the *Regulations on Safety Production Management of Construction Projects*, the *Regulations on Quality Management of Construction Projects*, the *Regulations on Safety Production Management of Construction Enterprises*, and the *Regulations on Safety Production License Management of Construction Enterprises*.

The *Safety Production Law of the People's Republic of China* is the basic law of

safety production in China, which stipulates the basic principles and management system of safety production and has important legal significance for construction safety management. The *Regulations on Safety Production Management of Construction Projects* comprehensively regulate the safety management in construction projects, including the responsibilities of engineering enterprises on construction safety management, safety management requirements for construction sites, requirements for the allocation and use of safety equipment, and safety production supervision and inspection. The *Regulations on Quality Management of Construction Projects* stipulate the quality management requirements for construction projects, including the quality management responsibilities of the construction party, engineering quality supervision and inspection, and other contents. The *Regulations on the Safety Production Management of Construction Enterprises* is a specific specification for the safety production management of construction enterprises, including requirements for the organizational structure of enterprise safety production, safety production management system, safety training and education. The *Regulations on the Management of Safety Production Licenses for Construction Enterprises* is a standard for the management of safety production licenses for construction enterprises. It requires enterprises to carry out construction activities in accordance with regulations after obtaining the license to ensure safe production during the construction process. In addition, the National Standardization Administration of China has formulated a series of standards and technical specifications such as the *Technical Regulations for Construction Safety*, *Construction Safety Acceptance Standards*, and *Construction Safety and Civilized Construction Standards*, which providing specific technical guidance for construction safety. The government departments have also proposed corresponding policy measures for construction safety management, such as implementing a safe production responsibility system, strengthening safe production supervision and inspection, and promoting safe and civilized construction.

Overall, China's construction safety management regulatory system is relatively complete, aimed at ensuring the safety of personnel and property during the

construction process and promoting the healthy development of the construction industry. However, there are still some problems in the actual implementation at construction sites that need to be continuously improved and strengthened.

2.5.2 Current Construction Safety Management Relevant Policies Practicing in Ganzhou

The current construction safety management regulations in Ganzhou City mainly include the *Ganzhou City Construction Safety Management Regulations*, *Ganzhou City Construction Engineering Quality Management Regulations*, *Ganzhou City Construction Enterprise Safety Production License Management Measures*, and so on.

The *Regulations on Construction Safety Management in Ganzhou* are the basic regulations of Ganzhou City, mainly involving construction site safety management, safe equipment management, accident emergency management, etc. It requires the construction enterprises to establish a safe production management system, formulate construction safety measures, and ensure the safety and quality of the construction projects. The *Regulations on the Quality Management of Construction Projects in Ganzhou* mainly focus on the quality management of construction projects, including quality supervision and inspection, construction of quality management systems for construction units, quality testing and evaluation, etc.,which aiming to improve the quality level of construction projects. The *Management Measures for Safety Production License of Construction Enterprises in Ganzhou* is a standard for the management of safety production licenses for construction enterprises in Ganzhou City. It requires the construction enterprises to hold a valid safety production license before start the construction activity and carry out construction in accordance with the requirements of the license to ensure safe production during the construction process. In addition, the Ganzhou Municipal Government has also introduced a series of construction safety management policies, such as strengthening construction site safety supervision, promoting safe and civilized construction, and establishing a safety production

responsibility system, to provide policy support for construction safety management. In addition, the Ganzhou Construction Industry Association has also formulated the *Ganzhou Construction Enterprise Safety Production Rules and Regulations*, which specifies the safe production management system, training, and education of construction enterprises.

Overall, the construction safety management regulations and policies in Ganzhou City are relatively complete, mainly based on central and provincial regulations, and have been refined and improved according to the actual situation of Ganzhou City. However, in actual implementation, there are still some problems that require continuous strengthening the supervision and improvement system to ensure the safety and quality of construction activities

CHAPTER 3

METHODOLOGY

3.1 Research Content

The main contents of this paper include several aspects:

First, considering the current situation of safety production in China's construction industry and the problems existing in the process of safety management, this paper put forward the necessity of building a construction safety supervision and management system in China.

Secondly, on the basis of questionnaire and interview, analyze the current situation and problems, the construction organization’s safety supervision and management system. At the same time, it analyzes the relatively advanced construction safety supervision and management mode in foreign developed countries, and summarizes the experience applicable to the long-term development of China's construction industry through critical review.

Thirdly, based on the analysis results of the questionnaire and interview, the existing literature research results and the experience of the construction safety supervision and management mode in developed countries, this paper put forward the theoretical framework of the construction safety supervision and management system suitable for China's national conditions, , and proposed the operation mode of the construction safety supervision and management system.

3.2 Research Methods and Study Design

This study adopted a semi quantitative research design, including both qualitative and quantitative research designs. The qualitative part of the study adopted various methods, including collecting relevant data, summarizing existing literature research results, analyzing the current situation and problems of China's construction safety supervision and management system, as well as the construction safety management policies of Jiangxi Qichen Construction Company. Through these methods, the study evaluated the construction safety supervision and management system and the safety management policies of Jiangxi Qichen Construction Company, identified their existing problems, and proposed improvement suggestions.

In the process of qualitative research, researchers conducted interviews with professionals related to construction management, to have a better understanding about the current situation and operation mechanism of the construction company and China's construction supervision and management system. Through these interviews, researchers gathered experience and insights from practical fields to further understand safety issues and challenges in the construction industry.

In addition to evaluate and critic policies and supervisory management systems, this study involved quantitative research. A cross-sectional study design was conducted using a questionnaire survey. The aim was to evaluate the problems, operational mechanisms, and possible causes of construction accidents in the construction safety supervision and management system of Jiangxi Qichen Construction Company. This questionnaire survey was conducted among the company's construction employees. Researchers distributed the survey questionnaire contained questions related to safety management and require the employee to answer in order to understand their views and practices on safety management system.

The purpose of this study was to gain a deeper understanding of the current situation and problems of China's construction safety supervision and management system, as well as the construction safety management policies of Jiangxi Qichen Construction Company, through qualitative and quantitative research methods. The results of the study helped to identify the problems and challenges in safety management, and propose improvement suggestions to improve the quality and efficiency of construction safety management.

3.3 Study Location

This study was carried out at Jiangxi Qichen Construction Company, Ganzhou, China. Ganzhou is located at the southern edge of the central subtropical zone, and belongs to the humid monsoon climate of the subtropical hills and mountains. The terrain is dominated by mountains, hills and basins. As of June 2020, Ganzhou has a total area of 39379.64 square kilometers, accounting for 23.6% of the total area of Jiangxi Province, and is the largest administrative region in Jiangxi Province. In order to promote the transformation and upgrading of the construction industry, Ganzhou actively develops prefabricated buildings and green buildings. From 2012 to 2022, the number of qualified construction enterprises in Ganzhou increased from 416 to 2636, and the number of enterprises increased by 533.65%. Among them, the number of construction enterprises with Grade I qualification or above increased from 8 to 96, an increase of more than 10 times. The added value of Ganzhou's construction industry reached 168.199 billion yuan, accounting for 6.51% of the city's GDP (Dayu Government, 2022).

3.4 Study Population

The research population of this study includes employees and leaders of construction company, relevant personnel at the construction site, university professors and construction management experts. To ensure the pertinence of the questionnaire, the research subjects of the questionnaire included all employee of Qichen Construction

Company, including the competent departments, subcontractors, supervision departments, construction departments, etc.

The employee of the construction company referred to all the management personnel of Jiangxi Qichen Construction Company (excluding the company's management personnel). The leaders of the construction company were the person in charge, the safety management personnel, and the project manager of Jiangxi Qichen Construction Company. Relevant personnel at the construction site referred to the management personnel at the construction site, such as the site safety officer and the construction personnel at the construction site. Construction management experts referred to relevant construction safety management experts hired by Jiangxi Construction Company, while university professors referred to university professors who study architecture at Jiangxi University of Science and Technology in Ganzhou, Jiangxi Province.

Minimum sample size was calculated for the questionnaire survey. This survey questionnaire recruited all workers who working for the construction company during the three weeks of data collection period. Since the construction workers who working at construction sites in Ganzhou, China is hired on a daily contract, the total number of construction workers is constantly changing every day.

Below was the sample size calculated for current study:

Number of administrative workers = 30 workers.

Number of construction workers at the construction site = average of 50 workers per week × 3 weeks = 150 people.

Thus, the calculated sample size was 30 + 150 = 180, and the number of non-response rate considered was 10%, which was 18, resulting in a total number of 198 respondents. Therefore, after considering 10% of non-response rate, the estimated minimum total sample size was 198 of respondents.

3.5 Research Instruments

3.5.1 Construction safety management policy of Jiangxi Qichen Construction Company

Through the investigation, we can know that Jiangxi Qichen Construction Company's construction safety work is people-oriented and adheres to the principle of "safety first, prevention first, and comprehensive management". Therefore, in view of this principle, Jiangxi Qichen Construction Company has formulated a series of safety policies, plans and measures.

Below are the construction safety management policy of Jiangxi Qichen Construction Company:

(1) The company carefully implements the labor protection and safety production policies, decrees, rules and regulations and safety contracts formulated by the state and government departments, such as the Production Safety Law of the People's Republic of China, the Regulations on the Safety Management of Construction Projects, the Regulations on the Safety Supervision of Housing Construction and Municipal Infrastructure Construction and other relevant national laws and regulations.

(2) The company implements "one post with two responsibilities", comprehensively implements "people-oriented" safety management, and achieves "ideological awareness, work energy, and system measures" in place.

(3) The company formulates safety production work plan and safety production responsibility system, formulates reward and punishment measures for safety production, and establishes and continuously improves the complete production management system.

(4) The company regularly analyzes the safety production situation. Timely study and solve safety production problems, and regularly report safety production conditions and measures.

(5) Jiangxi Qichen Construction Company approves the labor protection measures plan and organizes its implementation.

(6) The company regularly organizes safety inspections and actively carries out through various forms of safety labor competitions.

(7) The project manager shall carry out safety, discipline and labor protection legal education for the staff, and lead and urge the functional departments at all levels and the staff to do a good job in the safety work within the scope of their duties.

(8) The Project Manager shall preside over the investigation and handling of major casualties on site, and formulate and implement rectification measures.

3.5.2 Safety Policy and Plans

The relevant safety policy and plans of Jiangxi Qichen Construction Co., Ltd. are as follows:

1. Safety Policy

Chapter 1 General Provisions

To ensure the safety of employees and the workplace, avoid accidents, and ensure the production and operation of the company and the physical health of employees, this regulation is formulated.

Chapter 2 Safety Management System

(1) The company will integrate safety management into all levels and positions of the company, ensuring the safety awareness and ability of employees, and achieving safe production.

(2) The company will develop a safety management system in accordance with the requirements of laws and regulations, standardize the safety behavior and operation of employees, and strictly implement various safety systems and procedures.

(3) The company will establish a sound safety supervision and inspection mechanism, conduct risk assessment and management of workplaces and work processes, strengthen on-site supervision and management, and promptly identify and solve safety issues.

(4) The company will regularly conduct safety training and drills to enhance employees' safety awareness and ability, enhance emergency response capabilities, and reduce the occurrence of accidents.

Chapter 3 Safety Equipment and Equipment

(1) The company will provide employees with necessary safety equipment and equipment, including but not limited to safety helmets, safety shoes, protective gloves, safety ropes, etc., to ensure their safety at work.

(2) The company will regularly inspect and maintain these safety equipment and equipment to ensure their effectiveness and reliability.

(3) The company will establish a sound safety equipment and equipment management system, strictly implement various safety equipment and equipment usage regulations, and ensure their normal use and maintenance.

Chapter 4 Safety Responsibility and Reward and Punishment System

(1) The company will establish a sound safety responsibility system, clarify the safety responsibilities and obligations of management personnel at all levels, implement them on each employee, and ensure their personal safety.

(2) The company will establish a sound safety reward and punishment system, promote employee safety behavior and operation through incentive and disciplinary mechanisms, and promote safety production.

Chapter 5 Supplementary Provisions

(1) This Articles of Association shall come into effect from the date of promulgation and must be complied with by all employees of the company.

(2) The right to interpret these articles of association belongs to the company. During the implementation process, if there is a need for modification, the company will make adjustments and development based on the actual situation.

(3) Matters not specified in this Articles of Association will be implemented in accordance with relevant national laws, regulations, and industry standards.

2. Plans

Firstly, Jiangxi Qichen Construction Company conducts safety training at least once a year, which includes training on employee safety awareness, operating standards, emergency response measures, and conducts relevant knowledge assessments to improve employee safety awareness and emergency response capabilities. At the same time, the company conducts a monthly safety inspection to inspect the construction site and safety facilities, promptly identifying and resolving existing safety issues. For the safety drill plan, Jiangxi Qichen Construction Company conducts safety drills every six months to simulate various possible accident scenarios, test employees' emergency response capabilities, and evaluate the reliability and effectiveness of safety facilities.

In addition, the company will also implement relevant safety equipment management plans, such as establishing a safety equipment ledger and conducting quarterly inspections to ensure that all safety equipment meets requirements, is used and maintained normally. The company formulates safety discipline evaluation standards and regulations, conducts quarterly evaluations, criticizes, educates or punishes employees who violate regulations, and recognizes and rewards outstanding employees.

Furthermore, Jiangxi Qichen Construction Company carries out safety promotion activities through various channels, including safety knowledge training, poster display, flyer distribution, etc., to strengthen employees' safety awareness and prevention awareness. Finally, develop a safety emergency plan. The company develops corresponding safety emergency plans based on different types of construction projects, including escape plans, fire extinguishing plans, and corresponding emergency equipment preparation and drills.

3.5.3 Questionnaire

This questionnaire used in this study was adapted from the questionnaire by He (2015). The revised questionnaire contains 33 questions in total. These problems were studied from three aspects: (1) the operation mechanism, (2) current situation and existing problems of the construction safety supervision and management system of Jiangxi Qichen Construction Company, and (3) the causes of construction safety accidents of construction personnel. Among them, the operation mechanism includes 12 questions. The current situation and existing problems include 11 questions, while the causes of construction safety accidents of construction personnel included seven questions. The remaining three questions were about the personal information of the respondents.

