

Construction of Safety Culture and Performance Assessment in Construction Site of Building Engineering

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Abstract: This article focuses on the field of construction engineering, focusing on the construction of safety culture and performance assessment on the construction site. In view of the frequent occurrence of construction safety accidents, in order to improve the safety of construction projects and the sustainable development ability of the industry, this article conducts research through theoretical analysis, system construction and other methods. In this article, the connotation and characteristics of safety culture are analyzed, and it is clear that the construction covers the cultivation of safety concept and system construction, which is influenced by internal and external factors such as enterprise management style and industry policy. In the study, a performance assessment system is constructed, including the first-level indicators such as safety concept cognition and the corresponding second-level indicators, and the assessment method is determined. Based on this system, formulating performance improvement strategies such as strengthening concept dissemination and optimizing system implementation can effectively improve the performance of safety culture construction, provide scientific basis and feasible path for safety management in construction site, and help the safe development of the industry.

1. Introduction

As a key field to promote social development and economic construction, the safety situation of construction site has always attracted much attention ^[1]. In recent years, although the construction industry has made remarkable progress in technology and management, construction safety accidents still occur from time to time, which has brought negative effects on people's lives, property and social stability ^[2]. In this context, strengthening the construction of safety culture in construction site and scientifically evaluating its performance have become an important issue to be solved urgently in the construction industry ^[3]. As an advanced management concept, safety culture can fundamentally affect the safety awareness and behavior of construction personnel, thus effectively reducing the accident risk. The introduction of safety culture construction in the construction site of building engineering is helpful to create a good safety atmosphere and make safety awareness penetrate into the hearts of each participant ^[4]. Performance assessment provides a quantitative means to measure the effectiveness of safety culture construction. Through the assessment and analysis of various indicators, problems and deficiencies in the process of safety culture construction can be found in time, and then targeted improvement measures can be taken to enhance the construction effect ^[5].

The research on safety culture construction and performance assessment of construction site can enrich and improve the theoretical system of construction project management, and provide a new perspective and method for subsequent related research ^[6]. In-depth development of this research will also help construction enterprises to formulate more scientific and reasonable safety management strategies, improve the safety management level of the construction site and ensure the smooth progress of the project ^[7]. This can also provide decision-making basis for government supervision departments, help them strengthen supervision over construction safety and promote the healthy development of the whole industry. In view of this, it is of great practical significance to explore the construction and performance assessment of safety culture in construction site, whether

for improving the safety of construction projects or promoting the sustainable development of construction industry. This article will carry out a systematic study around this theme, aiming at providing useful reference for solving the safety problems in construction sites.

2. Connotation and characteristics of safety culture in construction site

The construction site safety culture of building engineering has rich and unique connotations. It takes construction safety as the core, and it is the sum of a set of safety values, safety codes of conduct and safety management concepts gradually formed by construction enterprises in the long-term project construction process ^[8]. Safety culture is not only embodied in rules and regulations, but also permeated in the daily behavior and thinking mode of construction workers. It guides the construction workers to pay attention to safety from the bottom of their hearts, actively abide by safety regulations, and form a conscious habit of safety behavior.

The safety culture in this scene has obvious characteristics. The first is complexity. The construction of building engineering involves many links, multiple technologies and a large number of people, and all the elements are intertwined, which makes it necessary to comprehensively consider all factors in the construction of safety culture. Secondly, it is dynamic, and the construction process is constantly changing with time. From foundation construction to main construction to decoration, different stages face different safety risks, and the safety culture needs to be adjusted and improved accordingly ^[9]. Furthermore, it is practical. The safety culture of construction site is not an abstract theory, but closely combined with the actual construction operation, which can be reflected through specific safety measures and behavior norms, and directly serves the construction safety practice. Finally, it is all-staff. The construction of safety culture is related to everyone on the construction site, from managers to front-line workers, all of whom play an important role. Only when all staff participate and practice together can a good safety culture atmosphere be truly created.

