Exploration on Control of Engineering Safety Supervision in the Framework of Fuzzy Mathematics

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Abstract: Carrying out effective safety supervision and control during the construction process of a construction project can greatly guarantee the construction safety of the construction project, and at the same time can improve the quality of the construction project, which is an important part of the construction process. There are still some problems in the current safety supervision of construction projects, which affect the efficiency of safety supervision. This requires analysis of the main points of safety supervision and control work, and promoting the effective application of safety supervision in the construction process of construction, so as to promote the long-term stable development of China's construction engineering industry.

1. Introduction
With the continuous increase of the scale of China's engineering construction projects, more and more attention has been paid to the work in all aspects of the engineering construction process. Safety supervision plays a vital role in the entire construction process, which can ensure the smooth implementation of engineering construction projects to a great extent, and can ensure the safety and construction quality of engineering construction projects. In the current development process of engineering construction projects, it is necessary to attach importance to the safety supervision work. In the specific work process, it is mainly to carry out effective safety management control on the preliminary preparation of the engineering construction and the engineering construction. At the same time, a strict and effective emergency plan must be formulated so that measures can be taken in a timely manner during the occurrence of a safety accident to solve it, minimize the harm caused by the safety accident, and prevent more serious safety accidents during the construction process. At the same time, ensuring the efficiency and quality of engineering construction can greatly improve the level of internal control and management of engineering construction, which is of positive significance to the long-term development of China's engineering construction project industry [1].

2. Development Direction of Engineering Project Safety Supervision and Control Work
Carrying out effective safety supervision in the process of project construction is an important measure to ensure the effect of project construction. In the current development process of construction projects, safety supervision work is getting more and more attention. Its overall development is in the direction of health and generality, which is mainly manifested in the following aspects: First, safety supervision work in engineering construction has been institutionally guaranteed. In the continuous development of engineering construction, safety supervision is an important part of it, which can ensure the safety and quality of engineering construction to a great extent. Relevant ministries and departments attach more importance to safety supervision, provide a lot of human and material support, and can greatly play the active role of safety supervision in the construction process of construction projects, and
promote the safety supervision of engineering construction. Besides, healthy development can promote the normative and standardized development of safety supervision. Secondly, new contents have emerged in the safety supervision work in engineering construction. In the process of continuous improvement of the current economic level, the development of all walks of life in society is relatively large. The development of safety supervision in the engineering construction industry is also relatively rapid, and the content of safety supervision in engineering construction in the new period is also richer, such as the effective application of new technologies, new materials and new equipment in engineering construction. New requirements have been put forward in safety supervision. This has promoted the development of safety supervision in a new direction. In addition, the full application of computer network technology in safety supervision of engineering construction can greatly improve the efficiency of safety supervision. In addition, the use of computer network technology can make more accurate and scientific prediction and assessment of the risks existing in engineering construction, which can greatly save the human and material resources and financial resources invested in safety supervision work, and can improve the application benefits of safety supervision work. During the development of engineering construction in the new period, the new content of safety supervision work is an important basis to promote the widespread application of safety supervision work, and it is also an important guarantee to promote the continuous improvement of safety supervision level [2].

3. Problems in Safety Supervision and Control of Engineering Projects
In the current development process of the engineering construction industry, many units have begun to attach importance to the effective application of safety supervision work, but there are still some problems in the process of actual safety supervision control work affecting the efficiency and quality of safety supervision work.

3.1 Lack of Awareness of Safety Supervision
In the process of rapid economic development, engineering construction is an important part of it. In the process of continuously improving the social level in the new period, many engineering construction units have paid more attention to the pursuit of economic benefits, and to some extent, ignored the orderly development of safety supervision work, which has led many managers to lack a correct sense of safety supervision. As a result, the safety supervision work of the engineering construction has flowed into the form, affecting the full play of the positive role of safety supervision work. In the long run, it will seriously restrict the long-term development of the engineering construction industry [3].

3.2 Failure to Develop A Sound Supervision System
In the process of engineering construction safety supervision and control, although many engineering construction units have formulated internal management control measures and systems according to the specific conditions of the project. However, in the process of carrying out safety supervision, a scientific safety supervision work system has not been formulated and perfected, resulting in a lack of strict and effective institutional guarantees for safety supervision. In addition, the safety supervision system formulated by some engineering construction units has not been adapted to the actual development of the engineering construction industry in the new period, affecting the implementation effect of the safety supervision work system. For example, some incentive mechanisms appearing in the new period have not been fully reflected, and the content of safety management has no relevant system, which affects the efficiency and quality of safety supervision.