3.5.4 Statistical Package for Social Science (SPSS) program version 22

For the quantitative results analysis, all data collected from the questionnaire survey were keyed in into the SPSS software for data analysis. IBM SPSS Statistics22 has comprehensive functions, including ad hoc analysis, hypothesis testing and reporting. SPSS uses a method similar to EXCEL table to input and manage data. The data interface is more general and can easily read data from other databases. The basic functions of SPSS include data management, statistical analysis, chart analysis, output management, etc. SPSS statistical analysis process includes descriptive statistics, mean value comparison, general linear model, correlation analysis, regression analysis,

logarithmic linear model, cluster analysis, data simplification, survival analysis, time series analysis, multiple response, etc.

Frequency analysis was conducted in this study. The analysis includes the opinions of construction company employees on the operating mechanism, current situation, and issues of the construction safety supervision and management system, as well as the possible causes of construction safety accidents.

3.6 Study Protocols

3.6.1 Literature Analysis, Evaluation and Critic

This study adopted a systematic approach to collect, screen, and organize literature related to the construction safety supervision and management system. Firstly, this study established clear search keywords and search strategies to ensure that the retrieved literature has a certain degree of reliability and representativeness. Next, this study selected and organized the retrieved literature, selected the literature that meets the research theme and purpose, and read and analyzed them. In the process of literature analysis, this study will combine qualitative and quantitative research methods to provide a comprehensive summary and analysis of the literature. Especially for existing research results and theoretical viewpoints, this study evaluated and gave comments by pointing out their advantages and disadvantages, in order to provide better reference for the theoretical framework and operational mechanism of construction safety supervision and management system. The analysis, evaluation, and commentary of literature in this study not only summarized and synthesized existing research results, but more importantly, identified and solved some unresolved problems and contradictions during the analysis process, which can provide useful ideas and directions for other research in the future.

3.6.2 Questionnaire Survey Among Employee of a Construction Company

The questionnaire survey in this study aimed to understand the current situation

and existing problems of construction safety management at Jiangxi Qichen Construction Company. Through a questionnaire survey, it is possible to better understand employees' understanding of building safety management policies, their awareness of safety training and safety production awareness, and their evaluation of construction safety measures. In order to ensure the effectiveness and credibility of the questionnaire survey, this study adopted online questionnaire survey method to collection data from the employees of Jiangxi Qichen Construction Co., Ltd. and interview method to obtain more professional suggestions from architectural experts and professors.

The questionnaire survey was conducted among the safety administrative department, construction department, construction department, supervision department, other relevant departments, and at construction site of Jiangxi Qichen Construction Company from March 2023 to April 2023 to ensure a comprehensive coverage of the employee group and construction site. In the questionnaire design process, this study used standardized survey questionnaires to ensure the scientific and comparability of the questions. The questionnaire included multiple questions such as employees' basic information, work experiences, safety training, safety production awareness, and implementation of construction safety measures, in order to gain a deeper understanding of employees' understanding and practical operation of building safety management. Before starting the questionnaire survey, written concerned from the respondents were obtained. The privacy and information security of the respondents were protected to ensure the authenticity and confidentiality of the investigation results. All of the data collected were used for research purposes only.

The data collected from the questionnaire survey were keyed in into the statistical analysis software. Statistical analyses were conducted in order to gain a deeper understanding of the problems and possible reasons in the construction safety management of Jiangxi Qichen Construction Company, and provide scientific basis for establishing a more comprehensive construction safety supervision and management

system.

3.6.3 Interview sessions with the relevant professionals

Interview is another important research method in this study. Through interviews with professionals related to construction management, we can gain a deeper understanding of the root causes and causes of problems in the current construction safety supervision and management system of Jiangxi Qichen Construction Company and China. The researchers selected a few experts, university professors, construction enterprise leaders, and construction site personnel who engaged in construction management related work in Jiangxi Province, to conduct in-depth interviews on the actual operation, policy implementation, existing problems, and solutions of the safety management system. During the interview, the researchers fully communicated and exchanged ideas with the interviewees to understand their views and suggestions on the building safety management system. At the same time, specific cases and data related to the construction safety supervision and management system were also be collected through interviews to provide support for further analysis and discussion.

Through a combination of literature analysis, questionnaire survey, and face-to-face interviews, this study could deeply explored the issues of Jiangxi Qichen Construction Company and the current construction safety supervision and management system in China, and propose feasible suggestions and measures to provide theoretical guidance and practical experience for construction safety supervision.

3.6.4 Field Data Collection Procedures

(1) Questionnaire Distribution

The questionnaire of this study was distributed through the questionnaire star software. In order to recover information quickly, data collection also uses "questionnaire star" for recovery. In modern society, mobile phones have become an indispensable tool in people's daily life. The traditional way of distributing

questionnaires on the spot is very inefficient. The inefficient way of questionnaire survey will seriously affect the statistical process of the data results of the paper.

(2) Interview sessions

The researcher of this study conducted several interviews with safety management experts and university professors of Jiangxi Qichen Construction Company. The interview results of construction safety management experts and university professors were summarized, qualitatively analyzed and compiled in the Chapter 4 Result and Discussion. The interview questions can be found in the appendix II.

CHAPTER 4

RESULT AND DISCUSSION

This chapter analyzed and criticized the safety management policy of Jiangxi Qichen Construction Company besides describing the results of questionnaire collection. A total of 230 questionnaires were sent out and 223 questionnaires were collected in this study. The response rate of the questionnaire was 96.96%. Section 4.1 mainly focuses on Overview of Construction Safety Supervision and Management in Developed Counties. Section 4.2 Review and critical of construction safety management policy of Jiangxi Qichen Construction Company. Section 4.3 is Sociographic Analysis. 4.4 Construction Safety Management of Jiangxi Qichen Construction Company. Section 4.5 Optimization Measures and Suggestions for Improving the Existing Construction Safety Management System. Section 4.6 contains the analysis of the interview result with the experts.

4.1 Overview of Construction Safety Supervision and Management in Developed Countries

After years of development, the construction industry in developed countries such as the United States, Germany and Japan has gradually formed a market-oriented construction safety supervision and management model (Tu, 2019). At the same time, they have accumulated a lot of experience in laws and regulations, institutional construction, management methods and means of construction safety supervision and management mode. Pang (2017) pointed out that, studying and learning from the experience of developed construction safety supervision and management can reduce the exploration time and detours, and it will have great significance for China to establish a construction safety supervision and management system that suitable for

China's national conditions. At the same time, through the analysis and discussion of the construction safety supervision and management mode in developed countries, it can also provide a valuable reference for improving the construction safety management level in China.

4.1.1 Building Safety Supervision and Management Mode in the United States

The construction safety supervision and management mode in the United States can be summarized from the following aspects: national supervision, enterprise responsibility, insurance restriction, and industry consultation.

National supervision - The United States established the National Occupational Safety and Health Administration (OSHA) in 1970 in order to have a better supervision and management system on the workers' occupational safety and health. The Bureau and its 10 regional branches in the United States are mainly responsible for the formulation of laws and regulations on occupational safety and health, and the supervision and management of construction enterprises and their construction sites. They mainly supervise and inspect the safe production behavior, machinery, equipment, materials, environment and other conditions of any construction enterprise and construction site in a reasonable manner within a reasonable time without notice through the OSHA safety and health inspectors who have been specially trained and experienced in safety and health. The main activities including carry out inspection and provide findings of inspection activities. Then, the local administrative department will decide whether to punish or penalty the enterprise according to the results of inspection (Jeelani et al., 2020).

Corporate responsibility - The United States is a highly legalized country. Therefore, in terms of law related with construction safety supervision and management, in addition to the provisions of civil law, labor law, employer liability law and other laws, the core of occupational safety and health related law in the United States is the

Occupational Safety and Health Act issued in 1970, which stipulates that employers of construction enterprises must consciously abide by the detailed federal and local safety standards and regulations that have been issued. In United States, employers should take the full responsibility for the safety and health of all personnel in the production process of the enterprise, including if any accident happened at the enterprise (Yin, 2017).

Legislation on work-related injury insurance- the legislation of industrial injury insurance in the United States has gone through three stages: first, the common law stage of industrial injury accidents; Second, the stage of employer liability law; Third, the stage of labor compensation law. So far, the legal and regulatory system of construction safety industrial injury insurance in the United States has been gradually improved. Nowadays, the federal law in United States clearly stipulates that employers must purchase work-related injury insurance for employees. At the same time, in order to stimulate the enterprises to actively prevent work-related injury accidents, the insurance rate is determined according to the occurrence rate of work-related injury accidents and safety management records of the enterprises in the previous year (Xu, 2018). Enterprises with low accident occurrence rate and good safety management records can correspondingly reduce the insurance rate, and on the contrary, increase the insurance rate. By controlling the safety production management behavior of enterprises through economic can fundamentally improve the safety management level of enterprises.

Industry consulting - The National Institute of Occupational Safety and Health (NIOSH), as a federal agency in United States, is mainly responsible for providing a healthy environment for the safety management of the industries by providing various occupational safety and health training, education, information and research in the field of occupational safety and health. At the same time, 12 professional committees affiliated to the National Institute of Occupational Safety and Health also provide safety consultation services to construction safety associations, professional consulting

companies and construction enterprises.

4.1.2 Construction Safety Supervision and Management Mode in Germany

Germany's construction safety supervision and management level has always been at the forefront of European countries. The construction safety supervision and management in Germany mainly adopts a "dual track" construction safety supervision model. This management system combines occupational safety and health laws and regulations issued by the federal government and government safety supervision and management agencies, and also clarifies responsibilities and work-related injury insurance.

At present, the laws and regulations on construction safety in Germany mainly include the Labor Protection Law, which was re-issued in 1996. It was properly revised and supplemented based on the overall framework of the Labor Protection Law, which was promulgated in 1992. The law stipulates that employers of construction enterprises must take measures to provide employees with safe and healthy working environment and evaluate the safety situation in the workplace. Occupational Safety Law, which is a law that mandatory the employment of safety management personnel by construction enterprises. There is also the Social Law, which stipulates that personal safety and health of the employees must be ensure while carry out construction activities, as well as the need to have construction safety production management system and specific management system. In addition to the above three basic laws, the German government also includes a series of laws, regulations and standards such as the Federal Construction Law, the Construction Product Law, the Law on the Prevention of Industrial Accidents, and the Regulations on the Contracting of Construction Projects. At present, a relatively complete system of construction safety production regulations has been gradually formed, and great attention has been paid to the supervision and management of construction safety by legal means.

The government agencies, labor protection departments, technical supervision departments, industrial injury insurance institutions, other institutions and participants play an important role in the Germany's "two-track" construction safety supervision and management model.

The construction and unified management department, labor protection department and technical supervision department of the government are responsible for the supervision and management of the construction project. First, the construction management department shall review the construction scheme and design drawings of the construction project before the construction of the project, which including supervise and inspect the project quality and fire safety twice during the construction process, and correct the problems found in a timely manner. After the building is completely constructed and allowed for occupancy, the safety situation of the project during occupancy period also will be tracked. The labor protection department mainly supervises and inspects the safety and health conditions of construction enterprises on behalf of the German government. The technical supervision department is mainly responsible for regular and irregular inspection to detect any unusual or faulty conditions of various mechanical equipment.

Germany is the first country in the world that establish an industrial injury insurance system, so its industrial injury insurance system is relatively perfect. In Germany, the industrial injury insurance system consists of the employer's liability insurance funds for the industrial sector, the agricultural sector and the public sector. Since the industrial injury insurance system in Germany is compulsory, the law stipulates that all employees of construction enterprises must participate in industrial injury insurance compulsorily, and each enterprise must join the local federation and become a member of the federation. All employers who undertake construction projects must pay the industrial injury insurance premium to the federation according to the number of employed employees and the degree of risk of their work, and the federation shall be responsible for the insurance. Through this system, it connects the relevant

government agencies and industrial injury insurance institutions jointly participate in the construction safety supervision and management.

4.1.3 Japan's Construction Safety Supervision and Management Mode

The construction safety supervision and management mode in Japan mainly starts with regulations that related to noise and sound, efficient institutional management, perfect industrial injury insurance and intermediary participation.

Japanese laws and regulations on construction safety mainly include laws, decrees, provincial decrees, announcements and other forms. After the establishment of the Ministry of Labor in 1947, Japan promulgated the highest level of safety production legislation, the Labor Benchmark Law (Lai, 2017). It contained the detailed regulations on employment, working hours and wages, and labor safety and health. Subsequently, according to this law, the Industrial Safety and Health Law was promulgated in 1972, which required all enterprises engaged in production activities to supervise the safety production system and appointed or formulated relevant responsible persons to supervise and guide the safety production work of enterprises. In the same year, the Labor Safety and Health Law was formulated and implemented, which stipulates in detail that construction enterprises must comply with safety production and occupational health standards. At the same time, in order to ensure the safety and environmental health of the workplace, the Working Environment Measurement Law and the Pneumoconiosis Law were formulated. Subsequently, the laws and regulations were continuously formulated, revised and improved according to the development requirements of the production safety in Japan. At present, Japan’s construction safety production has formed a legal and regulatory system of construction safety supervision and management with the “Industrial Safety and Health Law” as the center, and the “Labor Standard Law”, “Labor Safety and Health Law”, “Working Environment Measurement Law”, and “Pneumoconiosis Law” as the supplement, which help in enforcing the construction safety supervision and management.

The Ministry of Labor Is responsible for the supervision and management of construction safety in Japan. The supervision and management organization of safety in production is composed of three levels. The first level and also the highest level is the Labor Standards Bureau of the Ministry of Labor, followed by the second level of the Labor Standards Bureau of prefectures and counties, and the third level of the Labor Standards Supervision Office of the factory. The supervision and management system of safety in production is implemented under vertical leadership at all levels. The work safety supervision procurator shall be responsible for supervising, inspecting and guiding the work safety behavior of the enterprise; suggest rectification suggestions and issue production suspension notice to the enterprise for major safety hazards in the inspection process; and investigate, count, analyze and handle major safety accidents. In order to further strengthen and centralized the supervision and management of safe production in the construction industry, Japan carried out the reform of government institutions in 2001 and established the Ministry of Health, Welfare and Labor, which supervises and manages the safe production behavior of the construction industry. The safety and health association of construction industry provides safety education, training, research and other services. In addition, other inspection and supervision institutions entrusted by the government exercise the rights of safety production and health supervision, award qualification certification, and conduct education and training on behalf of the government to urge the enterprises in construction industry to carry out safe production.