3. Content and influencing factors of safety culture construction in construction site of building engineering

The construction of safety culture in the construction site of building engineering covers many key contents and is influenced by many factors. A deep understanding of these contents and factors is very important to promote the construction of safety culture. The content of safety culture construction is primarily the cultivation of safety concept. Construction enterprises need to convey correct safety values to all staff, so that the idea of "safety first" is deeply rooted in people's hearts. For example, through regular safety training lectures, safety knowledge contests and other activities, personnel's awareness of the importance of safety will be strengthened. Secondly, the construction of safety system, perfect and strict safety system is the cornerstone of safety culture. It covers all aspects of the system, from daily operation specifications to safety inspection procedures and accident emergency plans, to ensure that the construction process has rules to follow. Furthermore, it is safety behavior guidance. Through publicity, education, supervision and assessment, construction personnel are encouraged to develop good safety behavior habits and prevent illegal operations. Finally, the creation of a safe environment, creating a safe and comfortable construction environment, from hardware facilities to the setting of on-site safety signs, will help strengthen the safety awareness of personnel. There are many factors affecting the construction of safety culture in construction site, which can be divided into internal and external factors, as shown in Figure 1:

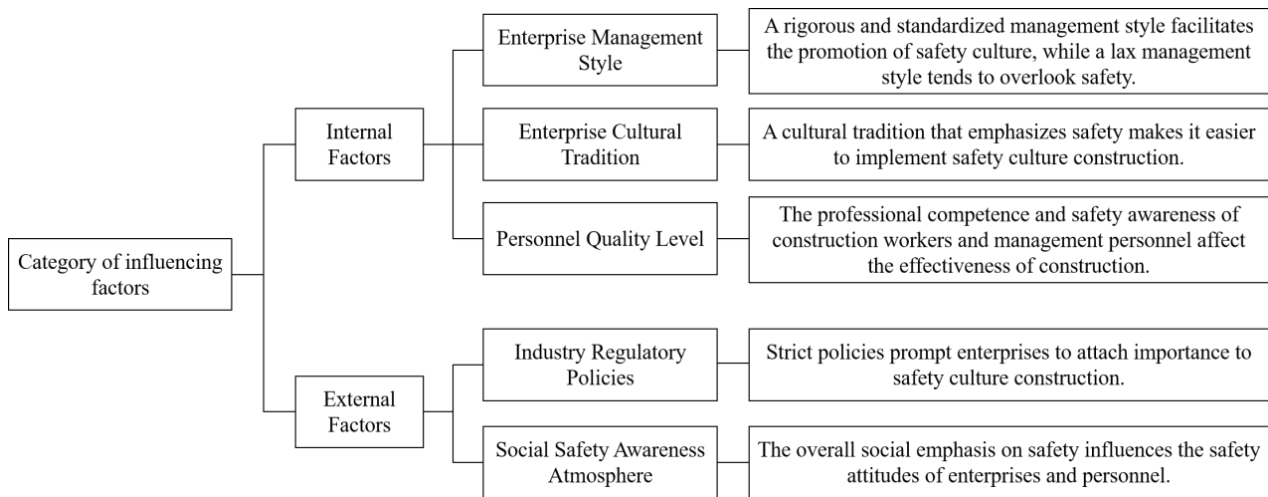


Figure 1 Influencing Factors of Safety Culture Construction at Construction Sites of Building Engineering Projects

From the internal factors, enterprise management style plays a key role. If enterprises adopt refined management and strictly control the safety management links, the construction of safety culture can be promoted in an orderly manner. The corporate culture tradition should not be underestimated. Employees of enterprises with profound safety culture are more likely to accept and practice the safety concept. The quality level of personnel also has a significant impact. People with high quality and high safety awareness can adapt to and participate in the construction of safety culture more quickly. Among the external factors, industry supervision policy is an important driving force. Government departments have issued strict safety supervision policies and severely punished violations, which can effectively urge enterprises to strengthen the construction of safety culture. The atmosphere of social safety awareness can not be ignored. When the whole society is highly concerned about safety, enterprises will actively invest resources in safety culture construction, and construction workers will consciously abide by safety regulations. A comprehensive understanding of these construction contents and influencing factors is an important prerequisite for improving the level of safety culture construction in construction sites.