3.3 Low Professional Quality of Supervisors
In the process of social and economic development in the new period, we must attach great importance to the training of talents. Only by recruiting professional relevant talents can we ensure that the engineering construction safety supervision work can be effectively carried out. However, in the
current process of engineering construction safety supervision, there is a lack of professional supervision talents. Many engineering construction supervision work is done concurrently by personnel from other departments, which leads to chaotic and disorderly supervision of engineering construction safety, which limits further development of engineering construction.

4. Engineering Project Safety Supervision Control Work Practice Strategy

4.1 Application of Fuzzy Mathematical Theory in Safety Evaluation

| Construction Company | Safety Evaluation of Production Equipment | Work Safety and Working Environment | Safety Management Evaluation |
|----------------------|------------------------------------------|------------------------------------|-----------------------------|
| Construction Company 1 | 0.94                                     | 0.81                               | 0.9                         |
| Construction Company 2 | 0.9                                      | 0.91                               | 0.9                         |
| Construction Company 3 | 0.8                                      | 0.93                               | 0.9                         |

The above-mentioned values use a mathematical fuzzy algorithm for security evaluation, and the average score is used to actually evaluate the number of units involved in each evaluation content. The calculation method has universality only when 100% evaluation is performed on the object under investigation. If it is a sample inspection, including the acceptance inspection of the superior inspection team, it is not convenient to use this method to calculate, because it is easy to cover up its major risk factors. When we conduct a comprehensive evaluation on the basis of evaluation, the level of the comprehensive score is very important for us, which relatively predicts the proportion of safety and risk factors. However, if we only rely on the comprehensive score rate to determine whether it is safe, critical, or dangerous, it is still one-sided. When evaluating, it is necessary to look at both the actual total score and the scores of key projects in order to make the comprehensive evaluation closer to the actual safety level. During the safety evaluation, the following aspects were paid attention to, and the comprehensive evaluation approached the real situation of safety level. First, the overall score of the overall examination; second, the score of the key evaluation items; and third, the key evaluation items. For the major hidden dangers in the review, use the text list for comprehensive evaluation and analysis, and focus on research and development of practical rectification measures, prioritize the solution and implementation of the rectification plan, and give comprehensive evaluation opinions based on the completion of the above work.

4.2 Safety Supervision Control During Construction Phase

The control work in the early stages of construction is mainly to ensure the effectiveness and safety of the preparatory work in the early stages of construction, to prevent it from affecting the construction progress and construction quality due to improper preparations during construction. The preliminary safety supervision work mainly includes the following aspects:

First, the construction design drawings are an important basis for the construction of the building. During the construction process of the construction project, the relevant requirements of the construction design drawings must be strictly followed to ensure the safety of the construction and the orderly construction. Therefore, strict approval of the construction design drawings is the first step in the preliminary preparations. When approving the construction design drawings, the relevant staff must be familiar with the construction design drawings, go deep into the construction site, and ensure the adaptability between the construction design drawings and the actual construction site. Questions should be communicated and communicated with the designer in a timely manner. If it is necessary to modify the design drawings, the effectiveness and rationality of the modification work must be guaranteed according to the specific conditions of the construction project. After the modification of the construction design drawings is completed, the review and approval work shall be carried out again.

Second, attach importance to the bottom line. Submission work mainly includes project delivery
and technical delivery. In the process of delivery, the supervisory staff and the construction staff must have a sufficient understanding and mastery of the actual conditions and technical requirements of the construction project. They must clarify the details of each construction process and carry out hidden safety hazards during the construction process. strict control. Once the potential safety hazards are found, they should be reported in a timely manner, and effective measures should be taken in time to control and deal with the potential safety hazards before the subsequent construction can be carried out. In the work of safety supervision and control, it is necessary to formulate a strict and effective safety supervision and control plan according to the specific conditions of the project, to ensure that the safety supervision and control work can be carried out smoothly, and to improve the positive role of safety supervision in the management of engineering projects.

Third, we must pay attention to the inspection of construction organization design and safe construction plan. In the process of inspecting the design of the construction organization and the safe construction plan, it is mainly to study the scientificity and operability of the implementation process to ensure that the project can be successfully launched. In the process of managing the design of the construction organization and the safe construction plan, if problems are found, they should be pointed out in a timely manner. At the same time, they should communicate with the construction personnel to improve and optimize the problems to ensure the scientific and rational. At the same time, it is necessary to strengthen the supervision of the implementation process of the construction design and safe construction plan, and to carry out the whole-process supervision to strictly control the implementation results.

