

Study on Construction Safety Management of Construction Engineering in Winter

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Abstract

The construction project cycle is generally long, the cross-year construction project is more common. In order to meet the needs of the project schedule, winter construction is inevitable. Winter Construction is characterized by harsh construction environment, harsh working conditions and strict construction requirements. It is easy to cause accidents if the safety management is negligent. This paper analyzes the characteristics and present situation of winter construction of building engineering, and analyzes the four major factors of person, project, environment and management in construction, aiming at the problems existing in safety management during construction, to come up with solutions and suggestions.

Keywords

Construction Engineering; Winter Construction; Safety Management.

1. Introduction

In respect of the construction characteristics of winter construction projects, Xinhai Wang thinks that there are mainly the following characteristics: first, the construction temperature is relatively low, the continuous construction is difficult, second, the construction time is relatively long, third, the construction operation is relatively difficult [1]. Junliang Yan thinks that some building materials are easy to produce ice crystal stress in the interior when they are frozen in winter, and then the properties of the materials decrease, which leads to the quality and safety problem [2]. Caiqian Zhang believes that construction in the inland areas in winter will be affected by the cold wave and other adverse weather effects, and construction preparation time is shorter, construction technology is more complex than other periods construction [3]. In construction safety preparation, scholars generally believe that winter construction should do a good job in three aspects (people, materials, environment) of preparation [4-5]. First of all, attention should be paid to the collection of construction site temperature data, secondly, the preparation of winter construction technical documents should be done well, and thirdly, attention should be paid to the training of personnel and technical disclosure. In terms of construction safety investment in winter, Yuejun Wang believes that the investment of production safety funds should be ensured first, the facilities, equipment and safety protective equipment needed at the construction site should be equipped [6]. Guojian He established the input-output model of safe production in winter construction projects, determined the ratio of safe input-output, and analyzed the importance of safety control cost input [7].

This paper holds that the winter is the prone period of construction safety accidents, the safety management is limited by the operation environment, management area, and uncertain factors, we must adhere to the actual starting point, grasp the internal law of winter construction, in order to reduce the accident rate and achieve the goal of construction production safety without accidents.

2. Construction Characteristics in Winter

According to the Construction Regulations for the Winter Period of Construction Engineering (JGJ104-2011), when the average outdoor daily temperature is steadily lower than 5°C for 5 consecutive days, the project enters the winter construction. When the outdoor daily average temperature is higher than 5°C for 5 consecutive days, the winter construction is lifted [8]. Specifically, the winter concrete construction has the following characteristics.

The first is complexity. In addition to the harsh weather conditions in winter, there are many kinds of cross-work in the construction. A large number of electrical equipment, machinery and tools, coupled with the uneven quality of the operation staff, are easy to cause construction site chaos, and then lead to short circuit, equipment shell live and electric shock accidents.

The second is rigor. In order to ensure the construction quality in winter and avoid quality accidents, the construction technology has strict requirements. Construction Engineering Winter Construction Regulations for the winter period of the concrete construction of the various processes are very detailed provisions, specifically including the choice of concrete materials, concrete mix ratio requirements, and concrete transport.

The third is technical. In the process of concrete construction, the early freezing damage of concrete should be solved, the shortest curing age of concrete should be determined, and the later strength and durability of concrete should be guaranteed to meet the requirements. In addition, prior preparation and arrangement of water supply system, power supply system and heat supply system before concrete construction in winter also require high technical operation.

The fourth is concealment. Construction materials will not be found to have quality problems in a short time, but with the passage of time, it will be gradually exposed, increasing the difficulty of accident treatment. The project which is difficult to return to work will cause a negative impact on the construction enterprise, more serious will affect the project construction schedule, causing immeasurable losses.

3. Current Situation of Construction Safety Management of Construction Engineering in Winter

Construction safety of construction project is a complex system. According to the law of safety management system, there are three factors that affect the safety coefficient of construction, including people, project and management factors.

3.1 Human Factors

Safe construction is not only a social responsibility but also the obligation of the construction unit. Construction personnel age gap is big, they have different cultural and technical level. At the same time, construction personnel liquidity is stronger, strengthening their safety consciousness has the certain difficulty.

3.2 Project Factors

In the construction process, there are the following situations. First, Party A does not apply for the construction license, affecting the smooth implementation of the project. Second, the project acceptance is not timely, resulting in the delay of the project schedule. Third, various construction projects have different requirements, for example, the construction requirements of economically developed areas are more strict, its safety management is more in place, some less developed areas, its construction safety management is not so in place.

3.3 Management Factors

The scope of work involved in the construction of construction projects in winter is wide, which requires strict supervision and management. The first is that the Part A does not have enough time to supervise the construction site, so it is difficult to conduct effective and reasonable supervision and

management of the construction site, which is likely to cause safety hazards. The second is that the supervisor must be certified and have rich supervision experience. The third is the construction side's management. In order to ensure safe construction, the construction party has set up a safety protection management team, which is directly led by the project manager, engineer and deputy manager. But in the actual process, its management mode still has the space of optimization.

