Research on the Construction of Construction Safety Hazard Investigation and Management System for Municipal Engineering

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Received: July 15, 2023
Accepted: August 12, 2023
Published: September 8, 2023

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Abstract

The investigation and treatment of safety hazards is an inevitable requirement to reduce the number of municipal engineering accidents and to guarantee the safety of municipal engineering construction. Ministry of Housing and Construction statement: sound control system, investigation of safety hazards, pay close attention to the hidden danger rectification as a key task. Safety hazards are manifested in all walks of life, among which engineering construction is a prominent representative. At the present stage, the way to solve safety hazards is not perfect. In order to solve the above-mentioned problems, this paper starts from the theoretical basis of safety hazards and constructs a system for the investigation and management of safety hazards in municipal engineering. The research of this paper can promote the progress and development of safety hazard investigation and management. On the one hand, it can deal with relevant construction problems scientifically and reasonably, effectively avoid the emergence of construction risks and ensure the construction quality and construction safety, on the other hand, it can also bring more economic and social benefits to the construction unit and bring more social and economic benefits to the construction of municipal engineering in China.

Keywords

Municipal engineering, safety hazards, hidden danger investigation, system construction

1. Introduction

Safety hazards are regarded as the cause of many accidents in construction projects, and the prior investigation of safety hazards can be effective for a rainy day. Safe and civilized construction is a key part of municipal construction projects and the level of management ability and professionalism of the construction unit is able to be reflected by the on-site construction situation therefore, construction enterprises want a good image; they should carry out safe construction [1]. Construction management should be fully integrated with municipal construction, standardize the guidelines of engineering construction, ensure construction safety, and facilitate the maintenance of normal urban order.

In recent years, China's population urbanization form more and more aggravated, the urban population increases, the corresponding behind the living facilities will also increase. With the increasing number of urban population, the required supporting living facilities are also gradually improved, water, electricity, coal, natural gas, bridge and road construction, rail transit through, almost from a city life perspective throughout the future economic direction of the city. To ensure the safety of municipal engineering construction, then it is necessary to check its safety hazards in advance, which can not only improve the construction standard of our municipal engineering construction, but also help to reduce the occurrence of relevant safety accidents and improve the happiness index of urban residents [2]. In this paper, we start from the theoretical basis of safety hazards and build a system for the investigation and management of safety ha-
zards in municipal engineering. It is hoped that it can provide useful reference experience for the investigation and management of safety hazards in China.

2. Theoretical Overview

2.1 Municipal engineering construction

Municipal engineering refers to the construction of municipal facilities, which covers a wide range of urban life, covering all aspects of the residents' living and walking, the most representative is the rail transit, roads, bridges, etc., and with a variety of living pipeline network. For a complete city, the importance of municipal engineering safety construction is self-evident.

Municipal engineering construction has the characteristics of complex construction environment, high construction intensity, and more crossover operations. First of all, in the process of municipal engineering construction, most of the cases are open-air operations, weather and natural environmental factors can easily affect the efficiency and progress of construction, and municipal engineering construction is generally located in the densely populated urban areas, which needs to face the complex traffic situation; secondly, most of the municipal engineering construction is in the bustling town, large construction equipment is difficult to play a role in helping, and most of the construction personnel manually. The construction time of municipal engineering is long, so the concentration of the construction personnel is particularly tested, so it is easy for the construction personnel to lose concentration due to physical and mental fatigue, which also brings greater safety risks to a certain extent; finally, the principle of municipal engineering construction is "underground first, then above ground. Finally, the principle of municipal engineering construction is "underground first, then above ground", to ensure the implementation of urban underground pipelines and road projects simultaneously [3], this construction method will lead to a large number of "cross work" situation, there is a high possibility of multiple teams working together, assuming the emergence of management loopholes, may have an impact on the surrounding buildings, residents' lives, and even The normal operation of water, electricity and natural gas in the area will be affected.

2.2 Safety hazard investigation and management

Safety hazards refer to a potentially dangerous state of production sites, machinery and appliances, and personnel in daily human activities (generally referred to as production activities), and also refer to unsafe factors that can lead to safety threats to personnel and economic losses. The State Ministry of Emergency Management has pointed out that safety hazards are unsafe behaviors, unsafe factors and management defects that may cause safety accidents in its survival and operation activities due to the failure of the unit to strictly comply with the laws and regulations related to production safety management or other factors. Safety hazards can pose a serious threat to the relevant construction operations, the personal safety of production personnel, and the property safety of the enterprise and the state society. As a kind of disaster invisible to human eyes, safety hazards have hidden characteristics [3]. "Under a certain basis, safety hazards may be a stable and spontaneous state, which is easy to be ignored by relevant personnel. Based on the law of "quantitative change causes qualitative change", safety hazards are also covered, and only by deploying all aspects of safety hazards in place can the safety of production and construction be greatly improved.

