

# Analysis on Safety Management Methods and Effective Countermeasures of Power Engineering in Power Supply Enterprises

Gaomin Bian<sup>1,2</sup>, Huizhong Dong<sup>1,\*</sup>, Weilong Zhang<sup>2</sup>, Shuna Liu<sup>2</sup>

<sup>1</sup>Business School, Shandong University of Technology, Zibo, Shandong, China

<sup>2</sup>State Grid Huimin Power Supply Company, Binzhou, Shandong, China

\*Corresponding Author

**Abstract:** With the increasing of social electricity consumption, power engineering is gradually facing severe challenges in the process of development. Due to the complexity and particularity of power engineering, in the actual construction process, some construction management units, construction units fail to implement the relevant safety management regulations, easy to cause safety accidents, safety management issues are very important. Therefore, this paper discusses the current safety management of power engineering construction site from the perspective of power supply enterprises, and analyzes the current safety management status of power engineering from three aspects: personnel safety awareness, safety education and training, and safety management methods. In view of these three aspects, management methods and effective countermeasures such as establishing safety awareness of all staff, strengthening safety education and training, improving safety risk prevention and control system, strengthening outsourcing team management and construction site management and control are proposed, which provide reference and suggestions for the healthy and stable development of the power supply industry.

**Keywords:** Power Supply Enterprise; Electric Power Engineering; Safety Management; Importance; Management Countermeasure

## 1. Introduction

At present, people's work, life, travel and other aspects of electricity demand continues to rise, the number of power projects will increase, and the safety management situation is more

severe. The power engineering has the characteristics of many points and wide areas, complex equipment and various operation methods, so the safety management is very difficult. In the process of power engineering construction, there are electric shock, falling from high places, object strikes, mechanical injuries and other safety risk factors. If a set of effective safety management methods is not established and targeted control measures are formulated, these risks and hidden dangers may lead to power safety accidents, which not only affect the safe operation of power supply enterprises, but also seriously threaten people's life and property safety. To realize the safe and stable production and steady improvement of management level of power engineering is the top priority of power engineering at present. Therefore, in-depth analysis of the key points and defects of safety risk management of power transmission and transformation projects, and active improvement to ensure the safety of personnel and equipment on the construction site have important practical significance for the stable development of the power industry.

## 2. The Importance of Power Engineering Safety Management

Safety is an important part of power engineering, among which safety management is indispensable [1]. In the daily operation and management of power supply enterprises, the safety management of power engineering is a science, which requires managers to constantly innovate management methods and models [2]. In the construction process of electric power engineering, it has the characteristics of wide range of points, complex equipment, diverse operation methods and so on. Usually, the construction period is long and the scale is

large. A power project has to go through civil construction, basic construction, electrical installation, equipment debugging and other stages from start to completion. This has brought huge economic losses to power enterprises and seriously threatened the life safety of construction workers [3]. Because the safety management of power engineering is very professional, it contains a variety of professional knowledge content, including many professions such as civil construction, electrical installation, etc., and these professions are not very close, but the construction process still needs efficient coordination and cooperation, in order to ensure that the safety management work is scientific throughout the construction of power engineering. So as to ensure the smooth completion of the entire power project.

The safety consciousness of construction personnel in power engineering safety accidents is related to the specific operation. To do a good job in power engineering safety management, we must always adhere to the people-oriented management concept [4]. It is an important foundation for the development of electric power industry to effectively guarantee the safety of construction personnel in the process of electric power engineering construction. In the process of power engineering construction, the establishment of an effective safety management system to ensure that safety management plays a maximum role, can effectively improve the level of safety management and management efficiency, reduce the probability of safety accidents, maximize the protection of personal and equipment safety, so as to ensure the safe and stable operation of the power grid, improve the production efficiency of power supply enterprises.

### **3. Problems Existing in Safety Management of Electric Power Engineering at Present**

#### **3.1 Personnel Safety Awareness Is Weak**

In the process of electric power project construction, only relying on the employees of electric power enterprises can not meet the deadline of the project completion, usually using the way of subcontracting construction. However, the construction personnel employed by the outsourcing unit have low cultural quality and uneven professional skills.

Some construction personnel have not even participated in safety training, seriously lack safety awareness, and are not skilled in practical operations, so they cannot carry out construction safely and reasonably [5]. Within power engineering enterprises, some staff still lack the corresponding safety management awareness and have not formed a standardized and clear safety awareness, which is mainly manifested in two aspects: First, some senior leaders ignore the importance of safety management and fail to play an exemplary and leading role, forming a lax situation in safety management from top to bottom [6]. Second, power supply enterprises and subcontracting units, there are some professional management personnel work complex, unable to concentrate on dealing with safety management related work, especially outsourcing units have not set up special safety management personnel, resulting in power engineering safety management is a formality, nothing. The weakening of safety management will not improve the overall efficiency of the project, on the contrary, it will also affect the overall progress of the power project and leave security risks [7].

