

Research on Reliability of Distribution Network Power Engineering Technology

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Abstract:

With the progress of society, electric power resources have become an indispensable part of people's production and life. The power system composed of four parts, namely, power plant, transmission network, distribution network and users, is an important part of China's power grid, supporting the transmission and use functions of China's power grid. Therefore, ensuring the stable and continuous operation of the power system helps to build a strong transmission network in China, improve the transmission efficiency and efficiency of the power grid, and further improve the maturity of the power engineering technology of the distribution network. Therefore, this paper studies the reliability of distribution network power engineering technology.

Keywords:

Electric power enterprises; distribution network; electric power engineering technology; reliability.

I. Application status and characteristics of China's distribution network power engineering technology

With the development of China's economy and the continuous improvement of people's living standards, electric power resources play a more important role in national resources, and have become a key resource affecting national security and social stability. The power engineering technology of distribution network can solve the problems in the operation of power grid in time, and help to improve the operation quality of power grid and the utility of power transmission. From the current application degree of power distribution technology in our country, the technical imbalance is more obvious, which will increase the probability of hidden security risks to a certain extent, and is not conducive to the storage and analysis of user information. Therefore, to improve the application of power technology in China's distribution network is a win-win choice that is responsible for the people and the society. The establishment of the distribution network system needs to adhere to the principles of tightness, safety and reliability. Therefore, when constructing the distribution network system, it is necessary to strictly control the assembly quality of precision instruments and power generation equipment in accordance with relevant national technical standards, and improve the operation process of the power grid, which helps to avoid the occurrence of security and technical hazards in the later stage. However, at present, the power engineering technology of China's distribution network is not mature, and the coordination between various links is insufficient, resulting in the overall power generation efficiency of the grid system is not high, which greatly hinders the speed of power network construction. From this point of view, relevant departments and power enterprises should optimize the configuration structure of power generation equipment in a timely manner, and promote the development of the power grid system to the direction of ease of use and comprehensive development.

II. Factors affecting the reliability of power engineering technology in distribution network

1. Influence of power grid design

The application and practice of power engineering technology in distribution network are affected by multiple factors, among which the most influential is the design of power grid, because the survey and laying of power grid need to be carried out according to the actual situation on the site, and can not be arbitrarily designed based on subjective assumptions. However, in the relevant investigations of the power sector, the design scheme of the power grid is often inconsistent with the actual situation. For example, when the power grid is designed in some remote mountainous areas, the design scheme often does

not fully take into account the actual situation at that time, and the local geographical environment and hydrological conditions are not fully understood. After the completion of the power grid, there is often a power failure phenomenon or power facilities collapse phenomenon, which greatly affects the transmission quality of the power grid. Therefore, it is imperative to strengthen the quality of power grid design, change the traditional concept in power grid design, and improve the consciousness of responsibility and quality of power workers.

2. Influence of external factors

In the analysis of power engineering technology reliability of distribution network, in addition to grid design, external force is also an important factor. As we all know, the current demand for electricity in China is very large, which leads to the phenomenon of temporary cable pulling in order to increase the power supply often in some individual areas, although this approach achieves the goal of temporary sufficient power from the perspective of power supply, but in the long run, the approach is extremely easy to produce electricity safety hazards, especially in thunderstorm weather. Because most of the temporary wiring does not meet the national power supply technical standards, it is easy to lead to power supply safety accidents, threatening the life and property safety of the people. In addition to human factors, there are some natural factors that also affect the power grid transmission quality, such as wind, light and other natural factors will cause damage to the transmission cable to a certain extent, especially after a certain number of years, these natural external forces will accelerate the aging of the power grid infrastructure, resulting in the occurrence of power failures or security hazards. Therefore, the relevant departments of the old power grid equipment need to be regularly maintained and updated to ensure the reliability and security of the distribution network.

3. Influence of staff quality

With the continuous development of China's electric power industry, the operating environment of electric power enterprises has also undergone earth-shaking changes. In this context, in view of the different professional abilities and qualities of the current power engineering and technical personnel of the distribution network, it is necessary to further increase the resource investment in the internal staff of the power enterprise, from talent recruitment, systematic training to professional knowledge practice and other aspects of the need to establish a sound system. This has two advantages: on the one hand, it can improve the professional quality of the staff; On the other hand, it can strengthen the internal management of enterprises, improve the technical service quality of electric power enterprises, and enhance customer satisfaction.