For construction enterprises, industrial injury insurance can promote safe production, improve working conditions and protect the legitimate rights and interests of workers. In addition, the establishment and collection of annual insurance rates for different enterprises of construction industrial injury insurance in Japan and the identification and compensation of industrial injury accidents are all in charged by the safety supervision and management organization. Therefore, the Japanese government implements the system by combining safety supervision and management institutions

with industrial injury insurance. In addition to the Safety and Health Association of the Construction Industry, and the inspection institutions authorized by the government, other intermediary institutions approved by the government can also carry out the corresponding safety production publicity, education, training, equipment testing and other services. This is to facilitate the coordination between division of labor and facilitate communication with the intermediate institutions. In addition, intermediate agencies can also invite safety supervision and management supervisors, construction safety experts, scholars, construction enterprise leaders, and construction enterprise safety management personnel to participate in various safety production and technical seminars, symposiums, and information exchange meetings, which greatly improve the safe production behavior of enterprises and the safety supervision and management level of the construction industry.

4.1.4 Experience that Can Be Used for Reference in China's Construction Safety Supervision and Management

In order to improve the safety supervision and management of the construction industry, effectively reduce the occurrence of accidents at construction site, and effectively protect the life and property of the country and people, the following aspects are the keys to achieve these goals:

(1) Timely supplement and revise existing laws and regulations

One of the important signs of mature market economy is to implement updated laws and regulations according to the country' development. Therefore, the governments of the United States, the United Kingdom and Japan all prioritize occupational safety and health aspect by establishing legislation as the foundation, and safety and health management and supervision system as the basis. Therefore, in the process of continuously develop the construction industry, China should continue to sum up the previous experiences to formulate and promulgate the construction safety

laws and regulations which applicable to our national conditions in a timely manner. It is important to integrate the field of the construction safety in the legislation, able to timely revise and improve the legal provisions that do not adapt to the current development and conditions. At the same time, in addition to the central government formulating and promulgating national laws and regulations, the local governments should also formulate laws and regulations that are suitable for the specific conditions for the local construction industry. We should establish clear boundaries between supervision and management functions, and clear relationship between responsibilities and obligations of different relevant parties. These able to greatly strengthen the government's safety supervision and management, and make the enterprise's safety supervision and management become a conscious behavior.

(2) Allow industrial organizations and intermediaries to full play their safety supervision and management roles

The government should further clarify the responsibilities and obligations of safe production and labor hygiene in term of their construction safety supervision and management. The government functional departments should strengthen the supervision function; weaken the management function; entrust the daily supervision and management work to the industry organization for management; further improve the management functions of social intermediaries and industrial organizations; improve the management system of registered safety engineers; and give full play to the intermediary of industrial departments or organizations in execute their functions such as consultation, service and management.

(3) Improve the industrial injury insurance system

At present, China needs to establish a work-related injury insurance system that is compatible with the socialist market economic system and operating mechanism. The awareness of safe production of construction enterprises could be improved through

different rate system, floating rate system, reward and punishment mechanisms of industrial injury insurance system. At the same time, it can guarantee the right of the workers to receive medical treatment, economic compensation and occupational rehabilitation after suffering from safety accidents or occupational diseases. This is conducive to enhance the enthusiasm of workers, transfer financial risks after the occurrence of safety accidents, and reduce lost caused by safety accidents.

4.2 Review and Critic of Construction Safety Management Policy of Jiangxi Qichen Construction Company

4.2.1 Summary of the Existing Plans and Measures

Jiangxi Qichen Construction Company has implemented a range of safety policies, plans, and measures to prioritize the well-being of their employees and maintain safe workplaces. Their efforts aim to prevent accidents, ensure smooth production and operations, and safeguard the physical health of their workforce. The company has taken comprehensive steps to fulfill their safety management responsibilities, focusing on areas such as safety training, supervision, and equipment management. Below is an overview and summary of the existing plans and measures implemented by Jiangxi Qichen Construction Company.

The company has established a clear safety policy and developed a robust safety management system that integrates safety practices at all levels and positions within the organization. This approach includes enhancing employees' safety awareness and capabilities, aligning with legal and regulatory requirements, and diligently implementing various safety systems and procedures to promote safe behaviors and operational standards. Furthermore, the company has established an effective safety supervision and inspection mechanism. This involves conducting risk assessments and management for workplaces and work processes, strengthening on-site supervision and

management, and promptly addressing any identified safety issues. Regular safety training sessions and drills are conducted to improve employees' safety awareness and emergency response capabilities, thereby minimizing the occurrence of accidents.

Jiangxi Qichen Construction Company ensures the provision of necessary safety equipment to protect employees during work activities. They have implemented a comprehensive safety equipment and equipment management system, strictly enforcing usage regulations to ensure proper utilization and maintenance. The company has also implemented a safety responsibility framework, incorporating a system of rewards and punishments. This framework clarifies the safety obligations and responsibilities of management personnel at all levels. By employing incentive and disciplinary mechanisms, it can encourage safe behavior and operations in the workers, fostering a safety-consciousness culture and promoting safe production practices. Moreover, the company places emphasis on the safety management of external contracted projects, prioritizing project quality and safety, fulfilling social responsibilities, and contributing to the healthy development of the industry.

4.2.2 Strengthen Construction Safety Management

Jiangxi Qichen Construction Company has implemented a comprehensive safety production organization management system and inspection system to enhance construction safety management. The company's approach encompasses several key aspects. Firstly, the Project Department takes on the responsibility of overseeing on-site construction safety, promptly addressing and managing any major on-site accidents, as well as handling personnel issues related to such incidents. Additionally, each morning, the project leader conducts individual checks on construction workers to ensure they are wearing proper safety equipment, including safety helmets and safety ropes for those involved in working at height tasks. Only workers who meet the safety requirements and are fully equipped are allowed to enter the construction site. Furthermore, the construction team conducts daily patrols of the construction site, identifying and addressing any safety concerns among the workers. The designated

safety officer also reports the day's production safety status to the project department's leader. Implementation of these measures able to provide a safe and secure working environment for all employees.

4.2.3 Safety Production Responsibility System Management System

Jiangxi Qichen Construction Company has established a safety management system that integrates management at all levels and relevant functional departments to conduct regular evaluations. Safety objectives are divided into production safety accident control indicators, production safety hazard management objectives, and production safety civilized construction management objectives. These safety management objectives have been quantified. The company's safety production responsibility management system can be summarized as follows.

Firstly, it is emphasized to strictly abide by safety production regulations and safety technical operation procedures, with a focus on diligently completing assigned tasks. Secondly, employees should be familiar with the names of hazardous chemicals used in the production process, understand the main hazards associated with them, and understand emergency response methods and firefighting techniques. The company also emphasizes the implementation of a shift handover system, conscientiously conducting pre job inspections, and communicating safety precautions to successors. Before handover, the equipment and safety facilities of the designated workstation should be thoroughly inspected. At the same time, the company strictly prohibits illegal operations and requires employees to comply with process regulations and safety technical operating procedures. Accurate and comprehensive work records are required. In addition, the company also encourages a combination of regular and irregular inspections to effectively analyze, evaluate, and solve any safety anomalies that may occur during the production process.

For the issue of equipment operation failures, Jiangxi Qichen Construction Company strictly prohibits the operation of faulty equipment and emphasizes good

equipment maintenance work. If any malfunction occurs, employees should immediately stop the machine and apply for repair. The correct use and maintenance of protective equipment, tools, and firefighting equipment are also crucial. At the same time, it encourages employees to intervene and prevent others from engaging in illegal operations. They have the right to refuse orders that violate safety regulations and should report such situations to their superiors. At the same time, Jiangxi Qichen Construction Company urges employees to promptly report any hidden dangers or unsafe factors they discover. Encourage employees to provide suggestions and contributions to improve the safety production of the unit and enterprise. By implementing this safety production responsibility management system, Jiangxi Qichen Construction Company aims to ensure a safe and reliable working environment, reduce risks, and promote a safety awareness culture throughout the organization.

4.2.4 Safety Production Regulations

Jiangxi Qichen Construction Company attaches great importance to complying with the government's safety production laws and regulations. In addition, considering the unique characteristics of the company, specific safety production regulations have been formulated. The company has established a clear safety responsibility system and adheres to strict responsibility system standards. A safety management plan has been implemented for relevant personnels. However, it is important to acknowledge certain shortcomings in the company's safety production practices.

Firstly, Jiangxi Qichen Construction Company lacks of regular safety production training for its employees. Secondly, Jiangxi Qichen Construction Company did not evaluate the safety production awareness of its employees, assuming that they have sufficient safety management capabilities, but did not conduct an appropriate evaluation. Meanwhile, the safety production technology and equipment of Jiangxi Qichen Construction Company are relatively outdated. Finally, Jiangxi Qichen Construction Company irregularly distributes the safety management manuals to employees without fully emphasizing the requirement of careful reading and full understanding.

Solving these shortcomings is crucial for Jiangxi Qichen Construction Company to improve safety production performance, improve employee quality, and create a safer working environment. By implementing regular training programs, evaluating and strengthening employees' safety awareness, updating the safety relevant technology and equipment, and ensuring consistent distribution and understanding of safety management manuals, the company can make significant progress in safety production work.

4.2.5 Safety Measures and Plans

Firstly, safety is the top priority of the company. The company always prioritizes safety in production and operation, emphasizes putting people first, strengthens safety management, continuously improves employees' safety awareness and ability, and implements safety responsibilities. Secondly, the company has been developing and improving the safety management system in accordance with laws and regulations and industry standards, standardizing the operation, establishing a sound safety supervision and inspection mechanism, strengthening on-site supervision and management, timely find and solve the safety problems.

In addition, the company also strengthens safety training and drills for employees, enhances their safety awareness and ability, enhances emergency response capabilities, and reduces the possibility of accidents. The company will provide employees with necessary safety equipment and equipment, establish a sound safety equipment management system, strictly implement various safety equipment usage regulations, and ensure their normal use and maintenance. The company is suggested to establish a sound safety responsibility, reward and punishment system, clarify the safety responsibilities and obligations of management personnel at all levels, promote a safety culture, motivate employees to actively participate in safety work, and form a good safety management atmosphere.

The company strengthen the safety management of external contracted projects in order to ensure the quality and safety of the projects, fulfill social responsibilities, and promote the healthy development of the industry. Finally, the company will regularly evaluate and modify safety policies, continuously improve and enhance the company's safety management level, and ensure the company's production and operation as well as the physical health of employees.

In summary, Jiangxi Qichen Construction Company had implemented a series of safety plans and measures aimed at enhancing employees' safety awareness and abilities, strengthening safety management, and ensuring the company's production and operation as well as the physical health of employees. By developing safety training plans, safety inspection plans, safety drill plans, safety equipment management plans, safety discipline assessment plans, safety awareness promotion plans, and safety emergency plans, the company has developed specific action plans to achieve safety policies. By continuously improving and enhancing the level of safety management, Jiangxi Qichen Construction Company would ensure the smooth progress of its production and business activities, and ensure the physical health of its employees.

4.3 Sociodemographic Analysis

4.3.1 Occupation

According to the survey results, the proportion and frequency of three types of occupations surveyed in this study were construction workers, other professions related to the construction industry, and non-construction industries, which were summarized in Table 1. The frequency statistics of occupational distribution was shown in Figure 4. The proportion of construction workers was 42.6%, which is relatively high in this study. Due to the occupational background of the survey subjects, this questionnaire may be aimed at construction workers or personnel related to the construction industry, so the number of construction workers is relatively large. The proportion of other professions

related to the construction industry is 48.9%, which is also relatively high in this study. The construction industry involves many related professions, such as architectural designers, project managers, engineers, etc., which are closely related to construction workers and therefore account for a relatively high proportion. The proportion of non-construction industry is 8.5%, which is relatively low. The questionnaire may focus on the construction industry or related issues, resulting in a lower proportion of non-construction industries. From the results of this questionnaire survey, it can be seen that the occupational distribution of the subjects is relatively reasonable.

Table 1 Occupation frequency and percentage of the respondents (n = 223)

Occupation	Frequency	Percentage
construction worker	95	42.6%
Other professions related to the construction industry	109	48.9%
Non construction industry	19	8.5%

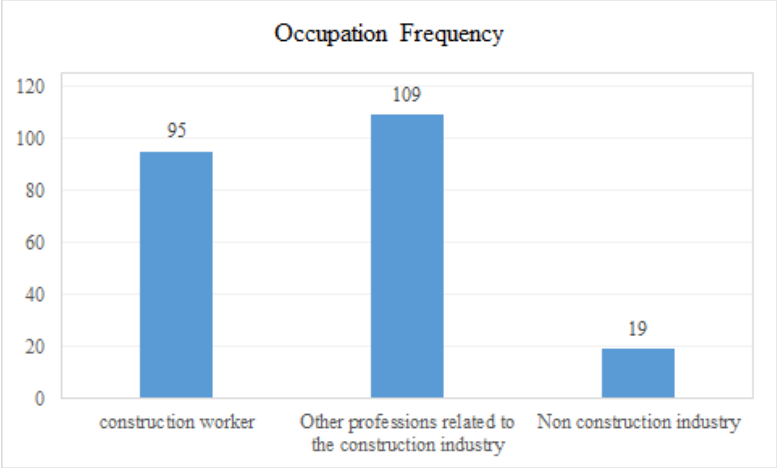

Figure 4 Distribution of occupations among the respondents (n = 223)

4.3.2 Years of Working Experience in Construction Industry

According to the survey results, the working years of the research subjects in this study included: less than 1 year, 1-3 years, 3-5 years, 5-10 years, and more than 10 years. The proportion and frequency of the survey results were shown in Table 2. The frequency distribution of working years of the respondents were shown in Figure 5. In

this survey, the number of people with less than one year of work experience was the highest (24.7%). The possible reason is that the construction industry may have a certain level of personnel mobility, with a large number of new employees, resulting in a higher number of people with less than one year of work experience. Meanwhile, the construction industry may face an increase in personnel demand in the near future, attracting more people without work experience to join. Additionally, the survey may target new entrants to the construction industry, resulting in a higher number of people with less than one year of work experience. The number of people with 1-3 years of work experience were the third highest group (19.3%). The period of 1-3 years working experience is usually the initial stage in the construction industry, in which a large number of people accumulate work experience in the working industry. At the same time, the 3-5 year period is usually the intermediate stage in the construction industry, and some people who are promoted from junior positions will accumulate more experience during this stage. Within a period of 3-5 years, people may have found stable positions in the construction industry and continue to accumulate experience. The 5-10 year period may be an advanced stage in the construction industry, and some people who have been promoted from intermediate positions may not have reached this period yet. During the period of 5-10 years, some people may have left the construction industry, switched careers or pursued further studies during this period. In this survey, there were relatively high number of professionals (23.3%) who have been working in the construction industry for over 10 years.