#### **3.2 The Effect of Safety Education and Training Is Not Good Enough**

At present, each power supply enterprise has developed a clear special training and weekly safety training, and regularly issues safety-related learning materials. Safety education and training not only include safety production skills training, accident case learning and warning education, but also include electric shock first aid cardiopulmonary resuscitation, fire safety and other essential skills training for life and work. Through the special inspection of safety management work at all levels and in various forms, it was found that some units of safety professional winter special training, summer special training and every Friday "safety day" activities exist "pendulum" phenomenon, although the safety professional management department has developed a comprehensive training plan, However, other professional production departments, teams and personnel have resistance and fluke psychology when carrying out training, the training time is compressed at will, and the supervision plan of safety management personnel at all levels is

unclear and insufficient, resulting in the safety education and training effect is greatly reduced, and the role of special training and "safety day" activities is not played.

### **3.3 The Lack of Safety Management Methods**

In the process of power engineering construction, in order to strengthen the overall effect of the work, a sound and perfect safety management system is required as a prerequisite support [8]. The safety management of power engineering is chaotic and the responsibility is not clear, which is the main manifestation of the lack of safety management. Although the power supply enterprises have formulated relatively perfect safety management rules and regulations, in the actual application and operation, because there are more departments involved, there will be deviations in the cooperation of various departments, and the management personnel themselves are complicated and have no energy to deal with safety management related work, or there is no full-time safety management personnel within the department. As a result, the enthusiasm of personnel is low, the work efficiency is low, and the work completion effect is poor, which can not meet the relevant safety management requirements stipulated by the enterprise. In addition, it is easy to have a management mode that is too simple, which will affect the progress of power project management after a long period of accumulation. Some power project managers, for various reasons, excessively pursue the construction progress while ignoring the safety guarantee of the project, resulting in the loss of the original significance of safety management [7]. Perfect safety management system is an important guarantee and measure to ensure the safety of power engineering, and is also the basic premise of urban and rural residents' electricity consumption. There is no sound safety management system, coupled with the above safety awareness is not strong, easy to cause safety accidents [1].

## **4 Countermeasures for Safety Management of Electric Power Engineering**

### **4.1 Establish Safety Awareness of All Staff**

In the process of power engineering construction, every employee should establish

a safety-oriented work consciousness, and fully implement various safety management systems in the daily work process. In the implementation process, it is also necessary to establish a reasonable safety supervision and management mechanism based on the actual situation of power engineering construction, and mobilize everyone's safety management consciousness through a perfect system. Enhance the safety maintenance awareness of the staff. While ensuring that every employee can pay enough attention to safety issues, a good safety management atmosphere should be built, and timely safety training and education should be provided to staff from time to time by taking advantage of the sense of responsibility of each staff member, so as to improve the sense of responsibility of staff in daily work as much as possible and ensure the efficient progress of power project construction [9].

### **4.2 Strengthen Safety Education and Training**

The smooth safety management of power engineering cannot be achieved without a sound supervision mechanism [10]. Power supply enterprises should develop safety education and training plans, standardize safety education and training regulations, and use the weekly "safety day" activities, on the basis of learning the notification documents issued by the superior, each team according to the actual work to arrange accident analysis, safety knowledge learning and examination content, and record the process of carrying out activities to ensure that the activities are real and effective. Safety management personnel at all levels of the enterprise actively participate in the supervision of "Safety Day" activities, provide targeted guidance on the process of carrying out the activities, enrich the content of the activities in the form of "lecture hall", stimulate the vitality of the activities, ensure that the safety management requirements are truly conveyed to the grassroots and popularized to the front line, and change the mentality of the team personnel "want me to be safe". Gradually cultivate team members' awareness of "I want safety".

### **4.3 Improving the Security Risk Prevention and Control System**

First of all, power supply enterprises should refine the operational risk classification. According to the actual situation of the job site, the emphasis is placed on personal risk, and various typical job risk grading tables are established considering the importance of equipment, the difficulty of operation control, and the difficulty of process technology. At the same time, according to various typical construction processes, the key processes are extracted, and the risk identification of these key processes is made and the safety risk prevention measures are formulated, so as to establish the process risk database. The power engineering operation site can rely on the operation risk level table and the process risk database to strengthen the differentiated management and control of the whole operation process, and carry out key management and control. Secondly, power supply enterprises should improve the risk prevention and control mechanism. While focusing on different operational risks, continue to deepen the application of operational risk level table and process risk database. Clarify the responsibilities of key links such as plan formulation, program compilation and review, and on-site control, tighten the management responsibilities at all levels, refine the safety responsibility requirements of each post, and form a comprehensive safety risk prevention and control responsibility system.