4. Construction of performance assessment system of safety culture in construction site of building engineering

It is very important to construct a scientific and reasonable performance assessment system of safety culture in construction site for accurately measuring the effectiveness of safety culture construction, finding existing problems and promoting improvement. The construction of performance assessment system should follow a series of principles. The scientific principle requires the index system to be based on rigorous theory and practical experience, which can accurately reflect the actual situation of safety culture construction. Practical principles emphasized that the assessment system should be easy to operate, and the data can be easily obtained and analyzed, which can provide effective support for actual management decisions. The principle of comprehensiveness ensures that the assessment covers all aspects of safety culture construction and does not miss key elements. The dynamic principle takes into account the changing characteristics of the construction site, so that the assessment system can meet the requirements of different stages and conditions. When determining the assessment index, various factors need to be comprehensively considered, as shown in Figure 2:

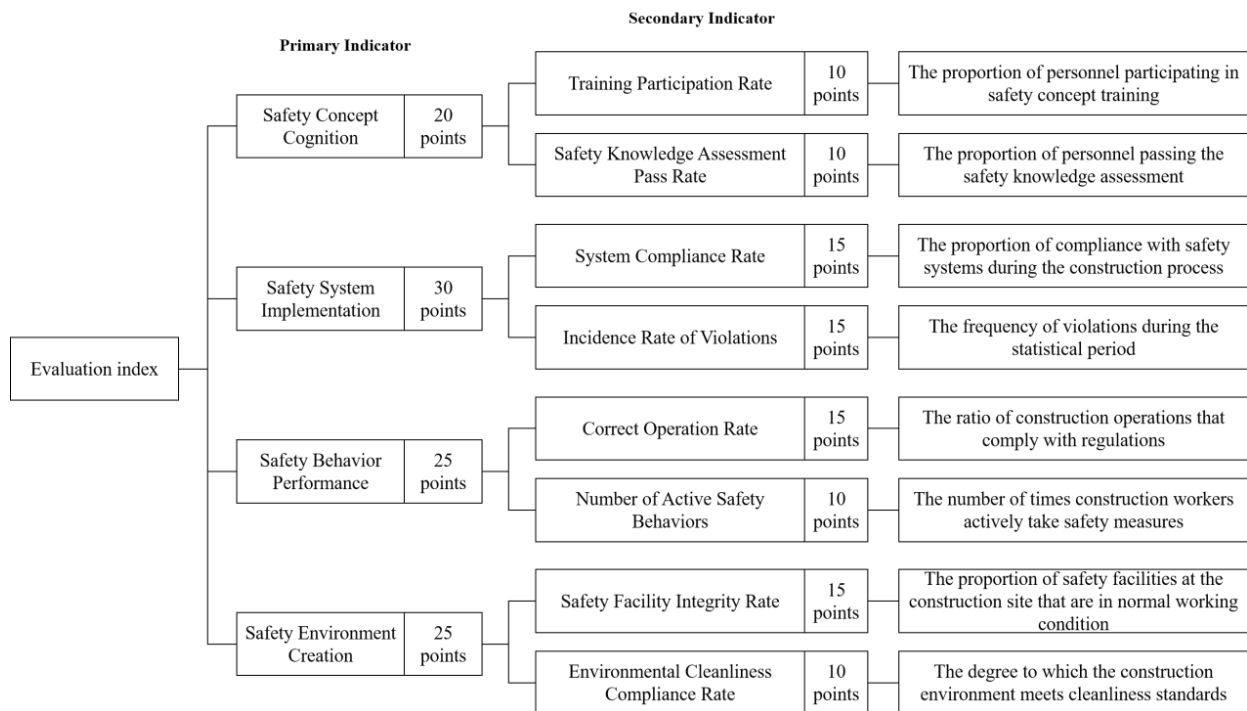


Figure 2 Performance Assessment Indicators for Safety Culture at Construction Sites of Building Engineering Projects