Table 2 Working seniority frequency and percentage (n = 223)

Working seniority	Frequency	Percentage
Less than 1 year	55	24.7%
1-3 years	43	19.3%
3-5 years	38	17.0%
5-10 years	35	15.7%
More than 10 years	52	23.3%

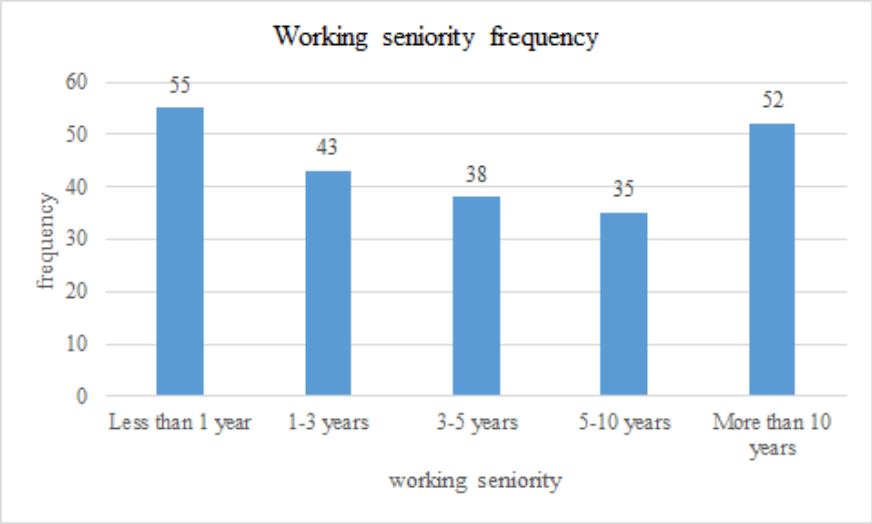

Figure 5 Working seniority frequency of the respondents (n = 223)

4.3.3 Age

According to the survey results, the age of the research subjects in this study were divided into the following ranges: 20-30 years old, 30-40 years old, 40-50 years old, and over 50 years old. The proportion and frequency of survey results were shown in Table 2. The frequency statistics of the age range distribution was shown in Figure 6. The survey results of this study showed that the Jiangxi Qichen construction company had the highest number of employees who aged between 20 and 30, accounting for half of the survey population. This group of people is the initial young adults who working in the construction industry. Next are professionals' group who aged 30-40 years old. People who were in this age group had basically stabilized their employment in the construction industry. The proportion of respondents who aged 40-50 was 12.6%, and they were also relatively stable practitioners in the construction industry. The proportion of people over 50 years old was 6.2%, who were the experts in the construction industry because they had at least 20 years of work experience in this industry.

Table 3 Frequency and percentage of age among the respondents (n = 223)

Age	Frequency	Percentage

20-30 years old	121	54.3%
30-40 years old	60	26.9%
40-50 years old	28	12.6%
More than 50 years old	14	6.2%

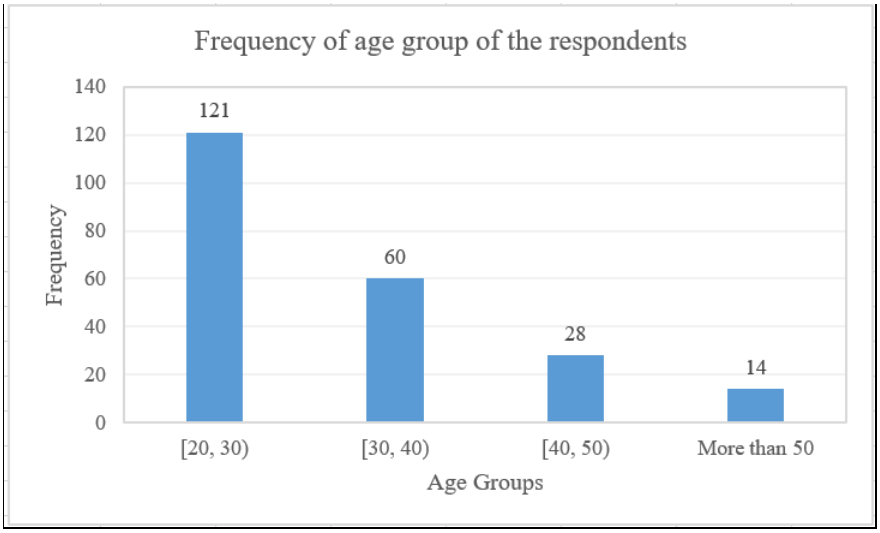

Figure 6 Frequency of age groups among the respondents (n = 223)

4.4 Construction Safety Management of Jiangxi Qichen Construction Company

4.4.1. Current Status of Construction Safety Operating Mechanism

According to Order No. 13 of the Ministry of Construction on the Supervision and Management of Construction Safety Production, construction safety production supervision and management refers to the industry supervision and management of construction safety production implemented by the construction administrative departments of various levels of people's governments and their authorized construction safety production supervision institutions. At present, among the government functional institutions for construction safety management in China, the institutions and departments involved in safety supervision and management of construction projects mainly include the construction administrative department, safety production supervision and management institutions, and occupational health (health) supervision and management institutions. However, occupational safety and health management in

China are managed separately. Occupational health supervision and management work is under the responsibility of the health department, while occupational safety production supervision and management are under the responsibility of the safety production supervision and management department. Therefore, in reality, the government functional agencies for construction safety management in China only include the construction administrative department and the safety production supervision and management agency.

This study conducted a survey on the operating mechanism of Jiangxi Qichen Construction Company's employees, and the results were shown in Table 4.

Table 4 Operating mechanism investigation results

Question	Percentage of the option(s)
Q4: Do you know the current building safety management policy of the construction company?	A. Understand: 82.5% B. Don’t understand: 17.5%
Q6: Do you know the current operational mechanism for construction safety supervision?	A. Understand: 81.2% B. Don’t understand: 18.8%
Q8: Do you know the laws, regulations and rules of safe construction?	A. **Don't know**: 3.1% B. **General**: 37.7% **C. Know:** 45.7% **D. Very well:**13.5%
Q15. Does your company establish and implement complete construction safety management system?	A. Very perfect and strictly implemented:39.9% B. Very perfect and basic implementation:26% C. Very perfect, but not implemented:2.2% D. Quite perfect. And implement it well:11.7% E. Relatively perfect, not well implemented:16.1% D. Not established:4%
Q16. Does your company establish and implement reward and punishment measures for safety production?	A. Yes, and strictly implemented:57% B. Yes, basic implementation:35.4% C. Yes, but not implemented:2.7% D. Not established:4.9%
Q19. Which of the following is your company's safety supervision and management mechanism?	A. Safety leading group: 45.3% B. Safety organization: 15.7% C. Safety supervision: 30.5% D. Others: 8.5%
Q21. How to improve the content of safety supervision standardization?	A. Standardization of laws and regulations: 33.6% B. Scientific management: 14.3% C. Sustained safety education: 27.8% D. Site standardization: 11.2%

	E. Personnel behavior standardization: 13%
Q25. How do you think of the impact of construction site safety on construction companies?	A. Accidents have little impacts on the construction unit, and it is not necessary to consider that safety production can improve the social image of the construction unit: 18.8% B. It is the contractor's responsibility to bring economic benefits to the construction unit by safe production, which has nothing to do with the construction unit: 21.1% C. Others: 60.1%
Q27. If you are the owner of the construction enterprise, what would you do if a major accident happened at the construction site?	A. It is the construction company's own business: 2.7% B. It is fined: 2.2% C. It is required to stop work for rectification: 30.9% D. Report to the local authority in time: 60.1% E. Others: 4%
Q30. Do you think the contractor should set up full-time safety management personnel at the site?	A. Yes:97.3% B. No: 2.7%
Q31. At which stage do your enterprise implement safety management?	A. Decision stage: 8.1% B. Design stage: 2.2% C. Construction stage: 36.3% D. Use stage: 0.4% E. Demolition stage: 0.4% F. All of the above stages:52.5%
Q32. Do you think it is necessary for the site supervision department to allocate relevant professional safety personnel to duty at site?	A. Yes: 98.7% B. No: 1.3%

Based on the answers to the aforementioned questions, it can be concluded that majority of employees are very familiar with the safety management policies of Jiangxi Qichen Construction Company and can effectively apply these policies. However, there are still about 15% -20% of employees who are somewhat unclear about the specific content of these policies. Considering the importance of safety management, we cannot ignore the existence of this issue. Therefore, it is necessary for Jiangxi Qichen Construction Company to further increase the promotion of safety policies to ensure that every employee deeply understands the importance of safety issues and adheres to these policies in their daily work. Through such efforts, the company can improve its overall level of safety awareness, reduce potential health and safety risks, and create a safer and healthier work environment for employees. Meanwhile, the above research results also indicate that Jiangxi Qichen Construction Company needs to pay attention to building safety related issues. According to the survey results, the company needs to dispatch professional safety personnel to the construction site for management and supervision. About one-third of the respondents pointed out that Jiangxi Qichen Construction Company has not established a complete safety construction management system. Therefore, in order to ensure the safety of the construction site, Jiangxi Qichen Construction Company should consider strengthening its attention to building safety and dispatching professional safety personnel to be responsible for on-site management and supervision. By establishing a comprehensive safety construction management system, the company can effectively improve the safety level of construction sites and prevent potential accidents and risks. Such measures will further ensure the safety of company employees and create a more reliable and safe working environment for the company. Choudhry et al. (2007) pointed out that the government needs to increase its promotion of safety policies in the construction industry. Meanwhile, Choudhry et al. (2007) argue that research has explored the establishment of a workplace safety culture and provided some methods and measures for establishing a safety culture to reduce the occurrence of accidents and injuries. Colligan and Cohen (2004) studied the impact of safety training on employee safety behavior and explored effective training methods

to enhance employees' safety awareness and behavior at work. Lee et al. (2019) studied past literature on safety atmosphere interventions and explored future directions for improving safety atmosphere to enhance workers' safety awareness and behavior.

4.4.2. Current Situation and Problems of Existing Construction Safety Management

There were 7 questions in this study that investigated the current situations and existing problems of construction safety management practiced in Jiangxi Qichen Construction Company. The results of the survey were presented in Table 5. On the question "Based on your opinion, the main cause of high accident rate at construction site is mainly due to (multiple choice)", this article sets 7 options, as shown below.

A. Lack of safety knowledge among workers

B. Lack of safety protection system

C. Lack of safety awareness among workers

D. Poor working environment

E. Safety management is not emphasized or not concerned by the management

F. Construction period is too tight (time pressure)

G. Others

Table 5 Current situation and problems of existing construction safety management

Questions	Frequency, n (%)
Main causes of high accident rate at construction site is mainly due to:	
Lack of safety knowledge among workers	167 (74.9%)
Lack of safety protection system	156 (69.9%)
Lack of safety awareness among workers	92 (41.3%)
Poor working environment	118 (52.9%)
Safety management is not emphasized or not concerned by the management	107 (48.0%)

Construction period is too tight (time pressure)	174 (78.0%)
Others	35 (15.7%)

The urgency of the construction period is often an important issue that leads to an increase in the accident rate at the construction site. When the project schedule is tight, construction personnel may face greater time pressure and work intensity, which may affect their attention and focus. For example, fatigue and insufficient attention. The tight schedule may result in workers needing to work continuously for long periods of time, which may lead to fatigue and insufficient attention. Fatigue is a major accident risk factor as it slows down reaction time, increases the likelihood of errors, reduces judgment, and thus increases the risk of accidents occurring. In order to meet the urgent schedule requirements, workers may be required to work overtime frequently. Long hours of work can increase the physical and psychological burden and increase the probability of accidents. Fatigue and overtime may also lead to workers' distraction from work tasks and safety concerns. The urgent schedule may lead to the acceleration of high-risk operations, rather than fully considering safety measures. For example, some safety procedures and steps may be sacrificed to accelerate progress, thereby increasing the risk of accidents. There were some problems in the current construction safety management of Jiangxi Qichen Construction Co., Ltd. In China that need to be addressed and improved.

The survey results show that employees generally have a high level of safety awareness, and most employees understand safety management policies and comply with relevant regulations and operating procedures during the construction process. Near to 75% of the respondents agreed that lack of safety knowledge could lead to high accident rate at construction site. According to a study by Zhang et al. (2019), the majority of employees possess a certain level of safety knowledge and are able to effectively comply with safety guidelines. However, it should be noted that some employees still lack sufficient safety awareness. Approximately 15% to 20% of

employees do not have a clear understanding of the details and requirements outlined in the safety management policy. This knowledge gap may lead to potential safety hazards and unexpected events. A research article by Du & Sun (2012) supports this finding, emphasizing the importance of addressing safety awareness gaps in reducing workplace risks. In addition, the company also faces the challenge of insufficient promotion of safety policies. It is crucial to increase efforts to promote safety policies and ensure that every employee has a clear understanding of the guidelines, as well as relevant safety operating procedures and emergency measures. According to a study conducted by Chang et al. (2019), effective promotion of safety policies can improve safety performance and reduce workplace accidents. In order to ensure the effective implementation of safety management policies, it is necessary to strengthen the supervision and inspection system at the construction site.

