

Construction Safety Management of High-Rise Buildings under the Basic Principles of Disaster Sociology

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Abstract: In order to reduce the risk of accidents in high-rise building construction, firstly, the potential disaster risk factors in the construction of high-rise buildings were systematically analyzed, including the distortion of accident information transmission, the lack of morality during disasters, the danger of high-altitude work, the complexity of the intersection of types of work, and the non-professionalism of construction management. Secondly, this paper focuses on the analysis of the current problems in the construction safety management of high-rise buildings, and considers the social risk factors, including the distortion of safety accident transmission, the lack of morality during disasters and the disaster safety awareness of construction personnel. Finally, from the perspective of disaster sociology, specific improvement measures for the safety management of high-rise building construction are proposed. The results show that social risk factors are equally important in construction safety management, which not only enriches the theoretical basis of construction safety management of high-rise buildings, but also provides a specific theoretical reference for safety management in practice.

Keywords: Disaster Sociology; High-Rise Buildings; Construction Safety Management.

1. Introduction

In the process of high-rise building construction, various disaster risks are everywhere, fire, collapse, fall from height and other disasters occur frequently, these disasters not only directly threaten the life safety of construction personnel, but also have a serious impact on the construction progress and project quality. The importance of construction safety management research of construction units cannot be ignored.

Bilal M [1] explored the safety factors affecting accidents in the construction of high-rise buildings by consulting the literature, and identified the safety technology to minimize accidents in high-rise building projects. Swaroop Devaiah K. L [2] used BIM 3D and Autodesk Revit to identify hazards and risks during the design phase and to implement and plan effective safety measures. Many scholars in China have also done a lot of research, Guo Dong [3] analyzed and studied from three aspects: construction management personnel management, equipment and machinery management, and equipment environmental management. Shi Zhengwei [4] analyzed the construction characteristics and safety management methods of high-rise buildings, and then proposed the application of BIM technology and "smart construction site" for construction safety management.

Through the research and analysis of scholars at home and abroad, it is concluded that the research on the safety management of high-rise building construction mainly focuses on the management of technical equipment and personnel, and the influencing factors on society and culture are mentioned. Starting from the basic principles of disaster sociology, the influencing factors of society and culture are added, so as to provide new ideas for the research on safety management of high-rise building construction.

2. An Overview of Theories Related to The Sociology of Disasters

2.1. Research Content

Disaster sociology is a branch of sociology that studies the phenomenon of disasters and their interrelationships with social structure, culture, economy, politics and other aspects. The causes, evolution, social impact and social response mechanisms of disasters are deeply discussed, so as to provide a scientific basis for disaster prevention, post-disaster recovery and reconstruction. The research content of disaster sociology not only covers the natural factors of disasters, but also focuses on the analysis of the important role of social factors in the formation, evolution and response of disasters.

2.2. The Social Nature of Disasters

The basic principles of disaster sociology emphasize the social nature of disasters, and the so-called disasters refer to social events that are caused by natural and social reasons that are abnormally interrupted in the process of satisfying human needs, so that people's survival and development are seriously hindered and destroyed [5].

The overall characteristics of disasters are duality [6], including the destructive nature of human social activities to the natural environment, the enthusiasm of human beings for the construction of modern science and technology, the wanton extraction from nature, the satisfaction of their own desires, the destruction of the natural environment, causing environmental pollution, resource depletion and other natural disasters. At the same time, disasters are also destructive to human social activities, mainly manifested in the destruction of human life, human property security and living environment.

Nowadays is the era of developed media, once a safety accident occurs in a construction project, if there is a bad

media in order to win traffic, false rumors, exaggerate the facts, it will have an impact on the social reputation and brand image of the construction enterprise, and more importantly, cause the public to fall into panic, seriously affecting the social order.

2.3. Continuity of Disasters

The continuity of disasters is mainly reflected in the development process of the disaster event itself and the persistence of its subsequent impacts. The occurrence of one disaster may induce or exacerbate another disaster, forming a chain of disasters [7], and its effects are continuous and cumulative in time and space. In addition, post-disaster recovery and reconstruction is a long-term process that requires sustained resource investment, policy support and social participation.

