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Research on Construction Safety Management and Quality Management Based on Binary Decision Map

Hongtao Niu

Ankang University, Ankang, Shanxi 725000, China

ABSTRACT. *With the rapid development of science, technology and economic strength in China, the construction industry has developed vigorously. Construction safety and quality management is a systematic project. The quality of construction will directly affect the safety of people's lives and property and the stable development of society. Construction quality and safety is the key to the success of construction projects. It is the fundamental guarantee to maintain the corporate image and obtain long-term economic benefits. Safety-critical system design needs to be guided and evaluated by security analysis. Fault tree based on binary decision graph is one of the commonly used methods of safety analysis in engineering. The risk assessment is based on the risk factor and the simulation application environment design experiment is performed. Correctly handling the relationship between construction safety and quality management plays an important role in the smooth completion of engineering projects and the stable development of society.*

Keywords: *Construction; Construction Safety; Binary Decision-making; Safety Analysis*

1. Introduction

With the rapid development of science and technology and economic strength in China, the construction industry has developed vigorously and promoted the process of urbanization. As an important part of construction management, the scientific development of construction safety and quality management has an extremely important impact on the economic interests of construction enterprises and construction quality assurance [1]. With the rapid development of construction industry, a large number of safety accidents have occurred, which restricts the healthy development of China's construction industry. There are still many problems in the construction of construction projects, and construction accidents occur frequently, which is inseparable from the construction safety an d quality management of the project [2]. The important part of quantity management is the quality control of on-site construction. The perfect quality control can prevent the quality of construction engineering from being prevented in advance, and effectively control the quality of the project to achieve the expected goal [3]. Strengthening the

construction safety and quality management of construction projects plays an important role in ensuring the smooth completion of buildings and ensuring the safety of people's lives and property [4]. In order to complete the construction project with high quality without accident, we must firmly grasp the quality and safety control from all aspects of the whole process.

The construction industry is an industry with high accidents. Once a production accident occurs on the construction site, it will bring certain casualties and property losses. Safe construction not only affects the reputation of construction companies, but also relates to the safety of corporate property and construction personnel. In the construction industry, safety management is a very important task. The quality of safety work is the main manifestation of a company's reputation and the quality of management of this unit [5]. Safety critical system design relies on safety analysis for guidance and evaluation. Fault tree based on binary decision graph is one of the commonly used methods of safety analysis in engineering [6]. Construction safety, quality management theory and management means lag behind the problem is very prominent. The construction team with peasant workers as the main body has low cultural level and weak awareness of safety and quality [7]. As a result, the construction industry has always been one of the industries with the highest occupational safety accident rate. With the gradual enlargement of the system scale, the traditional manual analysis method not only has a huge workload, but also the accuracy of the results can not be guaranteed.

2. Characteristics of Construction Safety and Quality Management

The construction industry is an accident-prone industry. Construction safety and quality management of construction projects is an important link and foundation for the successful completion of the entire project. The fault tree of building construction safety risk is a logical structure describing the relationship between construction safety risk accidents and influencing factors. It cites the idea of fault tree in system reliability engineering. Construction safety and quality management are inseparable from any construction stage. If the safety and quality of construction projects are problematic, it will hinder the smooth completion of the project [8]. Construction quality and safety management are the key to building construction, which directly affects the quality of building construction and corporate benefits. Safety and quality assurance of construction, to a large extent, ensures the smooth completion and use of buildings. The long-term development of construction units, the safety of people's lives and property, and the stable development of society have had an important impact. As a construction manager, safety measures must be taken and safety education and training should be done for all attendees. In order to ensure the survival of the enterprise and the benefit of the project, the construction personnel should consciously abide by the safety rules and implement the safety measures.

In the process of construction, the examination and approval supervision system is not perfect enough. The construction authorities and quality supervision agencies in many areas have no idea about some problems in the construction process.

Architecture itself is a non-self-contained system which is independent of nature and needs to absorb natural resources to meet its own independent operation. It is difficult to systematically, efficiently and comprehensively solve various problems that arise during engineering design or construction. Modern building projects have clear traffic lines, reasonable functional divisions, and combined with aesthetic technology to form a comprehensive office space. The figure shows the application method of construction safety survey technology in construction practice.