#### **4.4 Strengthening the Management of Outsourcing Team**

First of all, power supply enterprises should strictly manage outsourcing operations. It shall strictly implement the requirements for outsourcing access, strengthen the review of the qualifications and business capabilities of outsourcing units, and require outsourcing personnel to complete safety education and training and pass the safety knowledge examination before entering the site. Implement targeted management measures for outsourcing operations, and safety managers supervise the implementation of safety measures for outsourcing operations. Secondly, power supply enterprises should seriously outsource team assessment. The outsourcing team shall be homogenized, the outsourcing team shall be forced to set up full-time on-site safety management personnel, and carry out

pre-resumption training and examination and on-site examination. In order to manage the outsourcing team more effectively, we should establish and improve the evaluation mechanism of the outsourcing team, conduct safety management evaluation of the outsourcing team, and establish the "blacklist" of the outsourcing team. At the same time, it is necessary to strengthen the operation behavior control of outsourcing personnel, each outsourcing personnel to establish a personal violation score file, all kinds of violations of the outsourcing personnel in the work site, according to the severity of the violation, the corresponding safety points will be deducted, strengthen the assessment management, so as to ensure the safety of the work site construction.

#### **4.5 Strengthen the Management and Control of Construction Site**

First of all, power supply enterprises should strengthen the operation process control. The implementation of technical standards is strengthened through the combination of information technology and standardized management and control, by improving standard operation cards, refining operation processes, focusing on key processes, etc. Through the preparation of typical operation standards, for the complex operation with multi-professional cooperation, comprehensive consideration of personnel, machinery and environment and other factors, to determine a reasonable operation process. Secondly, power supply enterprises should strengthen on-site standard operations. Through on-site identity labeling and differentiated assignment of work tasks, we strictly control the work scope and operation authority of new employees and outsourcing personnel, implement differentiated on-site monitoring, and focus on the on-site supervision of key operators. At the same time, by strengthening the practical training of the operators' skills, the corresponding skill clearance evaluation is carried out to promote the rapid improvement of the technical ability of the operators, so as to ensure standardized operations and ensure the safety and control of the site.

#### **5. Conclusion**

With the rapid development of China's economy, the power field has also obtained a

better space for development, the volume of power projects has continued to increase, the scale of power engineering projects has continued to expand, and the difficulty of safety management has also increased. However, there are many shortcomings in the safety management of power engineering in power supply enterprises. In order to ensure the stable development of power supply enterprises, the orderly promotion of power engineering projects needs to be adjusted in many aspects. Through a comprehensive analysis of the current power engineering safety management mode and existing problems in power supply enterprises, this paper proposes targeted management methods and effective countermeasures to strengthen and improve safety management from safety education and training, improve safety risk prevention and control system, strengthen outsourcing team management, strengthen job site control and other aspects. All in all, in the process of power engineering development, safety management is the top priority, we should practice the concept of "people first, life first", under the premise of ensuring safety, scientific and efficient power engineering construction work, in order to better ensure that power engineering can maintain the health and safety of the development of the industry in the process of modernization. Help the steady progress and long-term development of power supply enterprises.

### References

- [1] Cai, X. (2021). Improvement of Safety Management of Electric Power Engineering. *Modern Industrial Economy and Information Technology*, 11(12):178-179+182.
- [2] Song, R. (2015). Analysis of Power Engineering Safety Management System. *Science and Technology Innovation Herald*, 12(21):204.
- [3] Li, Z. (2018). Research on Strengthening Safety Management of Power Engineering. *China New Technology and New Products*, 20:144-145.
- [4] Huang, S. (2018). Research on Human-oriented Power Engineering Safety Management Model. *China New Communications*, 20(22):216.
- [5] Feng, Y., & Liu, Y.F. (2017). Analysis on construction Safety Management of power transmission and transformation project. *Urban Construction Theory Research (Electronic Edition)*, 22:7.
- [6] Li, G. (2020). The importance and Effective Countermeasures of Power Engineering Safety Management. Chongqing: Chongqing Dingyun Culture Communication Co., LTD., 63-66.
- [7] Yu, T. (2018). Discussion on the process and measures of Power Engineering Safety Management. *China New Technology and New Products*, 20:147-148.
- [8] Ma, T. (2018). A Brief introduction to the methods of Power engineering safety management. *Management and Technology of Small and Medium-sized Enterprises (Mid-day)*, 10:37-38.
- [9] Gu, M.H. (2020). The importance and Effective Countermeasures of Power Engineering Safety Management. *Chinese and Foreign Entrepreneurs*, 17:59.
- [10] Xia, S.K. (2020). Research on Safety Management Improvement Path of 10kV Distribution Network Power Engineering. *Electronic Components and Information Technology*, 4(09):108-109.