Automatic Grounding Protection Technology for Low-Voltage Cable in Distribution Network Without Power Outage

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Abstract. With the continuous development of science and technology, the current era of low-voltage cable equipment has changed earthshaking compared with the traditional power failure equipment, and has a more significant application in the distribution network control system, effectively improve the work efficiency of power failure equipment. The rapid development of high voltage technology also provides a platform for the application of low voltage cable equipment. By expatiating the characteristics and present situation of the low-voltage cable equipment, this paper analyzes the application problems in the design of the non-power outage equipment system, and puts forward practical suggestions for readers’ reference.

Keywords: Low-voltage, Distribution Network Control M, System Design, Application Analysis

1. Introduction

The operation organization of the control system of distribution network should make a more scientific and reasonable analysis on the fundamental problems according to the actual operation system, and formulate corresponding and effective regulations, so as to guarantee the safe and stable operation of the low-voltage cable equipment and provide more instructive institutional guarantee for it. Should never patrol work of power equipment at the same time, regular maintenance and irregular sampling, a variety of ways along the combination of distribution network control system of risk evaluation and supervision and management, can guarantee normal operation at the same time, it can prevent the happening of the accident, set up effective liability protection system and performance rewards and punishment system, to transmit power control system to the protection of the individual, and tie the working condition and salary, inspire the enthusiasm of staff is more powerful and homework initiative [1].
2. Problems in the design of low-voltage cable equipment in the non-power outage equipment system

2.1. Low voltage cable equipment application mechanism is not perfect

With the continuous advancement of the new industrial situation in China, in recent years, the low-voltage cable equipment and distribution network control system in major cities in China have been improved and improved. But on the whole, the control mechanism of China's distribution network is still immature. To a large extent, the design of power outage equipment system can not be implemented. The staff does not establish a better sense of control of the distribution network in the process of work, and even the sense of responsibility is not strong and the work is sloppy [2,3].

2.2. The operation of distribution network control system is prone to accidents

In the current era, there are still some illegal elements in order to seek their own interests, to steal the resources of power equipment. This kind of illegal behavior is very unsafe for the operation of low-voltage cable equipment, which is easy to lead to accidents. As shown in Figure 1 below, accidents may occur during the operation of indoor high-voltage pipe fuse. At the same time, personnel related to low-voltage cable equipment and process control can also query the control information with different identities and rights. Planners and personnel of low-voltage cable equipment can query the plan and distribution network control contract respectively, so as to carry out all-round and multi-angle control on the whole construction process without power failure.

![Figure 1. Indoor high voltage tubular fuse](image)

At the same time, the relevant personnel also did not do a good job of the daily inspection of the internal power failure equipment, once the accident is easy to have a very serious impact. In addition, the operators of low-voltage cable equipment do not set corresponding warning marks at key locations to prevent accidents, and the control mechanism of low-voltage cable equipment takes less consideration of the factors of intentional sabotage.

2.3. Local protectionism affects the development of distribution network control system
At present, planners in some areas of our country still do not pay much attention to the specific planning of low-voltage cable equipment, and most of the planning schemes are sloppy and leaky, which further leads to the difficulty in carrying out the operation and maintenance of distribution network control in the later period. Even in order to ensure economic development, some regional leaders continue to squeeze the area controlled by the distribution network, which affects the operation of low-voltage cable equipment. The lack of awareness of leading organizations is also one of the important aspects that affect the safe operation of low-voltage cable equipment. Failure to correctly deal with the safety accidents that have occurred and coordinate the accident work is a great threat to the safety of the control system of non-power failure projects [4, 5].

2.4. Lack of professional LV cable equipment management talents

In terms of the control system of power distribution network operation, professional management personnel scarce phenomenon is more prominent, the majority of people is ignored because the job is not to choose further study in this respect, leading to corresponding number of professional management personnel quality is low, it is increased in the safety accident risk in the process of distribution network control system is running. First of all, there is no reasonable and perfect enterprise talent management system in the design of most non-power failure equipment systems in our country. It is risky for those who do not have professional management skills to check and supervise the work of distribution network control system. Secondly as industrial companies, most of the distribution network control system of the company's management mechanism is too rigid, do not meet the current needs of The Times, at the same time also lack a certain binding and reward system, it is for the development of professional management talents a larger limit, is not conducive to the maximization of enterprise talent development. And some managers' thinking is too conservative, which also leads to the limited enthusiasm of professional management talents, so that enterprises lack innovation ability and consciousness, and at the same time, it limits the efficient and healthy operation of the control system of the distribution network [6, 7].

3. The application strategy of low-voltage cable equipment in the control system of distribution network

3.1. Strengthen the management of non-power outage occupying phenomenon

In the risk evaluation study of distribution network control system, governments at all levels should first strictly check the occupying situation, control the occupying phenomenon from the source, and ensure the safe and effective operation. In addition, enterprises should also be provided with more reasonable and effective policy support, more scientific and reasonable layout, and prevent from "grabbing area" with other non-power failure projects (as shown in Figure 2).
Because of the construction treatment of the occupied and non-power failure projects often involves the interests of more parties, if it is not properly handled, it will make the following remediation work difficult to carry out. Therefore, it is necessary to proceed from the actual situation to carry out long-term coordination of the control system of the distribution network, take into account the interests of various parties through the discussion of professionals, and adopt a more practical and effective way to deal with the situation of occupying power outage equipment.

3.2. Increase the publicity of distribution network control system technology

While improving the protection system, the competent government departments should also focus on the protection and publicity of the control system technology of the distribution network, and enterprises should focus on the publicity and education of the corresponding knowledge to the residents along the line, so that the public can understand the importance of low-voltage cable equipment and its potential safety hazards. It emphasizes the consequences and responsibilities brought by hindering the application of control system of distribution network, and makes the application awareness of low-voltage cable equipment deeply rooted in people's mind through the frequent publicity of low-voltage cable equipment on the Internet and newspapers [8, 9].

3.3. Strengthen the training of control and management talents for professional distribution network control system

At present in the distribution network control system of management of professional talents are scarce, therefore to build a more perfect system of enterprise talent construction, through innovative talent management system to encourage innovation engineering personnel in engineering management, to establish and improve the distribution network control system of distribution network control system technology system, enhance the safety of the management skills training also should strive to work for the safe and smooth resource protection.

3.4. Carry out process control of the whole distribution network control system starting from transmission middlemen
In the application process of low-voltage cable equipment of distribution network control system enterprises, the corresponding information of transmission intermediaries is imported according to the unified template, and the management system of transmission intermediaries of distribution network control system is summarized and statistics are collected, so as to realize the overall docking of process control system and management network system of distribution network control system. The personnel related to the application process control of low-voltage cable equipment can also query the control information with different identities and rights. Planners and personnel of low-voltage cable equipment can query the plan and the contract of distribution network control system respectively, so as to control the whole process of distribution network control system from an all-round and multi-angle [10].

4. Conclusion

Low-voltage cable equipment has been widely used in the current distribution network control system, but there are many security risks in the application of low-voltage cable equipment in the distribution network control system. The whole China's low voltage cable equipment and power distribution network control system control mechanism is still not mature, to a large extent of low voltage cable equipment are not able to implement the target system, the control system of power distribution network operations shall be based on the actual operation of the system, from the fundamental problems in more scientific and reasonable analysis, formulate corresponding effective regulations, so as to guarantee the operation of the power control system security and stability; The staff should establish a better control consciousness of distribution network control system in the process of work. Doing these aspects well is of great practical significance for promoting the urbanization process in China.

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