4. The Main Problems of Construction Safety Management in Winter

4.1 The Responsibility System for Production Safety is not in Place

In the daily management, the construction unit cannot provide real-time, effective and targeted guidance according to the specific construction plan. For the safety responsibility of its own post, it only provides "responsible" guidance, resulting in the disconnection of on-site construction management. The safety consciousness of managers themselves is relatively weak, and their duties are not clear. When material personnel purchase materials, they only pay attention to the quantity and ignore the safety performance of materials. If some subtle safety hidden trouble cannot be eliminated, it is very easy to cause problems in the subsequent production practice.

4.2 Inadequate Safety Preparations before Construction

After entering the winter, the first thing is to do a good job in the winter construction program preparation and technical disclosure work, and do a good job in the relevant technical indicators. In the practice process, some construction parties do not pay enough attention to the compilation of winter construction plans, which are more general. The compilation of the safe and civilized construction plan lacks the division of the responsibility for safe production, the winter construction temperature data collection is not timely, the meteorological data collection is not recorded, the winter construction power supply system planning is relatively vague, the guiding significance is not strong, the front-line operators are all based on past experience for the construction. Construction site temporary electricity layout and configuration is also relatively chaotic. Some construction units are not standard line erection.

4.3 Construction Safety Awareness is Relatively Weak

The safe and civilized construction plan clearly states that smoking is strictly prohibited in the construction site and smoking rooms with fire prevention measures should be set up when necessary. However, in the actual situation, cigarette butts can be seen everywhere on the construction site. At the same time, near the Spring Festival period, although the construction site shut down, but in fact there is still a small part of the operation personnel do some tinkering work, who is lack of supervision of management personnel. In addition, there are many hidden dangers on the construction road, once person fall and slip, is likely to lead to a safety accident, causing personal injury.

4.4 Safety Education is not Effective

Through in-depth communication with construction people, for the safety, construction personnel can clearly recognize that "safety is more important than moun-tain", "the importance of life only have once", but in the process of actual operation, they still follow their own wills, who think safety education are a waste of time and energy, and have no practical significance for the progress. It can be seen that simple safety education is far from effective in prevention.

4.5 Security Risk Screening is Poor

First, in the process of construction in winter, the construction site road water and snow more, cleaning is not timely. The water accumulation in the foundation pit is serious, if not cleaned, on the one hand, the surface water seepage for a long time will affect the bearing capacity of the bearing soil layer of the foundation; on the other hand, the water-cement ratio will be too large in the concrete pouring process, which will affect the strength of the concrete and have a great impact on the quality and safety of the project. The second is to the construction site of the technician and construction staff smoking, which might cause a fire accident. Third, the usual staff dormitory internal electricity

situation check is not timely. In the living area, the phenomenon of random disorganization and connection is more serious.

5. Countermeasures to Strengthen Construction Safety Management in Winter

5.1 Implementation of the Responsibility System for Safe Production Management

In view of the phenomenon that the department and the post responsibility system is not in place, as a construction unit, it is necessary to take the initiative to supervise and urge the construction unit to implement the relevant system, the production safety responsibility system needs to be truly implemented at all levels of the project department management personnel and front-line construction personnel. This paper believes that the safety management personnel should be strict evaluation system, adhere to the "prevention first, safety first" concept.

5.2 Perfect the Safety Preparation before Construction in Winter

The first is to collect and improve the winter temperature data. When the project is about to enter the winter construction, we should prepare in advance, and designate a good professional responsible for collecting, to avoid the attack of frost and cold, to prevent trouble in the first place. The second is to do a good job in winter construction technology. As the main technical guidance document for winter construction, it shall be prepared in advance when the project enters winter construction, including power supply system, water supply system, heating system, concrete mixing plant layout and preparation, as well as be familiar with the winter concrete transport, pouring and maintenance measures, etc. Third, in order to ensure the quality of the project, safety personnel and technicians are required to carry out personnel training and related technical disclosure for each construction operator who enters the construction site. The fourth is to do a good job of raw materials testing work. In winter construction, for all kinds of raw materials must be re-test, in order to prevent unqualified materials used in the project, to improve construction quality.

5.3 Carry Out Winter Construction Safety Education

In view of the fact that the construction safety consciousness is weak in winter and the safety education has little effect, this paper thinks that the ideological and technical education of construction engineering in winter should be highlighted. In the ideological education, not only criticism and fine, but also should be combined with the characteristics of the current personnel, the belief in safe production will be inculcated into the thoughts of each construction worker, so that people can always restrain their own behavior. In terms of technical education, safety officers are required to actively study construction regulations such as 《Winter Construction Regulations for Construction Projects》, 《Technical Specifications for Temporary Electricity Safety at Construction Sites》, 《Ten Measures for Safe Production》 and 《Ten Standards for Civilized Construction》.

6. Conclusion

In this paper, the author mainly analyzes the four factors of personnel, project, environment and management in winter construction safety management. Aiming at the situation of insufficient preparation for construction safety, the paper puts forward some suggestions, such as improving data collection, making technical preparation, etc. In view of the poor effect of safety education, the author puts forward some suggestions, such as making education plan, standardizing education content and flexible education form. In this paper, there are still many issues are not thought deeply and many cases are not fully considered, the author still need to continue in-depth research.

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