3. High-rise Building Construction Safety Management Risk Analysis

3.1. Distortion of Accident Information Dissemination

Due to misunderstandings or misinformation in the process of information dissemination, or some media exaggerate facts and one-sided interpretation for the purpose of attracting attention and creating topics; In addition, the public is the main recipient group of information, and the way the public receives information includes other people's notices, media publicity and network media platforms, and the information disseminated by these methods has lost a certain degree of accuracy, coupled with personal subjective assumptions and misunderstandings, will make the accident information lose accuracy in the process of dissemination.

The complexity and professionalism of building construction are also one of the factors that distort information dissemination. The complexity of building construction is manifested in many aspects, including construction environment, construction technology, construction management, etc., if an engineering accident occurs, due to the complex environment and uncertainty of the site, the information cannot be integrated and processed in time, and it will be spread out without verification, resulting in a wide range of false information spreading, affecting the normal construction order, and even having a negative impact on the social order.

3.2. Lack of Morality in Times of Disaster

Moral behavior in times of disaster is a comprehensive social phenomenon, and the tenacity and fearlessness shown by some people when they are hit by disasters are of great significance to disaster relief. On the contrary, in the face of disasters and accidents, some construction personnel and safety management personnel due to fear and self-preservation, which makes them do some unethical things, ignore the safety of others' lives and property for their own safety, and even do harm to others. Some managers lack a sense of responsibility and professional ethics, have no sense of urgency when disasters occur, underestimate the severity of disasters, and lack safety awareness and good professional ethics, resulting in serious consequences.

Attention should be paid to the unethical behavior during the construction disaster, which not only affects the image of the construction enterprise, but also seriously damages the morality of the society.

3.3. The Danger of Working at Height

Due to the high construction height, if a fall accident occurs, it will cause serious physical and psychological injuries to the construction personnel, and at the same time, it will also have a huge impact on the psychology of their family members. Working at height also faces a variety of potential risks, such as tower crane tipping, fire accidents, electric shock accidents, and mechanical injuries. In addition, the complexity of aerial work operations increases the danger, and in the limited operating space, construction personnel need to deal with a variety of complex construction conditions and mechanical operations, if there is improper operation of instruments or equipment failure, it may cause serious engineering accidents.

3.4. The Complexity of the Intersection of Types of Work

The construction of high-rise buildings involves many professional fields, including water supply and drainage, electrical and HVAC, etc., in addition to the construction of the main structure of the building itself, including water supply and drainage, electrical and HVAC, etc., these professionals need to cooperate closely in the construction process to form complex cross-operations. The limitation of construction space leads to different types of work working in a narrow area, which increases the difficulty of construction coordination and management. In addition, the construction period of high-rise buildings is long and the amount of tasks is large, and how to arrange the construction scientifically and safely in a limited time is a big challenge for the on-site construction management personnel.

3.5. Non-professionalism of Construction Management

The professionalism of construction safety managers plays a crucial role in preventing the occurrence of disaster risk accidents. Non-professional safety management personnel do not have profound theoretical and practical experience, are not proficient in the use of various construction equipment and tools, and are unable to quickly identify potential risk factors and take effective preventive measures in the face of complex construction environments.

Professional safety management personnel should have both emergency management capabilities and good communication skills, and in the event of a disaster, the management personnel should quickly respond correctly and take appropriate measures to minimize the losses caused by the accident.

4. Problems in the Safety Management of High-Rise Building Construction

4.1. Distortion of Information Dissemination of Security Accidents Leads to a Crisis of Social Trust

In today's era of self-media, the dissemination of information on construction safety accidents is often accompanied by the risk of distortion. On the one hand, in order to gain traffic, some self-media personnel wantonly exaggerate the seriousness of the accident on the Internet, add false information, one-sided interpretation, and spread it rapidly, resulting in panic among the public and disrupting the normal social order; On the other hand, due to the relatively large scale of the construction project and the large number of

participants, the information dissemination process is prone to poor conditions, resulting in the omission of information in the process of dissemination, thereby losing a certain accuracy, which not only affects the reputation of the construction enterprise, but also greatly reduces the public trust, which is not conducive to the development of the construction enterprise.