Fourth, when carrying out safety supervision during the pre-construction period, it is necessary to inspect the overall ability and comprehensive quality of the construction supervision team, and at the same time strengthen the review of the construction personnel. When reviewing the construction personnel, it is mainly to review the qualifications of the construction unit and construction personnel. During the review process, the review process must be completed in strict accordance with the requirements of the construction personnel of the construction project to ensure that the professional skills of the construction personnel meet the construction requirements of the construction project. At the same time, special operators, such as welders, electricians, and operators of special machinery and equipment, need to strengthen their inspection efforts, and must ensure that special-type workers are certified to work in order to regulate the construction process [4].

Fifth, a comprehensive safety management system must be established in order to strictly supervise and urge the construction unit. The safety management system mainly performs safety supervision on all links of the entire engineering project. Therefore, the safety management system must have strong comprehensiveness and perfection. When formulating a safety management plan, full consideration must be given to the entire construction process of the project in order to ensure the feasibility of the safety management plan. During the implementation of the safety management system, specific construction safety responsibilities should be divided into each team and everyone, so as to improve the staff's awareness of safety responsibility. In addition, it is necessary to formulate emergency handling plans for some relatively dangerous local construction links. Once an accident is found, measures can be taken to remedy it in time, which can minimize the danger. In addition, it is necessary to strengthen the inspection and inspection work at the construction site, and to monitor and manage all links in the construction process and construction technology in order to ensure the overall construction safety of the construction project.

5. Safety Supervision Control During Construction Phase
In the supervision of construction safety, attention should be paid to the control of the construction process. In the safety supervision and control of the construction phase, effective safety control is mainly performed on the construction materials and construction machinery and equipment. The following aspects can be used to ensure the effectiveness of the safety supervision work.

First, strengthen the control of construction materials access. Before the construction materials enter the construction site, they must strictly review the performance test reports and qualification
certificates of the construction materials in accordance with relevant procedures and specifications to ensure that the quality of the construction materials meets the construction requirements before they can enter the construction site. Second, we must attach importance to the strict inspection of machinery and equipment entering the construction site, mainly inspecting the qualification certificates and quality assurance certificates of machinery and equipment. At the same time, it is necessary to formulate strict and effective machinery daily maintenance and maintenance work systems to ensure the performance and safety of machinery and equipment to prevent safety accidents caused by failures during the application of machinery and equipment. Thirdly, it is necessary to carry out regular inspections on safety protection facilities and protective devices, which are important equipment to prevent safety accidents during the construction process. When carrying out safety supervision, the safety protection facilities must be inspected regularly to ensure that the performance of the safety protection facilities meets the requirements. For example, safety helmets, steel buckles, and other items need to be retested before entering the site, and they can enter the construction site after retesting. Fourth, attention must be paid to construction safety monitoring in foundation pit engineering. If the depth of the foundation pit is more than 5 meters or the geological conditions are relatively complicated, a special excavation construction scheme must be formulated [5]. At the same time, the construction plan must be strictly reviewed to ensure that the construction plan meets the engineering design requirements before excavation can be carried out. During the excavation of the foundation pit, the supervisors must go to the site to supervise to ensure that the excavation construction process and construction safety requirements are met. In addition, strict and effective safety supervision and control work must be carried out in terms of electricity consumption, which can further improve the safety of engineering construction.

6. Conclusion
All in all, the safety supervision during the construction process of the construction project is integrated into the entire construction process, and it is an important foundation to ensure the safety and efficiency of the construction of the project. While performing quality management, cost management and construction period management of construction projects, construction safety supervision work must be properly treated. The importance of construction safety supervision work must be recognized in order to ensure that the safety supervision work can fully play its role. In the process of safety supervision, it is necessary to do a good job of safety supervision control and management before construction according to the actual situation of the construction project. At the same time, we must attach importance to safety supervision and construction control during the construction process. Supervisors must have a comprehensive understanding and mastery of safety supervision work, continuously improve their professional capabilities and comprehensive quality, timely identify problems existing in construction safety supervision, and propose effective measures to solve these problems in order to ensure the project effectiveness of safety supervision during construction. In order to ensure the safety of construction engineering construction, it is of great significance to promote the long-term sustainable development of China's construction engineering industry.

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