A strict inspection process and frequency should be established to promptly identify and solve existing problems. This suggestion is consistent with the findings of a research article by Shi et al. (2019), which emphasizes the importance of strong supervision and inspection mechanisms in preventing safety accidents. In addition, the company should focus on strengthening safety training and education for employees to enhance their safety awareness and skills. Regular training can provide employees with the latest safety standards and operating procedures, and provide them with the necessary knowledge and skills to respond to emergency and dangerous situations. A study by Abdullah & Abd Aziz (2020) supports the effectiveness of regular safety training in improving safety performance and reducing workplace accidents. In summary, although employees' safety awareness is generally high, there are still some areas that need improvement. The company should address the issue of insufficient safety awareness among some employees, increase the promotion of safety policies, strengthen supervision and inspection systems, and strengthen safety training and education. By implementing these measures, the company can create a safer working environment and reduce the risks associated with construction operations.

In summary, Jiangxi Qichen Construction Co., Ltd. has made certain achievements in construction safety management, but still faces some problems. By strengthening the promotion of safety policies, strengthening the supervision and inspection system, and strengthening employee training and education, the company can further improve the construction safety management to ensure the personal safety and health of employees, and reduce the possibility of potential risks and accidents.

4.4.3. Causes of construction safety accidents

Based on the investigation results, this study investigated the reasons for safety issues at Jiangxi Qichen Construction Company. According to the results of the survey, the main reasons for safety accidents at Jiangxi Qichen Construction Company according to the opinion of the respondents were mainly due to the safety awareness of workers is weak (such as mentality of taking chances), followed by the construction site places too much emphasis on efficiency and lacks manpower for supervision investment; and the technology is not advanced enough to achieve comprehensive monitoring. The results of the survey are summarized in Table 6.

Table 6 Frequency distribution of reasons for safety issues at Jiangxi Qichen Construction Company

Reasons for safety issues	Frequency, n (%)
A. The technology is not advanced enough to achieve comprehensive monitoring	31 (13.9%)
B. The construction site pays too many attention to efficiency, and insufficient manpower is invested in supervision	76 (34.1%)
C. Workers have weak safety awareness and have a fluke mentality	99 (44.4%)
D. Others	17 (7.6%)

Accident causal chain theories provide valuable insights into understanding the

causes of accidents. The Heisley Accident Causal Chain Theory suggests that accidents occur as a result of a chain of events, starting from an unsafe state of things leading to unsafe human behavior (Archer et al., 2017). Similarly, the Bode Accident Causal Chain Theory emphasizes that accidents arise from a sequence of factors, including unsafe conditions and human actions (Leveson, 2015). In line with these theories, the Adams Accident Causal Chain Theory posits that accidents stem from both the unsafe state of things and unsafe human behavior, with the interaction between the two contributing to the occurrence of accidents (Zeng & Li, 2022). Moreover, the Human Machine Trajectory Cross Theory emphasizes the significance of the intersection between the trajectory of human behavior and the trajectory of the machine or environment in causing accidents (Herschelle et al., 2022). These theories collectively highlight that accidents are often a result of the combination of unsafe human behavior and an unsafe state of things. Understanding this causal relationship is crucial for developing effective accident prevention strategies and improving safety measures in various industries. Its purpose is to remind people that unsafe human behavior and unsafe state of objects are the direct causes of safety production accidents.

According to statistics, over 80% of safety accidents in the construction industry are caused by unsafe human behavior, and only about 10% are caused by unsafe factors of objects (Kim et al., 2020). Human unsafe behavior includes the instability of workers' physical or physiological conditions, as well as the lack of safety knowledge, incomplete safety production operating procedures, or lack of relevant safety production skills when workers engage in construction safety production activities, and even the suitability of workers' personalities for their own work (Meng et al., 2019). These factors can cause changes in the level of consciousness in the workers' brains, thereby affecting their normal reactions and causing construction safety accidents. The unsafe state of objects mainly includes aging of machines and equipment, substandard material quality, and labor protection equipment not meeting safety production requirements. These factors buried the potential safety hazards and hazard in the construction and production activities, which will be converted into safety accidents

when they reach certain conditions.

4.5 Optimization Measures and Suggestions for Improving the Existing Construction Safety Management System

4.5.1 Continuous Safety Production Training and Education

Most of the construction industry employees in China are migrant workers with low cultural literacy and poor awareness of safety production. Thus, it is necessary to continuously promote the safety cultural literacy and safety operation level of frontline construction workers through periodical safety production training. Besides that, the safety production training and education of enterprises should be a long-term and sustained training program. Through safety education, construction site workers are encouraged to establish the correct safety production awareness, which help to build safe production and operation behaviors that more in line with the requirements of safety production norms and operating procedures.

The safety production training and education for employee can be divided into two groups. The first group of training comprised of comprehensive training and education on safety production laws and regulations, safety production requirements, safety operation procedures, and safety management knowledge for the core management personnel of the enterprise; while the second group is to provide training and education on safety laws and regulations, safety production skills, and safety production operation procedures for frontline employees. At the same time, during the training process, case studies can be combined into the training modules to encourage them to participate actively, master safety production standards, and implement safety production operating procedures.

4.5.2 Establish a Responsibility System for Safety Production Positions

The safety production responsibility system, also known as the safety production

responsibility system, refers to the system in which leaders, functional departments, relevant engineering and technical personnel, and production workers at all levels of an enterprise are responsible for the safety production within their respective positions or business scope during the labor production process. The safety production responsibility system can enable various personnel in various systems of enterprises to share safety responsibilities in production, ensuring clear responsibilities, division of labor and cooperation, and working together to do a good job in safety work. At the same time, the safety production responsibility system can prevent and overcome the phenomenon of confusion, mutual blame, and no one taking responsibility in safety work, and coordinate and unify safety and production work from the organizational leadership. The purpose of establishing a safety production job responsibility system in construction production activities is to clarify the safety roles and responsibilities of various functional departments, and personnel in engineering construction activities.

The safety production responsibility system and safety production rules and regulations are important components of the safety production position responsibility system. The safety production responsibility system should clarify the safety responsibilities of enterprise management personnel. On the other hand, safety production regulations and systems should include safety production inspection systems, safety production publicity and education systems, etc. The enterprise safety production assessment system and the safety production reward and punishment system also belong to the scope of safety production. Thus, a safety production culture atmosphere of "safeguarding culture with systems and setting off culture with images" is formed within the enterprise from top to bottom.

4.5.3 Provide a Safe Working Environment

The construction of safety culture in construction enterprises embodies the principle of "putting people first", which is reflected the fact that construction sites provide construction workers with construction equipment with safety guarantees and maintain them in a good and safe state, that able to provide the construction workers

with a safe and orderly construction working environment that focuses on "safety, health, and environment". A good working environment is conducive to employees' positive attitude towards safety production. Construction sites should strive to create a good working environment and carry out civilized construction. A safe working environment also includes the safety status of construction machinery, equipment, materials, and other materials in addition to the working environment. Therefore, construction enterprises should ensure the safety level of construction equipment and materials, thereby improving the intrinsic safety of construction production activities.

4.6 Analysis of Interview Results

Based on interviews with experts, the following findings were found in this study. Among the causes of safety accidents, the unsafe state of the environment is an indirect cause of construction related accidents. The unsafe state of the environment mainly includes the unsafe state of the natural environment and the unsafe state of the working environment. In terms of natural environment, as most construction projects are carried out in an open air and high-altitude environments. According to statistics, the outdoor work volume of construction projects accounts for about 70% of the total workload, and the high-altitude work volume accounts for about 90% of the total workload. Therefore, high temperature and severe cold weather can cause a decrease in workers' physical strength and attention. Rainy and snowy weather can also lead to slippery working surfaces. High altitude increases the number of unsafe factors in operations, which increases the difficulty of carrying out construction activities and may lead to safety accidents.

The working environment of the workers at the construction site is poor. Construction site contain a number of hazards, such as the construction workers were exposed to various types of dusts, noises, harmful gases and solid wastes at the work site, which also will pollute and harm the environment (Fang et al., 2020). Therefore, the unsafe state of the working environment and frequent change of workforce will

cause changes in the mood of the workers and increase their fatigue (Lee, 2021). All these factors may contribute in increasing the probability of safety accidents occurring.

Causal chain models are commonly used in various countries around the world to analyze the causes of accident. The model believes that the underlying cause of safety accidents is regulatory errors. In the process of building a safety management, the unsafe factors of people, objects, and the unsafe state of the environment are ultimately influenced or caused by regulatory errors.

Regulatory errors refer to errors or omissions made by regulatory agencies, personnel, or relevant managers in the process of safety management, resulting in the impact or occurrence of unsafe factors on people, objects, and the unsafe state of the environment. Regulatory errors include: errors in regulations and policies, errors in regulatory enforcement, inadequate supervision by regulatory agencies, and corrupt and dishonest behavior by regulatory agencies. If effective regulatory measures are taken before implementing construction safety production activities, the company can control the unsafe behavior of production personnel on the construction site. At the same time, the unsafe risks of production materials and equipment of construction companies can also be reduced. Construction companies improve workers' safety production skills through pre and post safety training. At the same time, the company updates and replaces aging machines and equipment, which can provide qualified construction and production materials for the construction site and provide a safe working environment. Therefore, in order to fundamentally reduce the occurrence of safety accidents and minimize the losses caused by safety accidents, it is necessary to pay close attention to construction safety supervision and management, and build a sound construction safety supervision and management system that is in line with China's national conditions and the long-term development of the construction industry.

CHAPTER 5

CONCLUSION

In recent years, with the continuous expansion of the production scale of China's construction industry, major safety accidents occurred frequently in engineering construction projects, causing huge economic losses and casualties to the development of China's construction industry and the entire society. The deficiencies in the construction safety supervision and management system are the main reasons for the frequent occurrence of safety accidents. After studying China's policies on construction safety management, the paper takes Jiangxi Qichen Construction Company as the research object to study for its current operating mechanism, current situation, and existing problems. The purpose is to promote the joint participation of construction safety administrative departments, industry organizations and construction enterprises which ultimately achieving the goal of safety supervision and management in the construction industry and improving the level of construction safety management system of construction company in China. The main conclusions of this paper are as follows:

1. The paper conducts a questionnaire survey, interviews, and extensive literature research on the current status of the safety supervision and management system of Jiangxi Qichen Construction Company, and analyzes the shortcomings of the current construction safety supervision and management system of the construction company. The supervision and management of the company's safety administrative supervision and management department is only a formality, which means that its supervision work is only a formal performance, which lack of true effectiveness and substantive supervision. The supervisory and management department may not have developed

clear plans and strategies to supervise and manage security affairs. They may lack clear goals and indicators to provide targeted regulatory measures. In addition, the lack of effective implementation measures and tracking mechanisms may lead to false appearances in supervision and management.

Personnel in the supervisory and management department may lack the necessary professional knowledge and skills to effectively carry out regulatory responsibilities. They may lack a deep understanding of security management and related regulations, unable to identify potential security risks and violations. In addition, the lack of effective training and improvement mechanisms may also lead to insufficient quality and abilities of the personnel. If the supervisory and management department is interfered with or controlled by other stakeholders, it may lack independence and impartiality. For example, if the department is under political pressure from superiors or influenced by internal interest groups within the company, it will be difficult to make objective and fair regulatory decisions. The supervisory and management department may face a shortage of human, material, and financial resources. Lack of sufficient resources may lead to one-sidedness and incompleteness in regulatory work, which cannot fully cover the company's safety management activities.

At the same time, the role of industry organizations in supervision and management is not fully utilized, and Jiangxi Qichen Construction Company has low enthusiasm for participating in safety supervision and management for its own interests. The employees of the company have a weak awareness of participating in construction safety supervision and management. To improve the construction safety supervision and management level of Jiangxi Qichen Construction Company and achieve long-term management of construction safety, it is crucial to improve the current construction safety management system.

2. In response to the problems in the safety supervision and management system of Jiangxi Qichen Construction Company, combined with the actual situation of China's

construction industry and the advanced models of construction safety supervision and management in developed countries, this study analyzes from different levels and proposes security measures for the construction safety supervision and management system. Provide decision-making and reference for Jiangxi Qichen Construction Company to effectively implement and continuously improve its safety supervision and management system. These improvement measures mainly include:

(1) Improve the capacity and independence of regulatory authorities. the regulatory authorities shall provide the training and relevant briefing to the construction company to enhance their professional knowledge and skills, enabling them to effectively fulfill their regulatory responsibilities. In addition, ensure the independence of regulatory authorities and avoid interference from other interest groups.

(2) Improve supervision and law enforcement procedures. the government authorities should strengthen supervision and law enforcement procedures to ensure their fairness and transparency. Develop a clear supervision plan, strengthen inspections and inspections of construction sites and safety operations, and promptly identify and solve existing safety issues.

(3) Strengthen safety training and education. Construction companies can improve their employees' safety awareness and skill level through regular safety training and education. The training content should include the latest safety standards and operating procedures, as well as methods for responding to emergency and dangerous situations.

(4) Establish a security risk assessment and management mechanism. Construction companies should conduct a comprehensive assessment of safety risks during the construction process and take corresponding management measures to reduce risks. This includes developing emergency plans and implementing control measures to ensure that the safety management of the construction site complies with relevant regulations and standards.

(5) Increase safety promotion and awareness activities. Construction companies should strengthen the promotion of safety policies and measures, and increase employees' awareness of safety. Organize safety awareness activities, such as safety meetings and safety month activities, to promote communication and learning among employees.

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APPENDICES

Appendix A. Questionnaire on The Construction Safety Management of a Construction Company in Ganzhou, China

Dear Sir/Madam,

Hello, in order to understand the current situation of safety culture and construction safety management system in the Chinese construction industry, we would like to invite you to participate as one of the respondents in my master research project, with the title "*The Construction Safety Management of a Construction Company in Ganzhou, China".* Please answer according to the actual situation of your project department and your opinion. All of the collected information will be kept confidential. Thank you for your cooperation and participation!