III. Measures to improve the reliability of power engineering technology in the distribution network system

1. Improve the overall quality of staff

In the actual work process, power supply enterprises want to effectively improve the reliability of power engineering technology, it is necessary to ensure that the relevant grass-roots staff have good work quality, and the quality of the staff is directly related to the quality of power supply services, and the two are proportional to the development. Therefore, in the actual work process, the relevant staff of urban distribution network construction planning need to continue to learn the relevant knowledge of power engineering technology, improve service awareness, and realize the overall improvement of their comprehensive quality. In addition, in the training process, the relevant departments also need to formulate training objectives and training plans to ensure that the participants can carry out supplementary learning according to their own characteristics, and achieve the purpose of improving the comprehensive quality of all staff as much as possible.

2. Effectively solve the pollution flashover problem

Among the many factors that affect the reliability of distribution network operation, pollution is the most important one. Therefore, effectively solving the pollution problem can greatly improve the reliability of distribution network operation. In the process of solving this problem, the relevant power personnel should according to the specific characteristics of each part of the distribution network, the support insulators, connecting rod bottles, and through-wall bushings in the distribution network switch room can be protected by protective covers, and the protection of the busbar can be achieved by adding insulation heat shrink tubes to the mother. These measures can improve the anti-pollution ability of the distribution network equipment to a certain extent, and also effectively avoid the short circuit of the distribution network caused by small animals. In addition, the power personnel can also destroy the conditions of pollution flashover by changing the humidity of the air, so as to effectively avoid

pollution flashover phenomenon.

3. Strengthen the rationality of power grid design

There are two ways to start. First, the rational design of the technical aspect. It is necessary to carry out reasonable planning according to the specific local conditions, comprehensively consider the local weather, pollution degree and wind direction and other conditions to design electrical performance, comprehensively consider the tower, metal, wire stress and stability to design mechanical properties, in the selection of distribution lines, but also fully consider local planning, to ensure that the line design is short and straight to the greatest extent, and reduce the occupation of cultivated land; second, the reasonable design of safety. First of all, it is necessary to ensure the electrical and mechanical nature of the distribution line, fully consider the distance of each tower and the distance of the line crossing, install the corresponding grounding device and lightning protection device, in addition, the insulated wire should be used instead of the bare wire, to avoid external interference and improve the reliability of the distribution network.

4. Strengthen the distribution network project supervision

In strengthening the supervision of power engineering technology of distribution network, we can start from two aspects. Firstly, it is necessary to make full use of the electronic information platform, establish an intelligent electronic information supervision platform through image generation, data model and other ways, and solve the problems in the power engineering technology of the distribution network in time based on this platform. At the same time of data resolution, it is also necessary to do a good job in customer data accumulation and collection, provide data support for the simulation of the later data model, strive for the location of potential safety hazards that can be analyzed and studied with data, and improve the degree of data and scientific supervision of power engineering in the distribution network. Second, in the process of implementing power distribution, automatic early warning devices should be installed in time, and the reliability and stability of power engineering technology of distribution network should be improved by early warning Settings.

5. Accelerate the automation construction of distribution network

With the continuous development of science and technology in China, computer technology is gradually applied to various industries, so the distribution network project should keep up with the pace of the times, and integrate computer technology, automation control technology, electronic technology, communication technology and high-tech distribution equipment in the work process, so as to speed up the automation construction process of the distribution network. Distribution network automation can accurately locate the fault point in the work project, and can analyze the cause of the fault point. For some transient faults, the power can be automatically restored after troubleshooting, and for some permanent faults, it can automatically trip after receiving the remote control command and can isolate the fault point, and at the same time reconstruct the power grid and quickly restore the normal power supply in the fault area.

Conclusion

Although there are still many problems in the process of distribution network planning and construction in China, we have reason to believe that with the maturity of distribution network power engineering technology, the scientific and orderly nature of China's urban power grid construction planning will be further improved, and the reliability of its distribution network power engineering technology will be gradually enhanced, and various problems in the application process at this stage will be solved one by one.

References:

- [1] Mingxiong Wang. *Safety and Reliability Analysis of Electric Power Engineering Technology Application in Distribution Network Construction* [J]. *Science and Information Technology*, 2017(33).
- [2] Xiuli Zhang. *Discussion on the Application Strategy of Electrical Automation in Power Engineering* [J]. *Electronic Technology and Software Engineering*, 2017(09).
- [3] Yuanzhong Zhuang. *Research on Reliability of Power Engineering Technology of Distribution Network* [J]. *China Science and Technology Investment*, 2016(29).
- [4] Yinan Yan. *Analysis on Technical Reliability Analysis of Power Engineering of Distribution Network* [J]. *Heilongjiang Science and Technology Information*, 2014(31).