3. Establish a system for investigating and managing safety hazards

3.1 Organization and system establishment

In recent years, the rise of the construction industry is evident to the national, the reason behind it, the country's need for talent, resulting in most young people choose to go to the city to develop and choose to settle in the city, thus making urban housing in short supply, driving the development of the construction industry. However, its quality is difficult to guarantee, and construction safety accidents are numerous. In order to implement safety management and improve the detection of hidden dangers, it is especially important to establish a reasonable set of organizations. A reasonable set of organization should be composed of three parts: site safety officer, project department safety supervision department, and the department responsible for hidden dangers. The site safety officer is responsible for pre-shift inspection of the working environment, inspection of hidden dangers during operation and inspection of safe and civilized construction at the end of shift; collecting and organizing relevant information, filling out the log of safe and civilized construction management; finding hidden dangers and rectifying them in time, and informing the successor of the hidden dangers that cannot be rectified [4]. The Safety Supervision Department of the project department is responsible for weekly safety inspection of the construction site; filling out the safety and civilized construction checklist and safety inspection record sheet; pointing out and urging rectification to the hidden-danger unit for problems; and inspecting the project and industry data every month. The department responsible for the hidden danger is responsible for rectifying the hidden danger of safety and civilized construction checked out and feeding back the rectification situation to the safety and
In order to implement good safety management, a set of scientific system is the key that can substantially improve the level of construction works. If it can be implemented well, firstly, it can reduce our annual economic loss of tens of billions of dollars and thousands of casualties; secondly, it can greatly reduce the safety hazard accidents in the construction industry and improve the safety factor of the whole industry.

3.2 The method of security hazard identification

Intelligent safety hazard inspection is a more extensive and comprehensive inspection than traditional manual inspection, and is an important supplement to traditional manual inspection. It covers the relevant personnel, equipment and facilities, environmental changes and other aspects, and these potential safety hazards to monitor and comprehensive analysis. The current Internet of Things technology also establishes the basis for "monitoring and coordination", such as the movement of personnel trajectory, equipment and facilities safety, environmental changes and other factors to monitor the implementation of the maximum extent of the hidden danger investigation, thereby reducing the possibility of accidents.

(1) Human factors: location tracing (area access), video monitoring (behavior identification), safety reminders (notifications and alarms).
(2) Physical factors: impact area detection, equipment status abnormality detection.
(3) Environmental factors: mobile video, online monitoring of environmental protection, six-factor weather station (temperature, humidity, air pressure, rainfall, wind direction, wind speed).

3.3 Requirements for the management of security hazards

(1) The hidden danger management should meet a series of requirements issued by the relevant state departments, and ensure that the "five in place", that is, the five aspects of the plan, responsibility, time limit, measures, funds.
(2) When the hidden danger work cannot be done without fail, all the people must be evacuated from the area, ensure the orderly evacuation, set up warning signs, and stop all the activities of the people concerned, so as to avoid casualties to the greatest extent possible. For mechanical equipment and facilities that may be involved in safety accidents, strict control and inspection must be carried out, and a special mechanical equipment failure investigation team must be set up to strictly investigate and report the equipment and facilities involved in accidents to prevent accidents from happening again.
(3) For safety hazards that may cause accidents due to natural disasters, enterprises must do a good job of publicity on a daily basis and develop a good backup strategy in advance in case of mishaps in accordance with industry as well as national standards. When a serious natural disaster forecast is received a notice must be issued to show the alert; in case of a natural disaster, measures such as stopping production and evacuating people must be invoked and reported in a timely manner.

3.4 Safety hazard management process

The process of accidental hazard management is shown in Figure 1.

Figure 1. Accidental hidden danger management process.

3.5 Evaluation of safety hazard management

The evaluation of safety hazard management, that is, the results of safety hazard investigation, so as to make feedback, so that "if there is a correction, there is no correction", and the evaluation includes the following specific points.

(1) Self-investigation rate of hidden danger: Calculate the ratio of the number of hidden danger of a sub-section to the overall number of hidden danger within the enterprise. Self-checking rate of hidden danger = the number of hidden danger of a sub-project / (the number of hidden danger of a sub-project + the number of all hidden danger of the enterprise).
prise) \times 100\%; hazard coefficient A \geq 70\%; hazard coefficient B \geq 80\%, through which the number of safety hidden danger is controlled [8], and based on the assessment of the reward of excellence and punishment, aimed at rectification of hidden danger.

(2) Correction rate of hidden dangers: Closed-loop management is adopted for the hidden dangers found by the Safety Supervision Department to ensure improvement, and the correction rates of the hidden dangers of Grade 1 to Grade 3 are 90\%, 98\% and 100\% respectively [7].

(3) Responsible accident hidden danger: Literally, it roughly means: the hidden danger accident caused by the relevant person in charge not fulfilling the responsibility he/she should perform. For this kind of accidents, we must catch them hard, no bargaining, in accordance with the principle of "four no let-ups", and punish the relevant personnel until the results are improved [8].

4. Conclusion

This paper takes "safety hazards in municipal engineering construction" as the theme, and takes a series of theoretical bases of safety hazards as the support, so as to complete the construction of safety hazards investigation and management system, the full research illustrates that "safety hazards in municipal engineering construction should be paid great attention and the construction of relevant system for investigation, so as to reduce economic losses and casualties". The most critical part is the construction of the system [9], which includes the establishment of organization and system, the method of hidden danger investigation, the requirements of hidden danger investigation, the process of hidden danger investigation and the evaluation of the results. If the safety hazard inspection system constructed in this paper can be used in engineering cases, the occurrence of hidden hazard accidents can be reduced.

References