1. Your occupation

A. Construction workers B. Other occupations related to construction industry C. Non-construction industry

2. How long have you been in the construction industry

A. Less than 1 year B. 1-3 years C. 3-5 years D. 5-10 years E. More than 10 years

3. Your Age: _____ years old

4. Do you know the current construction safety management policy of the construction company?

A. Understand B. Don't understand

5. Do you know the problems in the current construction safety supervision process?

A. Understand B. Don't understand

6. Do you know the current operation mechanism of construction safety supervision?

A. Understand B. Don't understand

7. What do you think of the effect of the existing construction site safety management mode?

A, very good B, average C, poor D, very poor

8. Do you know the laws, regulations and rules of safe construction?

A. Don't know B. General C. Know D. Very well

9. Based on your opinion, the main cause of high accident rate at construction site is mainly due to (multiple choice)

A. Lack of safety knowledge among workers B. Lack of safety protection system C. Lack of safety awareness among workers

D. Poor working environment E, Safety management is not emphasized or not concerned by the management F. Construction period is too tight (time pressure) G. others

10. Which of the following measures is more feasible to prevent accidents at construction site?

A. Improve the safety and reliability of equipment B. Improve the overall quality and safety knowledge of the workers

C. Do a good job in personal safety protection D. Reasonable layout of the workplace/ safety working environment E. Improve the safety management policies and systems

11. In your opinion, the main reason “prevention before accidents happen” cannot be achieved in safety production management is

A. The technology is not advanced enough to achieve comprehensive monitoring

B. The construction site pays too much attention to efficiency, and insufficient manpower is invested in supervision

C. Workers have weak safety awareness and have a fluke mentality

D. Others

12. Based on your understanding, construction safety at construction site is

A. Related to the safety of people's lives and property

B. Directly related to the speed of economic development

C. Directly related to the healthy development of the economy

D. Related to the overall situation of social stability

13. Do you think modern science and technology is reasonable and important to ensure workers' work safety?

A. Reasonable but unimportant B. Unreasonable and unimportant

C. Reasonable and critical D. Unreasonable but critical

14. Which of the following problems do you think are the most urgent to be solved?

A. Worker real-name certification B. Material resource management

C. Safety hazard monitoring D. Work efficiency supervision

15. Does your company establish and implement complete construction safety management system?

A. Very perfect and strictly implemented B. Very perfect and basic implementation

C. Very perfect, but not implemented D. Quite perfect. And implement it well

E. Relatively perfect, but not well implemented D. Not established

16. Does your company establish and implement reward and punishment measures for safety production?

A. Yes, and strictly implemented B. Yes, basic implementation

C. Yes, but not implemented D. Not established

17. During the construction of the project, does the construction company provide safety knowledge training for workers?

A. Regularly held B. Occasionally held

C. Basically not

18. Is there a safety evaluation organization in your area that conducts safety evaluation on enterprises and construction site?

A. Yes B. No

19. 19. Which of the following is your company's safety supervision and management mechanism?

A. Safety leading group B. Safety organization C. Safety supervision D. Others

20. How frequent do hidden danger troubleshooting and emergency trainings conducted by the relevant safety supervision unit of your company?

A. No relevant troubleshooting and training conducted B. Occasionally C. Regularly

21. How to improve the content of safety supervision standardization?

A. Standardization of laws and regulations B. Scientific management C. Sustained safety education

D. Site standardization E. Personnel behavior standardization

22. Did your company or organization consider the investment estimation of safety

during the early planning of the project?

A. Yes B. No

23. In your opinion, what is the main safety investment of a project?

A. Salary of full-time safety personnel B. Prepare safety facilities C. Purchase personal safety protection equipment/ devices

D. Provide special safety technical program E. Safety publicity F. Safety relevant education and training G. Others

24. In the safety management at construction site, what is the owner's main safety responsibility?

A. Arrange safety representative in the project B. Hold safety meeting with the contractors

C. Review the contractor's special safety plan D. Regularly check the contractor's safety status

E. Implement the safety incentive plan F. Pay the safety expenses regularly and in full

G. Supervise the use of safety production costs H. Other

25. How do you think of the impact of construction site safety on construction companies?

A. Accidents have little impacts on the construction unit, and it is not necessary to consider that safety production can improve the social image of the construction unit

B. It is the contractor's responsibility to bring economic benefits to the construction unit by safe production, which has nothing to do with the construction unit

C. Others

26. What are the main responsibilities of the supervising engineer at the construction site?

A. Assist in the implementation of safety production expenses, supervise and guide the use of safety production expenses

B. Review the special safety production plan and inspect the construction site’s safety

C. Supervise the on-site safety management office to assist in time to handle on-site accidents and others

27. If you are the owner of the construction enterprise, what would you do if a major

accident happened at the construction site?

A. It is the construction company's own business B. It is fined C. It is required to stop work for rectification

D. Report to the local authority in time E. Others

28. Does your company have safe work practices relevant incentives?

A. No B. Spiritual motivation C. Material motivation D. Other

29. What do you think of the safety management capability of your company's existing construction contractors?

A. Very poor B. Poor C. Average D. Good E. Very good

30. Do you think the contractor should set up full-time safety management personnel at the site?

A. Yes B. No need

31. At which stage do your enterprise implement safety management?

A. Decision stage B. Design stage C. Construction stage D. Use stage E. Demolition stage F. All of the above stages

32. Do you think it is necessary for the site supervision department to allocate relevant professional safety personnel to duty at site?

A. Yes B. No

33. In terms of construction safety, do you think the relevant industry management departments have fulfilled their responsibilities?

A. Yes B. No

Appendix B. Interview Outline

1. Overview of the company's building safety management system

a. What systems and processes does the company adopt in building safety management?

b. How does the company ensure the safety of construction projects?

c. Does the company have clear safety management responsibilities and division of responsibilities?

2. Building safety training and education

a. How does the company provide building safety training and education for employees?

b. Is there a specific training plan or course?

c. What aspects does the training cover, such as safety operating procedures, emergency response, etc?

3. Risk assessment and control

a. How does the company conduct risk assessment for construction projects?

b. How to identify and evaluate potential security risks?

c. What measures have been taken to control and reduce these risks?

4. Safety supervision and inspection

a. Does the company have a dedicated safety supervision and inspection agency or personnel?

b. How to conduct regular safety inspections and evaluations?

c. What corrective measures did the company take after discovering safety issues?

5. Safety equipment and protective measures

a. What safety equipment and protective measures does the company provide to ensure the safety of employees?

b. Do these equipment and measures comply with relevant safety standards and regulations?

c. Are there dedicated personnel responsible for maintaining and repairing these equipment?

6. Safety awareness and culture

a. How does the company promote employee safety awareness and culture?

b. Is there a mechanism to encourage employees to report safety issues and provide improvement suggestions?

c. Does the company provide safety rewards and recognition?

7. Emergency response and accident handling

a. Does the company have an emergency response plan and procedures?

b. How to respond to sudden accidents and emergencies?

c. Have accidents been investigated and analyzed, and corresponding improvement measures been taken?

8. Partner and supplier management

a. How does the company manage the construction safety management of partners and suppliers?

b. Are there safety requirements and evaluation standards?

c. How do companies coordinate security work with partners and suppliers?

9. Safety data recording and analysis

a. Does the company conduct security data recording and analysis?

b. How to track and analyze safety incidents and accidents?

c. Have improvement measures been developed based on data analysis results?

10. Challenges and Future Development of Building Safety Management

a. What are the main challenges faced by the company in building safety management?

b. What are the future development plans of the company in building safety management?

c. Is there a plan to use new technologies or innovative methods to improve building safety management?

Appendix C SPSS Result Analysis Output（Translated to English version)

Your occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Construction workers	95	42.6	42.6	42.6
	B. Other occupations related to construction industry	109	48.9	48.9	91.5
	C. Non-construction industry	19	8.5	8.5	100
	Total	223	100	100	

How long have you been in the construction industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. Less than 1 year	55	24.7	24.7	24.7
	B.1-3years	43	19.3	19.3	43.9
	C.3-5 years	38	17	17	61
	D.5-10 years	35	15.7	15.7	76.7
	E.More than 10 years	52	23.3	23.3	100
	Total	223	100	100	

Your Age: _____ years old

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20	3	1.3	1.3	1.3
	21	9	4	4	5.4
	22	15	6.7	6.7	12.1
	23	14	6.3	6.3	18.4
	24	16	7.2	7.2	25.6
	25	11	4.9	4.9	30.5
	26	14	6.3	6.3	36.8
	27	14	6.3	6.3	43
	28	15	6.7	6.7	49.8
	29	8	3.6	3.6	53.4
	30	15	6.7	6.7	60.1
	31	3	1.3	1.3	61.4
	32	6	2.7	2.7	64.1
	33	9	4	4	68.2
	34	2	0.9	0.9	69.1
	35	11	4.9	4.9	74
	36	3	1.3	1.3	75.3
	37	2	0.9	0.9	76.2
	38	5	2.2	2.2	78.5
	39	4	1.8	1.8	80.3
	40	6	2.7	2.7	83
	41	1	0.4	0.4	83.4
	42	3	1.3	1.3	84.8
	43	3	1.3	1.3	86.1
	45	7	3.1	3.1	89.2
	46	4	1.8	1.8	91
	48	2	0.9	0.9	91.9

	49	2	0.9	0.9	92.8
	50	4	1.8	1.8	94.6
	51	4	1.8	1.8	96.4
	52	2	0.9	0.9	97.3
	53	1	0.4	0.4	97.8
	54	2	0.9	0.9	98.7
	56	1	0.4	0.4	99.1
	60	1	0.4	0.4	99.6
	二十	1	0.4	0.4	100
	Total	223	100	100	

Do you know the current construction safety management policy of the construction company?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Understand	184	82.5	82.5	82.5
	B.Don't understand	39	17.5	17.5	100
	Total	223	100	100	

Do you know the current operation mechanism of construction safety supervision?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Understand	181	81.2	81.2	81.2
	B.Don't understand	42	18.8	18.8	100
	Total	223	100	100	

Do you know the laws, regulations and rules of safe construction?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Don't know	7	3.1	3.1	3.1
	B.General	84	37.7	37.7	40.8
	C.Know	102	45.7	45.7	86.5
	D.Very well	30	13.5	13.5	100
	Total	223	100	100	

Does your company establish and implement complete construction safety management system?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Very perfect and strictly implemented	89	39.9	39.9	39.9
	B.Very perfect and basic implementation	58	26	26	65.9
	C.Very perfect, but not implemented	5	2.2	2.2	68.2
	D.Quite perfect. And implement it well	26	11.7	11.7	79.8
	E.Relatively perfect, but not well implemented	36	16.1	16.1	96
	F.Not established	9	4	4	100
	Total	223	100	100	

Does your company establish and implement reward and punishment measures for safety production?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Yes, and strictly implemented	127	57	57	57
	B.Yes, basic implementation	79	35.4	35.4	92.4
	C.Yes, but not implemented	6	2.7	2.7	95.1
	D.Not established	11	4.9	4.9	100
	Total	223	100	100	

Which of the following is your company's safety supervision and management mechanism?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Safety leading group	101	45.3	45.3	45.3
	B.Safety organization	35	15.7	15.7	61
	C.Safety supervision	68	30.5	30.5	91.5
	D.Others	19	8.5	8.5	100
	Total	223	100	100	

How to improve the content of safety supervision standardization?

		Frequency	Percent	Valid	Cumulative

				Percent	Percent
Valid	A.Standardization of laws and regulations	75	33.6	33.6	33.6
	B.Scientific management	32	14.3	14.3	48
	C.Sustained safety education	62	27.8	27.8	75.8
	D.Site standardization	25	11.2	11.2	87
	E.Personnel behavior standardization	29	13	13	100
	Total	223	100	100	

How do you think of the impact of construction site safety on construction companies?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Accidents have little impacts on the construction unit, and it is not necessary to consider that safety production can improve the social image of the construction unit	42	18.8	18.8	18.8

	B.It is the contractor's responsibility to bring economic benefits to the construction unit by safe production, which has nothing to do with the construction unit	47	21.1	21.1	39.9
	C. Others	134	60.1	60.1	100
	Total	223	100	100	

If you are the owner of the construction enterprise, what would you do if a major accident happened at the construction site?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.It is the construction company's own business	6	2.7	2.7	2.7
	B.It is fined	5	2.2	2.2	4.9
	C.It is required to stop work for rectification	69	30.9	30.9	35.9
	D.Report to the local authority in time	134	60.1	60.1	96
	E.Others	9	4	4	100

	Total	223	100	100	

Do you think the contractor should set up full-time safety management personnel at the site?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Yes	217	97.3	97.3	97.3
	B.No need	6	2.7	2.7	100
	Total	223	100	100	

At which stage do your enterprise implement safety management?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Decision stage	18	8.1	8.1	8.1
	B.Design stage	5	2.2	2.2	10.3
	C.Construction stage	81	36.3	36.3	46.6
	D.Use stage	1	0.4	0.4	47.1
	E.Demolition stage	1	0.4	0.4	47.5
	F.All of the above stages	117	52.5	52.5	100
	Total	223	100	100	

Do you think it is necessary for the site supervision department to allocate relevant professional safety personnel to duty at site?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Yes	220	98.7	98.7	98.7

	B.No	3	1.3	1.3	100
	Total	223	100	100	

Do you know the problems in the current construction safety supervision process?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Understand	177	79.4	79.4	79.4
	B.Don't understand	46	20.6	20.6	100
	Total	223	100	100	

What do you think of the effect of the existing construction site safety management mode?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A,Very good	104	46.6	46.6	46.6
	B,Average	113	50.7	50.7	97.3
	C,Poor	6	2.7	2.7	100
	Total	223	100	100	

Based on your opinion, the main cause of high accident rate at construction site is mainly due to (multiple choice)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Lack of safety knowledge among workers	9	4	4	4
	A. Lack of safety knowledge among	2	0.9	0.9	4.9

	workers ┊ B.Lack of safety protection system				
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers	12	5.4	5.4	10.3
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ D.Poor working environment	7	3.1	3.1	13.5
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊	5	2.2	2.2	15.7

	D.Poor working environment ┊ E.Safety management is not emphasized or not concerned by the management				
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ D.Poor working environment ┊ E.Safety management is not emphasized or not concerned by the management ┊ F.Construction period is too tight (time pressure)	38	17	17	32.7

	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ D.Poor working environment ┊ E.Safety management is not emphasized or not concerned by the management ┊ F.Construction period is too tight (time pressure) ┊ G. others	15	6.7	6.7	39.5
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ D.Poor working	7	3.1	3.1	42.6

	environment ┊ F.Construction period is too tight (time pressure)				
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ E.Safety management is not emphasized or not concerned by the management	13	5.8	5.8	48.4
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ E.Safety management is not emphasized or not concerned by the	7	3.1	3.1	51.6

	management ┊ F.Construction period is too tight (time pressure)				
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ E.Safety management is not emphasized or not concerned by the management ┊ G. others	1	0.4	0.4	52
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ F.Construction period is too tight	7	3.1	3.1	55.2