4.2. Lack of Morality in Times of Disaster Exacerbates the Consequences of Disasters

In the aftermath of an accident, an effective response at the first time is crucial. In construction, there is a tendency for construction personnel to report to the safety management personnel in a timely manner when there is a trend of safety accidents, or to cause minor accident risks due to their own reasons, conceal the truth, and do not take timely remedial measures, because of the lack of personal professional ethics, and finally cause serious engineering accidents. In addition, after the occurrence of an engineering accident, the construction unit mainly considers the economic benefits, chooses to conceal the accident information, and shirks the responsibility, resulting in the missed best rescue opportunity and further expanding the disaster loss.

4.3. The Safety Management System is Not Perfect, and It is Difficult to Cope with the Challenges of Disasters

The construction technology, construction environment of high-rise buildings are relatively complex, and it is imperative to establish a scientific and safe management system. However, at this stage, many construction enterprises are not perfect in the construction safety management system, such as the lack of supervision and management of the whole process of the construction site, the specific management of labor and technology, especially the construction site management, mainly based on the subjective assumption of the management personnel, when the builder has illegal construction operations, the management personnel on the spot after inspection, self-judgment, still continue to build, to the safety and quality of the construction brings great hidden dangers. Secondly, there is a lack of clarity in the responsibilities of various departments, and when there is a safety accident, it is uncertain that it is not within the management scope of its own department, resulting in various departments shirking their responsibilities to each other, not responding to accidents in a timely manner, and increasing disaster losses.

4.4. Weak Awareness of Disaster Risk and Lack of Comprehensive Prevention Concept

The lack of safety education and training for construction personnel in construction enterprises leads to the lack of correct understanding and vigilance of construction personnel on potential safety risks. From a sociological point of view, some front-line construction workers belong to the "vulnerable group", they have a relatively low level of education, and they do not have a clear understanding of the content of safety training. Their professional skills may be low, their knowledge of safe operations is insufficient, and they cannot meet safety standards during construction. The awareness of disaster risk is also relatively weak, and unsafe behaviors such as not wearing safety helmets and not wearing

safety ropes have occurred, resulting in personal safety accidents.

The construction unit pays more attention to the construction progress and economic benefits, and ignores the prevention and control of disaster risks, such as the lack of safety warning signs on the construction site, and the safety training is not in place, which leads to the lack of preventive measures and increases the risk of engineering accidents.

4.5. The Professionalism of the Safety Management Personnel is not Strong, and the Implementation of the Task is Not in Place

The lack of professionalism is reflected in the lack of theoretical knowledge and practical skills of safety management personnel, the lack of in-depth understanding of safety norms and operation methods, their inability to accurately identify potential risks on the construction site to a certain extent, the lack of adaptability, and the inability to take safe and effective countermeasures when there is an emergency.

The lack of implementation of tasks is the deficiency of safety management at the implementation level. Even if there are well-established safety systems and plans, they will be useless if they cannot be effectively implemented by safety managers. There is dereliction of duty and lack of professional responsibility, which eventually leads to the occurrence of disasters and accidents.

5. Measures to Improve the Safety Management of High-Rise Building Construction

5.1. Establish a Strict Information Disclosure Mechanism to Strengthen Media Supervision and Public Information Literacy

The construction unit should use big data, artificial intelligence and other scientific and technological means to build a scientific and efficient information disclosure platform, set up a special information review team, when an engineering accident occurs, the inaccurate and incomplete information is screened out, the information is repeatedly checked, and the accuracy of the information source is ensured, so as to ensure the timeliness and accuracy of safety accident information and reduce the risk of distortion of information dissemination.

Media platforms should strictly review reports that have a greater impact on society to avoid the rapid spread of false information, and the internet supervision departments should also strengthen supervision of media platforms. At the same time, each community should regularly hold information education and publicity activities to improve the public's ability to judge information, reduce social panic caused by information distortion, and maintain the brand image of construction enterprises through scientific and effective methods.