In terms of safety concept cognition, the participation rate of training and the pass rate of safety knowledge examination reflect the acceptance and mastery of safety concept by construction personnel. The implementation of the safety system is measured by the compliance rate of the system and the occurrence rate of violations, which reflects the implementation of the safety system in the construction site. The correct operation rate and the number of active safety behaviors in the performance of safety behaviors directly show whether the daily behaviors of construction workers meet the safety requirements and their enthusiasm for actively maintaining safety. Safe environment construction evaluates the support of the hardware environment on the construction site for safety culture by means of the intact rate of safety facilities and the compliance rate of clean environment.

In the assessment method, AHP can be combined with fuzzy comprehensive assessment method. Analytic Hierarchy Process is used to determine the weight of each index, which makes the assessment more scientific. The fuzzy comprehensive assessment method deals with the fuzziness and uncertainty in the assessment, and comprehensively considers multiple factors to get the final assessment result. Through the construction of such a performance assessment system, we can comprehensively and objectively evaluate the performance of safety culture construction in construction site, and provide a strong basis for continuous improvement.

5. Performance improvement strategy based on safety culture construction

In order to effectively improve the performance of safety culture construction in construction site, it is necessary to formulate and implement targeted strategies from several key aspects. These strategies are interrelated and promote each other, and jointly build a perfect promotion system. Construction enterprises should carry out diversified safety training activities, including not only traditional classroom teaching, but also interactive methods such as case analysis and simulation drills, so as to enhance construction personnel's understanding and recognition of safety concepts. At the same time, construction enterprises can make use of publicity columns, radio and other channels on the construction site to continuously publicize safety knowledge and safety culture concepts and create a strong safety atmosphere. Optimizing the implementation of safety system is the key. Enterprises should refine the safety system and make clear the specific safety operation requirements of each post and each construction link. Enterprises need to establish a strict

supervision and assessment mechanism, regularly check the implementation of the system, reward those who abide by the system, and severely deal with those who violate the rules. Improving the safety literacy of construction personnel can not be ignored. On the one hand, enterprises should strengthen the safety skills training for construction personnel, so that they can master the construction operation norms and safety protection skills skillfully; On the other hand, pay attention to cultivating the safety awareness and sense of responsibility of construction personnel, and guide them to actively pay attention to safety and abide by safety regulations through incentive mechanism and corporate culture. It is also very important to plan the layout of the construction site reasonably to ensure the smooth construction channels and orderly stacking of materials. Enterprises should update and maintain safety facilities in time to ensure their good performance and reliable operation; Strengthen the health management of the construction site and keep the environment clean and tidy. The performance improvement strategy based on safety culture construction is shown in Figure 3:

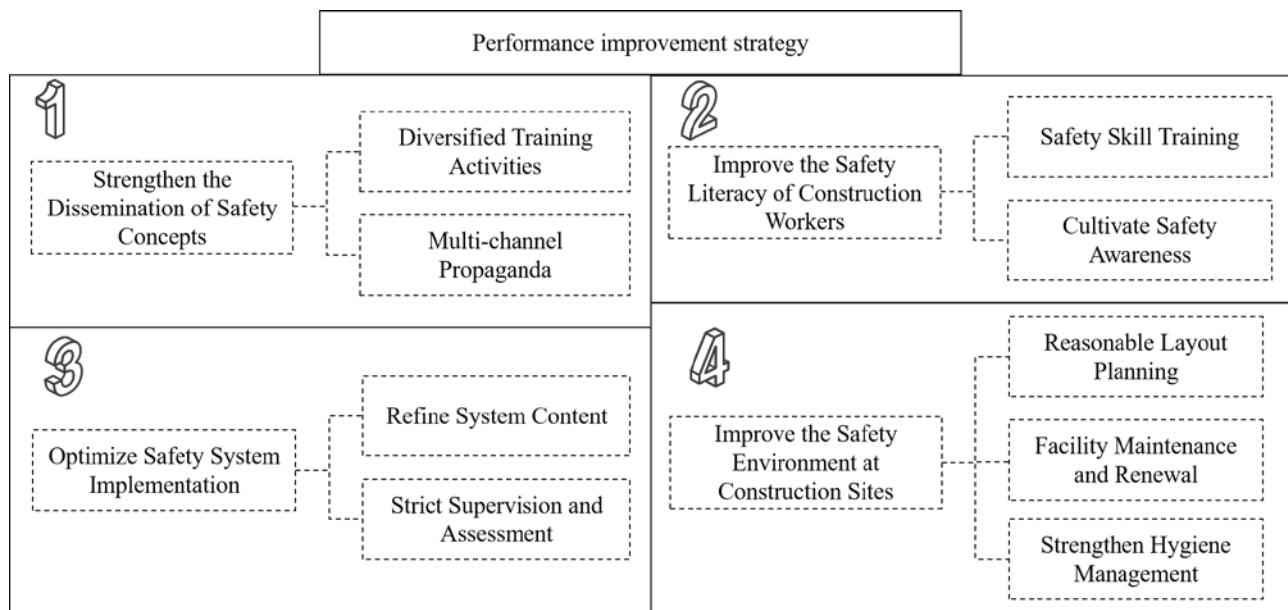


Figure 3 Performance Improvement Strategies Based on Safety Culture Construction

If the above-mentioned performance improvement strategy based on safety culture construction is adopted, the performance of safety culture construction on the construction site of construction projects will be significantly improved from the perspectives of concept dissemination, system implementation, personnel literacy improvement and environmental improvement, and it will be steadily promoted in strict accordance with the implementation points. With the improvement of this performance, the construction safety risk will be effectively reduced, thus providing a solid guarantee for the smooth development of the project.

6. Conclusions

In this article, the construction of safety culture and performance assessment on the construction site of building engineering are studied in depth, and a series of practical guiding results are obtained.

In terms of the connotation and characteristics of safety culture, the article makes it clear that it takes construction safety as the core, which is a set of values, codes of conduct and management concepts, and has the characteristics of complexity, dynamics, practicality and comprehensiveness. These characteristics determine that the construction of safety culture needs to be comprehensively, systematically and continuously promoted. According to the content of safety culture construction, the key aspects such as the cultivation of safety concept, the construction of safety system, the guidance of safety behavior and the creation of safety environment are determined. At the same time, it is found that it is influenced by internal enterprise management style, cultural tradition,

personnel quality, external industry supervision policy, social security awareness atmosphere and other factors. All factors are intertwined and work together in the process of safety culture construction. By constructing a scientific performance assessment system, setting the first-level indicators and sub-level indicators such as safety concept cognition, safety system implementation, safety behavior performance and safety environment creation, and combining analytic hierarchy process and fuzzy comprehensive assessment method, the comprehensive and objective measurement of safety culture construction performance is realized.

Based on the above research, the performance improvement strategies proposed in this article, such as strengthening the dissemination of safety concepts, optimizing the implementation of safety system, improving the safety literacy of construction personnel and improving the safety environment of construction site, have formed an organic whole and provided strong support for improving the performance of safety culture construction from different levels. This study provides a relatively complete theoretical framework and practical guidance for the construction of safety culture in construction site, which is helpful for construction enterprises to improve safety management level, reduce accident risk and promote the development of construction industry in a safer and more sustainable direction. Future research can further deepen the discussion on the quantitative relationship of various influencing factors and how to feed back the performance assessment results to the practice of safety culture construction more effectively.

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