	(time pressure)				
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ F.Construction period is too tight (time pressure) ┊ G. others	3	1.3	1.3	56.5
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ G. others	1	0.4	0.4	57

	A. Lack of safety knowledge among workers ⋮ B.Lack of safety protection system ⋮ D.Poor working environment ⋮ E.Safety management is not emphasized or not concerned by the management ⋮ F.Construction period is too tight (time pressure)	3	1.3	1.3	58.3
	A. Lack of safety knowledge among workers ⋮ B.Lack of safety protection system ⋮ D.Poor working environment ⋮ F.Construction period is too tight (time pressure)	3	1.3	1.3	59.6

	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ E.Safety management is not emphasized or not concerned by the management	3	1.3	1.3	61
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ E.Safety management is not emphasized or not concerned by the management ┊ F.Construction period is too tight (time pressure)	3	1.3	1.3	62.3
	A. Lack of safety knowledge among workers ┊ B.Lack of safety protection system ┊ F.Construction	1	0.4	0.4	62.8

	period is too tight (time pressure)				
	A. Lack of safety knowledge among workers ┊ C.Lack of safety awareness among workers	7	3.1	3.1	65.9
	A. Lack of safety knowledge among workers ┊ C.Lack of safety awareness among workers ┊ D.Poor working environment ┊ F.Construction period is too tight (time pressure)	1	0.4	0.4	66.4
	A. Lack of safety knowledge among workers ┊ C.Lack of safety awareness among workers ┊ E.Safety management is not emphasized or not concerned by the management	5	2.2	2.2	68.6

	A. Lack of safety knowledge among workers ┊ C.Lack of safety awareness among workers ┊ E.Safety management is not emphasized or not concerned by the management ┊ F.Construction period is too tight (time pressure)	1	0.4	0.4	69.1
	A. Lack of safety knowledge among workers ┊ C.Lack of safety awareness among workers ┊ F.Construction period is too tight (time pressure)	8	3.6	3.6	72.6
	A. Lack of safety knowledge among workers ┊ C.Lack of safety awareness among workers ┊ G. others	4	1.8	1.8	74.4

	A. Lack of safety knowledge among workers ┊ F.Construction period is too tight (time pressure)	1	0.4	0.4	74.9
	B.Lack of safety protection system	5	2.2	2.2	77.1
	B.Lack of safety protection system ┊ C.Lack of safety awareness among workers	3	1.3	1.3	78.5
	B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ D.Poor working environment	2	0.9	0.9	79.4
	B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ D.Poor working environment ┊	1	0.4	0.4	79.8

	E.Safety management is not emphasized or not concerned by the management				
	B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ D.Poor working environment ┊ E.Safety management is not emphasized or not concerned by the management ┊ F.Construction period is too tight (time pressure)	1	0.4	0.4	80.3
	B.Lack of safety protection system ┊ C.Lack of safety awareness among workers ┊ E.Safety management is not emphasized or not	3	1.3	1.3	81.6

	concerned by the management				
	B.Lack of safety protection system ┊C.Lack of safety awareness among workers ┊ F.Construction period is too tight (time pressure)	3	1.3	1.3	83
	B.Lack of safety protection system ┊C.Lack of safety awareness among workers ┊ F.Construction period is too tight (time pressure) ┊ G. others	1	0.4	0.4	83.4
	B.Lack of safety protection system ┊D.Poor working environment	1	0.4	0.4	83.9
	B.Lack of safety protection system ┊D.Poor working	1	0.4	0.4	84.3

	environment ⋮ F.Construction period is too tight (time pressure)				
	B.Lack of safety protection system ⋮ E.Safety management is not emphasized or not concerned by the management	1	0.4	0.4	84.8
	B.Lack of safety protection system ⋮ F.Construction period is too tight (time pressure)	3	1.3	1.3	86.1
	C.Lack of safety awareness among workers	5	2.2	2.2	88.3
	C.Lack of safety awareness among workers ⋮ D.Poor working environment	2	0.9	0.9	89.2
	C.Lack of safety awareness among workers ⋮ D.Poor working	1	0.4	0.4	89.7

	environment ┇ E.Safety management is not emphasized or not concerned by the management ┇ F.Construction period is too tight (time pressure)				
	C.Lack of safety awareness among workers ┇ D.Poor working environment ┇ F.Construction period is too tight (time pressure)	1	0.4	0.4	90.1
	C.Lack of safety awareness among workers ┇ E.Safety management is not emphasized or not concerned by the management	1	0.4	0.4	90.6
	C.Lack of safety awareness among workers ┇ E.Safety	2	0.9	0.9	91.5

	management is not emphasized or not concerned by the management ⋮ F.Construction period is too tight (time pressure)				
	C.Lack of safety awareness among workers ⋮ F.Construction period is too tight (time pressure)	2	0.9	0.9	92.4
	C.Lack of safety awareness among workers ⋮ F.Construction period is too tight (time pressure) ⋮ G. others	1	0.4	0.4	92.8
	C.Lack of safety awareness among workers ⋮ G. others	3	1.3	1.3	94.2
	D.Poor working environment	2	0.9	0.9	95.1

	D.Poor working environment ⋮ E.Safety management is not emphasized or not concerned by the management ⋮ F.Construction period is too tight (time pressure)	1	0.4	0.4	95.5
	E.Safety management is not emphasized or not concerned by the management	1	0.4	0.4	96
	E.Safety management is not emphasized or not concerned by the management ⋮ F.Construction period is too tight (time pressure)	1	0.4	0.4	96.4
	F.Construction period is too tight (time pressure)	2	0.9	0.9	97.3
	G.Others	6	2.7	2.7	100
	Total	223	100	100	

Do you think modern science and technology is reasonable and important to ensure workers' work safety?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Reasonable but unimportant	14	6.3	6.3	6.3
	B.Unreasonable and unimportant	6	2.7	2.7	9
	C.Reasonable and critical	196	87.9	87.9	96.9
	D.Unreasonable but critical	7	3.1	3.1	100
	Total	223	100	100	

Which of the following problems do you think are the most urgent to be solved?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Worker real-name certification	47	21.1	21.1	21.1
	B.Material resource management	14	6.3	6.3	27.4
	C.Safety hazard monitoring	153	68.6	68.6	96
	D.Work efficiency supervision	9	4	4	100
	Total	223	100	100	

During the construction of the project, does the construction company provide safety knowledge training for workers?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Regularly held	171	76.7	76.7	76.7
	B.Occasionally held	44	19.7	19.7	96.4
	C.Basically not	8	3.6	3.6	100
	Total	223	100	100	

Is there a safety evaluation organization in your area that conducts safety evaluation on enterprises and construction site?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Yes	202	90.6	90.6	90.6
	B.No	21	9.4	9.4	100
	Total	223	100	100	

How frequent do hidden danger troubleshooting and emergency trainings conducted by the relevant safety supervision unit of your company?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.No relevant troubleshooting and training conducted	20	9	9	9

	B.Occasionally	50	22.4	22.4	31.4
	C.Regularly	153	68.6	68.6	100
	Total	223	100	100	

In your opinion, what is the main safety investment of a project?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Salary of full-time safety personnel	35	15.7	15.7	15.7
	B.Prepare safety facilities	30	13.5	13.5	29.1
	C.Purchase personal safety protection equipment/ devices	40	17.9	17.9	47.1
	D.Provide special safety technical program	50	22.4	22.4	69.5
	E.Safety publicity	7	3.1	3.1	72.6
	F.Safety relevant education and training	51	22.9	22.9	95.5
	G.Others	10	4.5	4.5	100
	Total	223	100	100	

Does your company have safe work practices relevant incentives?

		Frequency	Percent	Valid	Cumulative

				Percent	Percent
Valid	A.No	38	17	17	17
	B.Spiritual motivation	50	22.4	22.4	39.5
	C.Material motivation	82	36.8	36.8	76.2
	D.Others	53	23.8	23.8	100
	Total	223	100	100	

What do you think of the safety management capability of your company's existing construction contractors?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Very poor	5	2.2	2.2	2.2
	B.Poor	8	3.6	3.6	5.8
	C.Average	93	41.7	41.7	47.5
	D.Good	71	31.8	31.8	79.4
	E.Very good	46	20.6	20.6	100
	Total	223	100	100	

In terms of construction safety, do you think the relevant industry management departments have fulfilled their responsibilities?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Yes	207	92.8	92.8	92.8
	B.No	16	7.2	7.2	100
	Total	223	100	100	

Which of the following measures is more feasible to prevent accidents at construction site?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Improve the safety and reliability of equipment	45	20.2	20.2	20.2
	B.Improve the overall quality and safety knowledge of the workers	66	29.6	29.6	49.8
	C.Do a good job in personal safety protection	42	18.8	18.8	68.6
	D.Reasonable layout of the workplace/ safety working environment	20	9	9	77.6
	E.Improve the safety management policies and systems	50	22.4	22.4	100
	Total	223	100	100	

In your opinion, the main reason “prevention before accidents happen” cannot be achieved in safety production management is

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.The technology is not advanced enough to achieve comprehensive monitoring	31	13.9	13.9	13.9
	B.The construction site pays too much attention to efficiency, and insufficient manpower is invested in supervision	76	34.1	34.1	48
	C.Workers have weak safety awareness and have a fluke mentality	99	44.4	44.4	92.4
	D.Others	17	7.6	7.6	100
	Total	223	100	100	

Based on your understanding, construction safety at construction site is

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Related to the safety of people's lives and property	152	68.2	68.2	68.2
	B.Directly related	23	10.3	10.3	78.5

	to the speed of economic development				
	C.Directly related to the healthy development of the economy	24	10.8	10.8	89.2
	D.Related to the overall situation of social stability	24	10.8	10.8	100
	Total	223	100	100	

Did your company or organization consider the investment estimation of safety during the early planning of the project?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Yes	204	91.5	91.5	91.5
	B.No	19	8.5	8.5	100
	Total	223	100	100	

In the safety management at construction site, what is the owner's main safety responsibility?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Arrange safety representative in the project	40	17.9	17.9	17.9
	B.Hold safety meeting with the	14	6.3	6.3	24.2

	contractors				
	C.Review the contractor's special safety plan D. Regularly check the contractor's safety status	32	14.3	14.3	38.6
	D.Regularly check the contractor's safety status	72	32.3	32.3	70.9
	E.Implement the safety incentive plan	11	4.9	4.9	75.8
	I.No responsibility	2	0.9	0.9	76.7
	F.Pay the safety expenses regularly and in full	21	9.4	9.4	86.1
	G.Supervise the use of safety production costs	17	7.6	7.6	93.7
	H.Others	14	6.3	6.3	100
	Total	223	100	100	

What are the main responsibilities of the supervising engineer at the construction site?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.Assist in the implementation of	77	34.5	34.5	34.5

	safety production expenses, supervise and guide the use of safety production expenses				
	B.Review the special safety production plan and inspect the construction site's safety	96	43	43	77.6
	C.Supervise the on-site safety management office to assist in time to handle on-site accidents and others	50	22.4	22.4	100
	Total	223	100	100	

Appendix D SPSS Result Analysis Output (Original Mandarin Version)

你的职业

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.建筑工人	95	42.6	42.6	42.6
	B. Other occupations related to construction industry	109	48.9	48.9	91.5
	C.非建筑业	19	8.5	8.5	100.0
	Total	223	100.0	100.0	

你在建筑行业工作多久了

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.不足 1 年	55	24.7	24.7	24.7
	B.1-3 年	43	19.3	19.3	43.9
	C.3-5 年	38	17.0	17.0	61.0
	D.5-10 年	35	15.7	15.7	76.7
	E.超过 10 年	52	23.3	23.3	100.0
	Total	223	100.0	100.0	

你的年龄: ___ 岁

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20	3	1.3	1.3	1.3
	21	9	4.0	4.0	5.4
	22	15	6.7	6.7	12.1
	23	14	6.3	6.3	18.4

	24	16	7.2	7.2	25.6
	25	11	4.9	4.9	30.5
	26	14	6.3	6.3	36.8
	27	14	6.3	6.3	43.0
	28	15	6.7	6.7	49.8
	29	8	3.6	3.6	53.4
	30	15	6.7	6.7	60.1
	31	3	1.3	1.3	61.4
	32	6	2.7	2.7	64.1
	33	9	4.0	4.0	68.2
	34	2	.9	.9	69.1
	35	11	4.9	4.9	74.0
	36	3	1.3	1.3	75.3
	37	2	.9	.9	76.2
	38	5	2.2	2.2	78.5
	39	4	1.8	1.8	80.3
	40	6	2.7	2.7	83.0
	41	1	.4	.4	83.4
	42	3	1.3	1.3	84.8
	43	3	1.3	1.3	86.1
	45	7	3.1	3.1	89.2
	46	4	1.8	1.8	91.0
	48	2	.9	.9	91.9
	49	2	.9	.9	92.8
	50	4	1.8	1.8	94.6
	51	4	1.8	1.8	96.4
	52	2	.9	.9	97.3
	53	1	.4	.4	97.8
	54	2	.9	.9	98.7
	56	1	.4	.4	99.1
	60	1	.4	.4	99.6
	二十	1	.4	.4	100.0
	Total	223	100.0	100.0	

你知道建筑公司目前的建筑安全管理政策吗?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.了解	184	82.5	82.5	82.5

	B.不了解	39	17.5	17.5	100.0
	Total	223	100.0	100.0	

你知道目前施工安全监督的运作机制吗？

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 了解	181	81.2	81.2	81.2
	B. 不了解	42	18.8	18.8	100.0
	Total	223	100.0	100.0	

你知道安全施工的法律、法规和规则吗？

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 不知道	7	3.1	3.1	3.1
	B. 一般	84	37.7	37.7	40.8
	C. 了解	102	45.7	45.7	86.5
	D. 非常清楚	30	13.5	13.5	100.0
	Total	223	100.0	100.0	