5.2. Strengthen the Construction of Corporate Culture and Morality, and Improve Laws, Regulations and Regulatory Systems

Corporate culture is the soul of an enterprise, which

directly affects the behavior and decision-making of employees. Therefore, construction enterprises should pay attention to the construction of corporate culture, integrate core values such as safety, integrity, and responsibility into the corporate culture, so that employees can form correct moral concepts imperceptibly. At the same time, strengthen professional ethics education, so that employees are aware of their professional ethics responsibilities, and clarify their responsibilities and obligations in the event of an accident.

The government should strengthen the supervision of construction enterprises, improve industry laws and regulations, and clarify the responsibilities and obligations of construction enterprises in safety management. Increase the punishment of violations of laws and regulations, and make those who violate laws and regulations pay the due price. In addition, establish a sound safety production supervision system, conduct regular inspections and evaluations of construction enterprises, and ensure the scientificity of enterprise safety production management.

5.3. Improve the Construction Safety Management System and Build a Multi-Layer Protective Barrier

From the analysis of the theory of disaster sociology, the occurrence of disaster risk is often related to the defects of the management system. Improving the construction safety management system and building a multi-layer protective barrier are important measures for the construction safety management of high-rise buildings. The construction unit can build and improve the construction safety management system in accordance with the "one case, three systems" model of China's disaster emergency management system.

"One case" refers to the emergency plan, which is formulated according to the specific project undertaken by the construction unit, and can respond quickly and effectively when an accident or natural disaster occurs. The "three systems" include the construction of an emergency management system, an emergency operation mechanism, and a legal system for emergency management. At the same time, we conduct safety training and disaster prevention drills. Actively building a sound construction safety management system and strengthening supervision and control are the prerequisites for ensuring construction safety [8].

5.4. Strengthen Disaster Risk Awareness Education and Enhance the Safety Awareness of All Employees

Cultivating awareness of disaster risk is a prerequisite for disaster prevention. In building construction, it should be fully recognized that construction personnel are key participants in safety management.

Establish the policy of safety production first, especially the front-line construction personnel, should carry out regular safety training, comprehensively strengthen the disaster risk safety awareness of construction personnel, continuously improve the self-safety prevention ability of construction personnel, and focus on the interpretation of relevant safety production regulations and demonstrate the correct use of construction equipment for the "vulnerable groups" among construction personnel. Carry out safety education activities through specific safety accident cases, so that construction personnel can more clearly understand the causes of various disaster risk accidents, prevent them everywhere in future

production and life, and complete construction tasks safely.

5.5. Improve the Professional Quality of Construction Management Personnel and Strengthen Disaster Risk Management Capabilities

When recruiting managers, their professional knowledge and practical experience are assessed in all aspects. In addition, the professional training of construction managers, especially in the field of disaster risk management, is carried out through the organization of regular training courses, such as online publicity, inviting industry experts to give lectures and going out to exchange and learn. At the same time, the establishment of a training system for construction safety management personnel, clear training objectives, the development of training plans, and the arrangement of skilled and experienced veteran employees "one-to-one" mentorship guidance, which not only improves the professional skills of safety management personnel, but also enhances the cohesion of the safety team.

Establish an assessment and incentive mechanism to regularly evaluate the professionalism of managers. By holding professional knowledge competitions, we will reward and encourage outstanding management personnel, continuously motivate management personnel to improve their professional quality, learn professional skills, and provide excellent talent guarantee for construction safety management.

6. Conclusion

From the new perspective of disaster sociology, this paper analyzes the risk of construction safety management, and the research results show that the safety management of high-rise building construction should not only consider the factors of equipment, environment and personnel, but also comprehensively consider the factors of society and disaster culture. Strengthen the corporate moral culture, establish a scientific and safe construction management system, focus on the "vulnerable groups" in the front-line construction personnel, set up safety management personnel, improve professional knowledge, and perform their duties. By optimizing construction safety management, construction projects can continue to operate safely and provide a guarantee for the sustainable development of the construction industry.

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