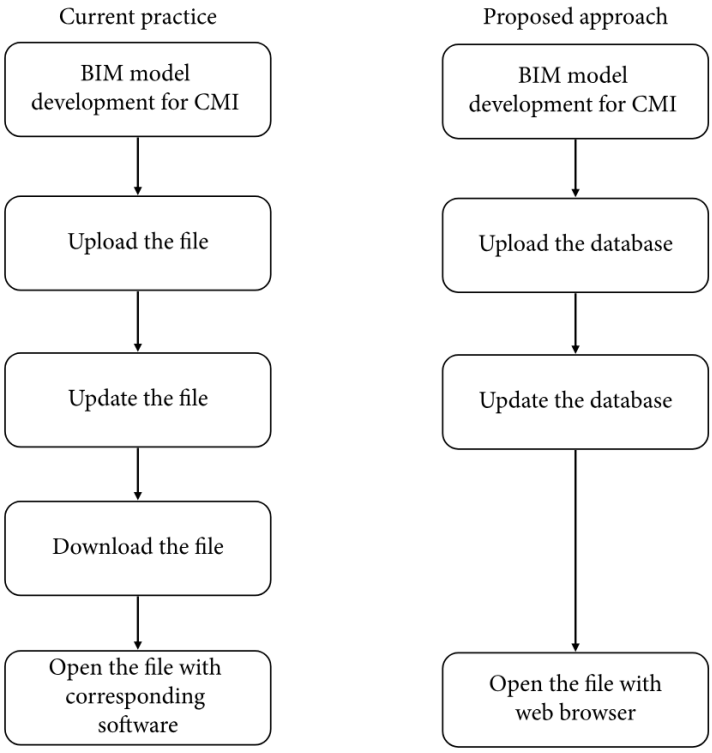

Fig. 1 Application method of construction safety survey technology in construction practice

The enterprise is the main body of construction engineering safety control. The quality control of construction engineering is mainly done by construction enterprises. With the continuous development of modern society and the continuous advancement of technology, the traditional safety and quality management system can no longer meet the needs of the current situation. To manage the quality of the project well, it is an effective measure to develop a relevant quality and safety manual in advance. In order to win more profits, many companies often catch up on the construction speed and pay too much attention to the construction speed. The neglect of construction quality leads to a hundred quality problems in construction

projects. Both managers and construction workers must recognize the importance of safety. Strengthening the safety consciousness of construction team is one of the effective measures to reduce the frequency of safety accidents. Construction workers should be trained in professional skills so as to improve their professional accomplishment and avoid safety accidents caused by irregular operation.

People are the most important wealth for the development of construction enterprises, and also the most critical factor for the development of construction enterprises. Managing people well is the most critical basic work for construction enterprises to obtain economic benefits and reputation. The current management mode is to lay stress on enterprise qualification and brand building, neglect the training and education of construction workers, and put the cart before the horse. The first guarantor of construction safety and engineering quality has been neglected by the producers who have been sticking to the first position [9]. The construction workers should be trained systematically and comprehensively so as to improve their professional quality and skills. The building construction site is the most crowded place, and all managers, technicians, and construction personnel gather here. As long as the knowledge level of construction workers has increased, safety awareness and quality awareness have increased. They can actively and consciously abide by relevant laws and regulations and norms. Establishing a sound safety supervision system can prevent potential safety hazards from being discovered in time, thus avoiding the occurrence of safety accidents.

3. The Concept of Fault Tree for Construction Safety Risk

Before the construction of the water conservancy project, the management personnel of the construction unit will identify the risks of the construction and evaluate the safety risk factor. Qualitative analysis can find all failure modes that cause the top event to occur, and quantitative analysis can determine the probability of occurrence of the top event and other quantitative indicators based on the probability of occurrence of the basic event. Based on the results of the fault tree analysis, security managers can develop risk control measures. Improve the safety and reliability of the construction process and prevent the occurrence of safety accidents. A fixed management system should be established throughout the on-site construction management. Clarify the work and responsibilities of each manager, and stipulate the resources and personnel qualifications of the project [10]. Perfect safety supervision system plays an important role in the long-term development of construction enterprises and the smooth completion of the project. The specific implementation of construction projects, we must formulate the corresponding organizational design in advance, through the architectural organizational design to further complete the guidance and construction of construction projects.

In the process of construction, the owner pays more attention to the progress and cost control of construction, and pays less attention to the control of construction safety and quality. In the calculation of construction binary decision diagram, the calculation and analysis of the whole structure are carried out, and the elastic time history analysis under multiple earthquakes is carried out according to the

parameters of artificial seismic wave. Table 1 shows the maximum acceleration and duration of seismic waves.

