Research on the Comprehensive Management of Architecture Engineering Safety Based on the Theory of Visual Visualization and Camera Deployment

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Abstract

Well doing the safety management of construction site is the demands of the safety and health for the staffs, the need of increasing the market competitiveness for the enterprises, and the needs of realizing people-oriented and creating a harmonious society. In this paper, based on many years’ safety management experience in the construction site, the author comprehensively analyzes and discusses the whole process in multiple perspectives of how to do a good safety management in the construction site from the preparation before the construction to each part of safety management during the construction and establishment of the project safety culture.

Keywords: The Construction Site; Safety Management; Safety Education; Safety Culture

1 INTRODUCTION

With the rapid development of China's economy and the fast pace of urban construction, architecture industry ushers the opportunity of vigorous development. Meanwhile, the promulgation and implementation of the Safety Production Law and the Construction Engineering Safety Production Management Provisions, and the centralized education activities of the 13th national "Safe Production Month" whose theme is "Strengthen the awareness of the red line, promote the development of security" organized and launched in the national production safety work conference in 2014, put forward more strict requirements for architecture construction. Therefore, construction site safety management faces unprecedented challenges and opportunities.

2 Ensure a safety and civilization construction

Under the premise of ensuring safety and civilization construction, construction duration and quality to meet the requirements, control the cost within the scope of the plan and strive for the maximum profit.

2.1 The staff management on the project cost

After organizing a high efficient project team, link the cost management and risk management together, require all staffs to bear the risks in accordance with the Project Contracting Management Measures, to be responsible for the cost index, and decompose the reducing cost index to the responsible person of each position, to make each project personnel to establish a strong sense of cost control, to make the behavior of reducing costs become the self-conscious and autonomy behavior of each project personnel. Therefore, benefit can be equal to the risk, and power matches to obligation.

2.2 Comprehensive management on the project cost

The main content of the project cost includes labor cost, materials cost, machinery cost, temporary facility fee, other direct fees and on-site management fees. The effective control of these costs

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involved in the technology, material, accounting, construction and all management posts, even the construction teams. Project cost management runs through the whole process of project implementation, which can be roughly divided into construction preparation, construction and completion acceptance.

3 Architecture construction safety issues
Architecture construction safety relates not only to the safety of people’s life and property, also the sustainable development of national economy and the overall situation of social stability. Therefore, how to prevent and control the safety issues of architecture construction project is the topic that practitioners engaging in the architecture industry must scientifically and seriously treat. In recent years, the architecture industry got rapid development, and our country has made some achievements in architecture construction safety and control, but the construction safety problem has still not been fundamentally solved with engineering accidents frequently taken place. Therefore, today, under the high speed development of architecture industry, exploring architecture engineering construction safety management and control great significance to improve safety management level of construction, and to promote its healthy and rapid development. Safety management of the architecture engineering project is to ensure its quality safety performance, and to ensure the people’s life and property safety during the construction. It should focus on the safety management of survey and design, the whole construction, supervision company, related production and business operation entities, and completion inspection and acceptance.

3.1 Present situation analysis of architecture engineering safety management in our country
During the project construction, with various processes and construction parts, high requirement of technology environment, relative complex geographical location, large quantities of machines and tools in the construction site, large amount of work, serious life-threatening problems, and great damage and loss caused by any part during the construction, it requires the enterprise to attach great importance to production safety management and do it all in place. With the rapid development of the mechanical construction, more and more construction organizations choose to adopt the more advanced mechanical construction. Therefore, the condition of machinery and accuracy of repair and maintenance, the proficiency degree and the sense of responsibility of operator, are all the factors relating to whether the accident occurred.

Architecture construction has the characteristics of frequent flow, which causes the construction personnel, equipment and machinery to bear this feature. Inevitably, more unsafe factors hide in the process of personnel and machinery equipment flow, meanwhile, incidence of the incidents will be increased obviously.

3.2 Safety management during the construction
It is the general principle of regulating the behavior of enterprise's safety production, controlling, restricting and stimulating the target management, the safeguard measure for the corporate leaders and managers to achieve the safety production, the embodiment of implementing the party and state’s production safety policies and regulations, and the rules and regulations with the force of law. It must be seriously implemented once being confirmed. "Safety First, Prevention Primary" is the production safety policy and regulation of the party and the state. "Safety First" means that the safety is the first issue in production activities, while "Prevention Primary" refers to the positive and reliable organization and technical measures which will be adopted when occurring accidents which are predicted according to the design, construction location, condition, time, method, the used
machinery and equipment, engineering characteristics, construction technology and other actual situations. Eliminating the hidden dangers is specifically to not let the bud of the incident occur.

3.3 The importance of the construction safety technical measures
Architecture engineering construction is a complex production process. Its product is fixed, and in the same construction site, it needs to organize many types of work, and even more units (such as piling, civil work hoisting, installation, decoration, etc.) to work together. To rationalize and coordinate all aspects of the relationships, to make a close cooperation, and to ensure the normal construction, a rigorous plan and organization shall be made. Therefore, the mandatory construction technology document-construction organization design or construction scheme must be prepared. And the safety technical measure is an important part in construction organization design (or method statement). Construction safety technical measures is to analyze the existed unsafe factors of one type of work in the construction in advance and to control and eliminate the hidden dangers which will occurred during the construction. It is to prevent accidents by taking measures from the technical and management aspects. Safety technical measurement is not a general measurement, it must be performed as the safety regulation stipulated by the state with the nature of law, and mandatory.