贵公司是否建立并实施了完整的施工安全管理体系？

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.非常完善且严格执行	89	39.9	39.9	39.9
	B.非常完善和基本的实施	58	26.0	26.0	65.9
	C.非常完美，但尚未实施	5	2.2	2.2	68.2
	D.非常完美。并很好地实施	26	11.7	11.7	79.8

	E.相对完善，但实施不到位	36	16.1	16.1	96.0
	F.未建立	9	4.0	4.0	100.0
	Total	223	100.0	100.0	

贵公司是否制定并实施安全生产奖惩措施?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.是，并严格执行	127	57.0	57.0	57.0
	B.是，基本实施	79	35.4	35.4	92.4
	C.是，但未实施	6	2.7	2.7	95.1
	D.未制定	11	4.9	4.9	100.0
	Total	223	100.0	100.0	

以下哪一项是贵公司的安全监督管理机制?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.安全领导小组	101	45.3	45.3	45.3
	B.安全组织	35	15.7	15.7	61.0
	C.安全监督	68	30.5	30.5	91.5
	D.其他	19	8.5	8.5	100.0
	Total	223	100.0	100.0	

如何提高安全监管标准化的内容?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.法律法规的标准化	75	33.6	33.6	33.6

	B.科学管理	32	14.3	14.3	48.0
	C.持续的安全教育	62	27.8	27.8	75.8
	D.现场标准化	25	11.2	11.2	87.0
	E.人员行为规范	29	13.0	13.0	100.0
	Total	223	100.0	100.0	

你如何看待建筑工地安全对建筑公司的影响？

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.事故对施工单位的影响很小，不必考虑安全生产可以改善施工单位的社会形象	42	18.8	18.8	18.8
	B.通过安全生产为施工单位带来经济利益是承包商的责任，与施工单位无关	47	21.1	21.1	39.9
	C. 其他	134	60.1	60.1	100.0
	Total	223	100.0	100.0	

如果你是建筑企业的老板，如果建筑工地发生重大事故，你会怎么办？

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 这是建筑公司自己的事	6	2.7	2.7	2.7
	B.被罚款	5	2.2	2.2	4.9
	C.要求停工整改	69	30.9	30.9	35.9

	D.及时向地方当局报告	134	60.1	60.1	96.0
	E. 其他	9	4.0	4.0	100.0
	Total	223	100.0	100.0	

你认为承包商应该在现场设立专职安全管理人员吗

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 是的	217	97.3	97.3	97.3
	B. 不需要	6	2.7	2.7	100.0
	Total	223	100.0	100.0	

贵企业在哪个阶段实施安全管理?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.决策阶段	18	8.1	8.1	8.1
	B. 设计阶段	5	2.2	2.2	10.3
	C.施工阶段	81	36.3	36.3	46.6
	D.使用阶段	1	.4	.4	47.1
	E.拆除阶段	1	.4	.4	47.5
	F.以上所有阶段	117	52.5	52.5	100.0
	Total	223	100.0	100.0	

您认为现场监理部门是否有必要派遣相关专业安全人员到现场值班?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 是	220	98.7	98.7	98.7

	B. 否	3	1.3	1.3	100.0
	Total	223	100.0	100.0	

你知道目前施工安全监督过程中存在的问题吗?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 知道	177	79.4	79.4	79.4
	B. 不知道	46	20.6	20.6	100.0
	Total	223	100.0	100.0	

你认为现有施工现场安全管理模式的效果如何?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A, 非常好	104	46.6	46.6	46.6
	B, 一般	113	50.7	50.7	97.3
	C, 不好	6	2.7	2.7	100.0
	Total	223	100.0	100.0	

根据您的意见，施工现场事故率高的主要原因主要是（多选）

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.工人缺乏安全知识	9	4.0	4.0	4.0
	A.工人缺乏安全知识┇B.缺乏安全保护系统	2	.9	.9	4.9

A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识	12	5.4	5.4	10.3
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇D.工作环境差	7	3.1	3.1	13.5
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇D.工作环境差┇E.管理层不重视或不关心安全管理	5	2.2	2.2	15.7
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇D.工作环境差┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	38	17.0	17.0	32.7

A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇D.工作环境差┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）┇G. 其他	15	6.7	6.7	39.5
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇D.工作环境差┇F.工期过紧（时间压力）	7	3.1	3.1	42.6
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇E.管理层不重视或不关心安全管理	13	5.8	5.8	48.4
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	7	3.1	3.1	51.6

A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇E.管理层不重视或不关心安全管理┇G. 其他	1	.4	.4	52.0
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇F.工期过紧（时间压力）	7	3.1	3.1	55.2
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇F.工期过紧（时间压力）┇G. 其他	3	1.3	1.3	56.5
A.工人缺乏安全知识┇B.缺乏安全保护系统┇C.工人缺乏安全意识┇G. 其他	1	.4	.4	57.0
A.工人缺乏安全知识┇B.缺乏安全保护系统┇D.工作环境差┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	3	1.3	1.3	58.3

A.工人缺乏安全知识┇B.缺乏安全保护系统┇D.工作环境差┇F.工期过紧(时间压力)	3	1.3	1.3	59.6
A.工人缺乏安全知识┇B.缺乏安全保护系统┇E.管理层不重视或不关心安全管理	3	1.3	1.3	61.0
A.工人缺乏安全知识┇B.缺乏安全保护系统┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	3	1.3	1.3	62.3
A.工人缺乏安全知识┇B.缺乏安全保护系统┇F.工期过紧（时间压力）	1	.4	.4	62.8
A.工人缺乏安全知识┇C.工人缺乏安全意识	7	3.1	3.1	65.9
A.工人缺乏安全知识┇C.工人缺乏安全意识┇D.工作环境差┇F.工期过紧(时间压力)	1	.4	.4	66.4
A.工人缺乏安全知识┇C.工人缺乏安全意识┇E.管理层不重视或不关心安全管理	5	2.2	2.2	68.6

A.工人缺乏安全知识┇C.工人缺乏安全意识┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	1	.4	.4	69.1
A.工人缺乏安全知识┇C.工人缺乏安全意识┇F.工期过紧（时间压力）	8	3.6	3.6	72.6
A.工人缺乏安全知识┇C.工人缺乏安全意识┇G. 其他	4	1.8	1.8	74.4
A.工人缺乏安全知识┇F.工期过紧（时间压力）	1	.4	.4	74.9
B.缺乏安全保护系统	5	2.2	2.2	77.1
B.缺乏安全保护系统┇C.工人缺乏安全意识	3	1.3	1.3	78.5
B.缺乏安全保护系统┇C.工人缺乏安全意识┇D.工作环境差	2	.9	.9	79.4
B.缺乏安全保护系统┇C.工人缺乏安全意识┇D.工作环境差┇E.管理层不重视或不关心安全管理	1	.4	.4	79.8

B.缺乏安全保护系统┇C.工人缺乏安全意识┇D.工作环境差┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	1	.4	.4	80.3
B.缺乏安全保护系统┇C.工人缺乏安全意识┇E.管理层不重视或不关心安全管理	3	1.3	1.3	81.6
B.缺乏安全保护系统┇C.工人缺乏安全意识┇F.工期过紧（时间压力）	3	1.3	1.3	83.0
B.缺乏安全保护系统┇C.工人缺乏安全意识┇F.工期过紧（时间压力）┇G. 其他	1	.4	.4	83.4
B.缺乏安全保护系统┇D.工作环境差	1	.4	.4	83.9
B.缺乏安全保护系统┇D.工作环境差┇F.工期过紧（时间压力）	1	.4	.4	84.3
B.缺乏安全保护系统┇E.管理层不重视或不关心安全管理	1	.4	.4	84.8

B.缺乏安全保护系统┇F.工期过紧（时间压力）	3	1.3	1.3	86.1
C.工人缺乏安全意识	5	2.2	2.2	88.3
C.工人缺乏安全意识┇D.工作环境差	2	.9	.9	89.2
C.工人缺乏安全意识┇D.工作环境差┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	1	.4	.4	89.7
C.工人缺乏安全意识┇D.工作环境差┇F.工期过紧（时间压力）	1	.4	.4	90.1
C.工人缺乏安全意识┇E.管理层不重视或不关心安全管理	1	.4	.4	90.6
C.工人缺乏安全意识┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	2	.9	.9	91.5
C.工人缺乏安全意识┇F.工期过紧（时间压力）	2	.9	.9	92.4
C.工人缺乏安全意识┇F.工期过紧（时间压力）┇G. 其他	1	.4	.4	92.8

	C.工人缺乏安全意识┇G. 其他	3	1.3	1.3	94.2
	D.工作环境差	2	.9	.9	95.1
	D.工作环境差┇E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	1	.4	.4	95.5
	E.管理层不重视或不关心安全管理	1	.4	.4	96.0
	E.管理层不重视或不关心安全管理┇F.工期过紧（时间压力）	1	.4	.4	96.4
	F.工期过紧（时间压力）	2	.9	.9	97.3
	G. 其他	6	2.7	2.7	100.0
	Total	223	100.0	100.0	

你认为现代科学技术对确保工人的工作安全是合理和重要的吗?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.合理但不重要	14	6.3	6.3	6.3
	B.不合理且不重要	6	2.7	2.7	9.0
	C.合理且重要	196	87.9	87.9	96.9
	D. 不合理但很重要	7	3.1	3.1	100.0
	Total	223	100.0	100.0	

您认为以下哪些问题最迫切需要解决?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.工人实名认证	47	21.1	21.1	21.1
	B.材料资源管理	14	6.3	6.3	27.4
	C.安全隐患监测	153	68.6	68.6	96.0
	D.工作效率监督	9	4.0	4.0	100.0
	Total	223	100.0	100.0	

在项目施工过程中，施工公司是否对工人进行安全知识培训?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.定期举行	171	76.7	76.7	76.7
	B.偶尔举行	44	19.7	19.7	96.4
	C.基本上不	8	3.6	3.6	100.0
	Total	223	100.0	100.0	

贵地区是否有对企业和施工现场进行安全评价的安全评价机构?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 是	202	90.6	90.6	90.6
	B. 否	21	9.4	9.4	100.0
	Total	223	100.0	100.0	

贵公司相关安全监管单位多久进行一次隐患排查和应急培训?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.未进行相关故障排除和培训	20	9.0	9.0	9.0
	B.偶尔	50	22.4	22.4	31.4
	C.定期	153	68.6	68.6	100.0
	Total	223	100.0	100.0	

在你看来，一个项目的主要安全投资是什么？

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.专职安全人员工资	35	15.7	15.7	15.7
	B.准备安全设施	30	13.5	13.5	29.1
	C.购买个人安全防护设备/装置	40	17.9	17.9	47.1
	D.提供专项安全技术方案	50	22.4	22.4	69.5
	E、安全宣传	7	3.1	3.1	72.6
	F.安全相关教育和培训	51	22.9	22.9	95.5
	G. 其他	10	4.5	4.5	100.0
	Total	223	100.0	100.0	

贵公司是否有与安全工作实践相关的激励措施？

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 没有	38	17.0	17.0	17.0

	B.精神激励	50	22.4	22.4	39.5
	C. 物质激励	82	36.8	36.8	76.2
	D. 其他方式	53	23.8	23.8	100.0
	Total	223	100.0	100.0	

你认为贵公司现有施工承包商的安全管理能力如何?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 非常差	5	2.2	2.2	2.2
	B. 差	8	3.6	3.6	5.8
	C. 一般	93	41.7	41.7	47.5
	D. 好	71	31.8	31.8	79.4
	E. 很好	46	20.6	20.6	100.0
	Total	223	100.0	100.0	

在建筑安全方面，您认为相关行业管理部门是否履行了职责?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 是	207	92.8	92.8	92.8
	B. 否	16	7.2	7.2	100.0
	Total	223	100.0	100.0	

为了防止施工现场发生事故，以下哪项措施更可行?

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	A.提高设备的安全性和可靠性	45	20.2	20.2	20.2
	B.提高工人的整体质量和安全知识	66	29.6	29.6	49.8
	C.做好人身安全防护	42	18.8	18.8	68.6
	D.工作场所/安全工作环境的合理布局	20	9.0	9.0	77.6
	E.完善安全管理政策和制度	50	22.4	22.4	100.0
	Total	223	100.0	100.0	

你认为，安全生产管理不能做到“防患于未然”的主要原因是

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.技术不够先进，无法实现全面监控	31	13.9	13.9	13.9
	B.施工现场过于注重效率，监督投入的人力不足	76	34.1	34.1	48.0
	C.工人安全意识淡薄，存在侥幸心理	99	44.4	44.4	92.4
	D. 其他	17	7.6	7.6	100.0
	Total	223	100.0	100.0	

根据您的理解，施工现场的施工安全

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.与人民生命财产安全有关	152	68.2	68.2	68.2
	B.与经济发展速度直接相关	23	10.3	10.3	78.5
	C.与经济健康发展直接相关	24	10.8	10.8	89.2
	D.与社会稳定大局有关	24	10.8	10.8	100.0
	Total	223	100.0	100.0	

贵公司或组织在项目早期规划期间是否考虑了安全投资估算?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A. 是	204	91.5	91.5	91.5
	B. 否	19	8.5	8.5	100.0
	Total	223	100.0	100.0	

在施工现场的安全管理中，业主的主要安全责任是什么?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.在项目中安排安全代表	40	17.9	17.9	17.9
	B.与承包商举行安全会议	14	6.3	6.3	24.2
	C.审查承包商的专项安全计划	32	14.3	14.3	38.6
	D.定期检查承包商的安全状况	72	32.3	32.3	70.9
	E.实施安全激励计划	11	4.9	4.9	75.8

	F. 无责任	2	.9	.9	76.7
	F.定期足额支付安全费用	21	9.4	9.4	86.1
	G.监督安全生产费用的使用	17	7.6	7.6	93.7
	H. 其他	14	6.3	6.3	100.0
	Total	223	100.0	100.0	

施工现场监理工程师的主要职责是什么?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A.协助落实安全生产费用，监督指导安全生产费用的使用	77	34.5	34.5	34.5
	B.审查专项安全生产计划，检查施工现场安全	96	43.0	43.0	77.6
	C.监督现场安全管理办公室及时协助处理现场事故等	50	22.4	22.4	100.0
	Total	223	100.0	100.0	