Table 1 Relevant parameters such as maximum acceleration value and duration of seismic wave

Adaptation	Maximum acceleration value (cm/s^2)	Duration (s)	Wave number	Time step (s)	Effective duration (s)
Artificial shock wave	80	35	1800	0.03	31.63
Natural shock wave	75	30	1750	0.03	34.68

Construction safety survey plays an irreplaceable role in urban construction and civil engineering projects. In the face of problems in construction safety surveys, effective measures are needed to solve these problems. The binary decision graph design metric relationship is also widely used in the planning results for the area statistics of the planned land, the calculation of the floor area ratio of different land types, the height and density of the buildings, and the minimum distance between buildings at different heights. The relationship between road width and building area is shown in Figure 2.

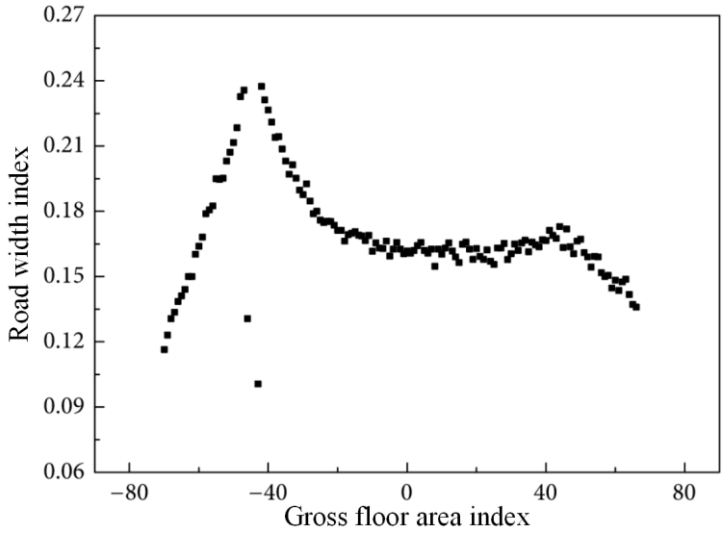

Fig. 2 Relationship between road width and building area

The role and effect of the construction management department on the safety and quality management of building construction is remarkable. However, due to

institutional reasons, the power of government supervision is relatively weak compared to the rapidly developing construction industry and the complicated construction market. Construction companies can learn from some successful experiences and build a safety supervision system that is in line with the characteristics of the company and adapts to the development of the enterprise. Since various factors causing an accident are random events, the safety risk accident rate can be expressed as a probability value, that is, the probability of occurrence of the top event. The quality of personnel directly affects the quality of the project and is the decisive factor for the quality of the project. Therefore, the primary task of controlling engineering quality is to train and improve personnel's own quality. Some safety accidents in construction are caused by outside factors, while most of them are caused by factors considered. Construction engineering organization design is a comprehensive economic document to guide construction projects, and plays an important role in promoting construction projects.

Although the contractor is responsible for the safety and quality of the construction, and entrusts the supervision unit to supervise and manage it. However, due to the contracting unit's pursuit of the goal of maximum profit and management defects, the construction safety and quality can not be effectively controlled. At this time, the supervision of supervision units often appears weak. The binary decision graph is based on the directed acyclic graph based on the fault tree. The fault tree should be normalized before the binary decision graph is generated. In the construction, each person's work is different, and the tasks they perform are different. The government management department educates and educates the safety and quality knowledge of the operators. It is the supervision and guarantee of the training and training of the operators within the enterprise. It is necessary to strengthen the professional quality of construction unit management personnel, strengthen safety management functions, and lay a solid foundation for the successful completion of engineering projects.

4. Conclusion

Doing a good job in quality and safety management is the primary task of building construction, and it is also an arduous task. As the market competition becomes increasingly fierce and you want to survive, you must start from the four aspects of reputation, qualification, price and relationship. The basics of four points are to do a good job in quality and safety management. Therefore, the issue of quality and safety is the core of the housing construction industry and a necessary condition for enterprises to survive and develop in the long run. The fault tree analysis process will involve a large number of basic events and minimal cut sets, which makes the computational workload very large and may result in inaccurate results. While constantly improving relevant laws, regulations and standards, a certain proportion of the cost is extracted from the relevant measures of the project. As training and education funds for construction workers and engineering managers. So that they have a chance to receive continuing education. It is necessary to strengthen the safety awareness of the construction team, enhance training, improve

the overall quality of the construction team, and establish a sound safety supervision system. To ensure the smooth completion of construction projects, to ensure the safety of people's lives and property, to ensure the long-term and stable development of construction enterprises and society.

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