3.4 Safety is the most important and the most basic needs for human beings
Safety production is an important symbol of social civilization and progress, the comprehensive reflection of economic development level, also the basic requirement of enterprise survival and development. Along with the advance of society, the accelerating process of industrialization, the safety management must be in with the times to meet the demand of reality. But the "red line" of security for workers in industrial and mining enterprises in our country has been frequently broken. The painful facts wake up that we must take effective management measures to firmly hold the worker's life safety "red line". How to let us together hold up security umbrella in the rain for a better life? How to let every employee take safety standards as his own conscious action to built a solid security defense line for life?

Through accident statistics analysis, the proportion of accidents caused by illegal or irregular action stakes almost 95%. Violation is the direct cause of the accident. Today, with a relatively complete safety management system in enterprise, the main reasons to cause the accident are: strictly processing the accident only after occurred in accordance with rules and regulations, strictly punishing the perpetrators and obtaining the painful experience and lessons from the accident and violation, but in the daily supervision and inspection and system audit finding that large amount of regulations and poor training pertinence lead the employees to a deviation in understanding, mastering and applying, insufficient safety education to the workers and poor efficiency make the operators know less and not form operation habit. How to make the rules and regulations effectively performed at the site is the key of effective safety production. A growing number of cases showing that there is a big gap between the requirements of the regulations and the site implementation. The traditional safety education mode is clearly not adapting to the needs of the current enterprise safety production, while visualization education is a breakthrough and innovation for the safety education mode.

4 Visual visualization and camera deployment and safety production
4.1 Carrying out real-time video inspection with applying the surveillance monitoring system in construction site
Spot check the on-duty situation of the staffs and workers on key positions of the site construction project department and site supervision department. Spot check whether the operator has a serious
violation of operating procedures. Monitor and control the major hazards in construction site, timely check whether the management and technical control measures are in place; monitor and control the civilization construction condition in the construction site. Monitor and control the shutdown items which have been ordered to be rectified. Supervision company shall list the system situation, the staffs’ credit card information, system implementation of credit card when in and out of the construction site in the scope of supervision work, keep records in the supervision log, supervise and urge the construction unit to complete the related work. The construction company should be responsible for allocating the fee of safety protection and civilized construction measures according to the rules before the beginning of work, and supervise and urge the construction unit to set up two systems. Provincial and municipal quality safety supervision and regulation department should be responsible for guiding the establishment and implementation of video monitoring system in construction site; examining employees and issuing credit cards; collecting, sorting, and reporting the implementation situation of two systems; supervising the duty performance of all functional sections and the site inspection of quality and safety production and civilized construction standardization.

4.2 Establish a remote security monitoring system to manage the construction site
Establish a remote security monitoring system to manage the construction site aims at strengthen the quality and safety protection management in construction site and real-time monitor the implementation of its measures with the application of advanced network system and the advanced computer technology. Establish a remote security monitoring system of construction site is to monitor and manage multiple construction sites distributing everywhere through the computer screen in real-time with adopting the video remote monitoring. It can help to reduce the work intensity of the regulators, and to strengthen the regulatory supervision and improve work efficiency for the construction administrative departments and regulation organizations. After being processed and analyzed, the various data from the remote monitoring system makes the working method of the supervision department shift from the past traditional on-site supervision to the remote video surveillance; it can be further converted to mobile surveillance through remote video automatic recognition and monitoring alarm system.

5 The advantages of visual visualization and camera deployment
5.1 Image intuitive visual management, improve work efficiency
Site managing personal organizing and commanding safety production is for substance to release all kinds of information. Operating personnel’s production work is the process of working after receiving information. High-speed production system requires the information transmission and processing to be fast and accurate. If the information associated with each operator shall be directly conveyed by the managers, how many management personnel shall be equipped with. Visual management is to transmit information quickly and accurately through the text, graphics, color codes, images and other visual signals, make the complex information such as safety regulations and production requirements specialized and visualized, and realize the organic combination of safety management regulations and the production requirements with site and posts, so as to realize the standardized operation of each post personnel, and improve work efficiency. High transparency of visual management can facilitate field personnel to supervise each other.

5.2 Visual management contributes to produce a good physical and psychological effect
The relevant requirements of visual management are open to the site operation personnel. It can
prompt every personnel entering the site with his operation behavior, contribute to the tacit understanding and coordination among the operators, constraint violations of operating personnel and make his operations under the supervision of the public. Visual management plays a role in prediction. It makes the operation personnel facilitate mutual supervision when entering the site, so as to abide by the relevant provisions of the safety production. The advantage of visual management is that it attaches great importance to comprehensively apply the research achievements of management science, physiology, psychology and other multi-disciplinary, and can scientifically improve the visual perception of various environmental factors for site personnel. In this way, it can produce a good physical and psychological effect, and improve and protect the operator's production enthusiasm. For example, giving a timely reminder to the operating personnel when they are tired or at the time of negligence through the scene of the production safety tips and warnings to avoid unnecessary injury; guiding the operating personnel to walk safely by setting up the secure walking ways; guiding the operators to prevent the risk factors through displaying the images of dangerous part of equipment; making the operation personnel to relatively easily grasp and regulate the behavior of his operation through showing the demonstration operation images of important and complex parts. preventing the operation personnel's visual fatigue by changing the colors of the working environment.

6 CONCLUSIONS
With the development of wireless communication technology, and constant improvement of the transmission bandwidth, rapid increased capability of communication terminal to process information in real-time, the wireless multimedia applications increasingly become the focus of the industry, and become the inevitable demand of people. Visualization construction management system is to timely upload the dynamic operation situations of mobile terminal, construction lifter and the tower crane, video data of site, concrete mixer truck’s over-speed and overload information to the general management platform system through the form of graphics and databased on the 3G wireless networks, internet technology and computer communication, and share the information to the responsible construction bodies, and process the information intelligently and carry out the system coordination. Implementing the early warning, emergency linkage, supervision and management of the site safety accidents to finally enhance the scientific management level of government departments.

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