Working on the Multifunctional Low-Voltage Distribution Box Insulated Operating Lever

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Abstract: with the continuous development of our country, the progress of society and the operation of the country are inseparable from the supply of electricity. As a means to ensure the normal operation of electricity, the multifunctional low-voltage distribution box insulated operating lever is indispensable during the daily power maintenance process. In order to protect the personal safety of power maintenance workers, it is necessary to strengthen the research and development of multifunctional low-voltage distribution box insulated operating levers. In this paper, the optimal scheme is determined by studying the scheme of the insulated operating lever, in order to promote the better and faster progress of china's electric power work.

1. Introduction

Aiming at the problems of the current insulating lever, the multifunctional low-voltage distribution box insulation operation lever can provide an operation method with flexible operation, complete functions and improved working effect. Through the development of a new type of multifunctional low-voltage distribution box insulated operating lever, the structural design can be made more ingenious, and it can be easily carried, and new functions can be added. The advantages of the multifunctional low-voltage distribution box insulated operating lever are light weight, convenient use, safe and effective. It can be installed quickly when use it, and can be easily disassembled when idle. The time has been effectively shortened from use to storage.

2. Introduction to Tools

As an important part of the daily maintenance of electric power maintenance, the operation of power off and transmission has a certain degree of danger. More than 60% of the work is to carry out the operation of column switches and disconnectors. Therefore, for this kind of dangerous but unavoidable work, it is necessary to find ways to avoid the danger. The operation lever and the electroscope are two important tools used in the work process. Through the research and development as well as update of the operating lever and electroscope, the personal safety of workers can be largely protected. [1].

2.1 Introduction of Insulating Levers and Electroscopes

2.1.1 Insulation Lever

The most commonly used in daily power maintenance is the flexible insulating lever, whose main function is to open or close the switch on the column. The telescopic insulating lever is 6 meters in length when it is fully deployed and consists of five sections in total.

2.1.2 Electroscope

In short, the electroscope is to verify whether the line is live. It can alarm by sound and light to remind the staff whether the line is live. When the electroscope light is off or there is no sound, it means that the line is out of power. The electroscope is composed of an operating handle and an electricity inspection section, which is fully extended for approximately 1.2 meters.

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2.2 Other Tools

Other equipment used in power maintenance work are mainly pole-assisted climbing tools.

3. Scheme Planning

3.1 Expected Goals

Reduce the operation time of the switch on the column.

3.2 Feasibility Analysis

3.2.1 Technical Requirements

The multifunctional insulated operating lever can greatly reduce the on-off and on-time of the switch on the column. The main technical difficulty is the production of parts.

3.2.2 Quality of Personnel

The research personnel have much practical experience for many years, and have participated in the development of new cable devices for 14 years.

3.2.3 Research Costs

According to the budget, the cost is within the controllable range.

3.2.4 Background Research

At present, power companies are constantly upgrading their functions. Because the work and maintenance process is affected by the operating environment, the existing insulation levers have insufficient functions. Unexpected situations may occur during actual use, which will catch them by surprise and resulting in unprepared, so it is necessary to carry out the research and development of the insulating levers of the multifunctional low-voltage distribution box [2].

3.3 Master Plan

3.3.1 Functional Integration

In order to reduce the operation time greatly, it is necessary to simplify the operation process and reduce the step of climbing the pole and the transfer time of tools. Therefore, it is necessary to integrate the switching operation and the power test function [3].

3.3.2 Signal Acceptable

In order to ensure the safety of the maintenance staff and the equipment during the switching operation, the body signal of the electroscope must be within the acceptance range of the maintenance personnel.

4. Determination of Plans

4.1 Clarification of the Overall Plan

In the process of this research, the team first made clear the focus of this research, that is, to develop the insulation operating lever of multifunctional low-voltage distribution box in the current practical use environment, and then carried out the focus of this work corresponding discussion meetings, experienced staff and experts were invited to clarify the design concept and requirements, and based on this premise, the design of multifunctional insulated operating levers is planned accordingly.

First of all, the design must fully consider the functional requirements of the operating lever of the distribution box. By simplifying the use process, try to shorten the process and time of using the operating lever to provide as much time as possible for other tasks. The purpose of doing so is also to reduce the difficulty of the staff and create a good environment for their long-term work.

Secondly, what needs to be considered during the development of insulating levers is to ensure the stability of information transmission. In the development process, no matter which part of the simplification and improvement, should first stand on the basis of signal reliability, ensure that relevant staff can receive information in time within the corresponding distance, and ensure the safety of staff and equipment .

4.2 Proposal

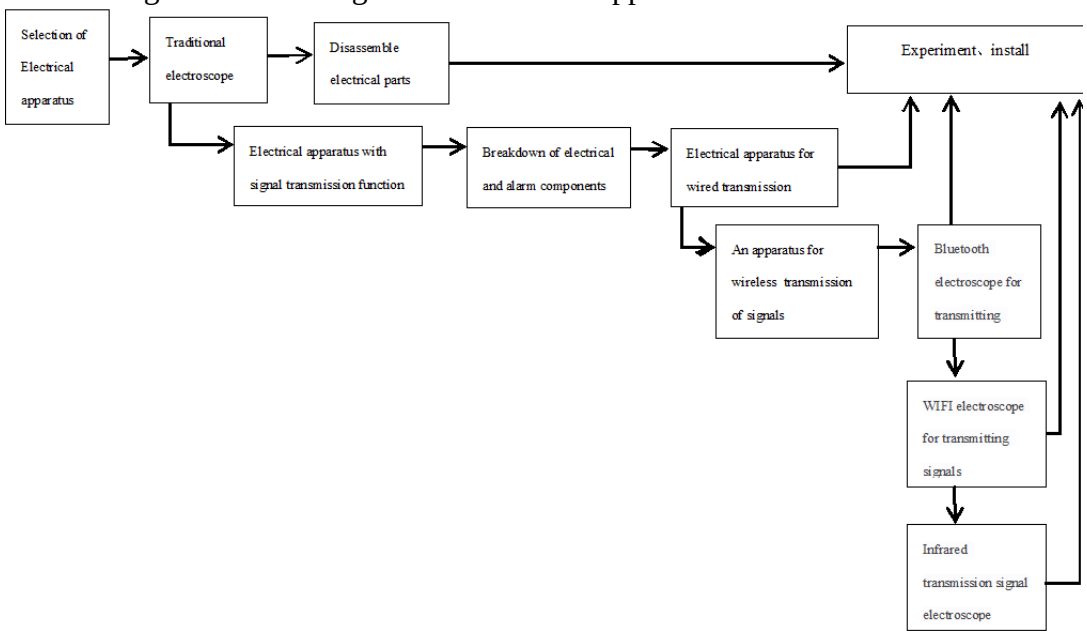
The research and development of insulating lever is mainly analyzed from two aspects. The structure of the multifunctional insulating operating lever can be divided into a built-in structure and an external structure. These two structures are fundamentally far from each other. Researchers are required to perform different analyses and research according to different situations. For example, the built-in structure is the part where the electroscope is embedded inside the insulated operating lever, so this part has higher requirements for material selection to prevent problems that cannot be solved due to internal problems. The external structure is the part where the electroscope is attached to the outside of the insulated operating lever. Therefore, the related staff will inevitably come into contact with the insulated lever during the operation of the insulated lever. Therefore, high-strength security is required to prevent the impact of safety problems The normal work of staff [4].

After relevant research and investigation, it is clear that the use of external type in the design of the insulation lever is mainly to improve safety and reduce hidden risks. At the same time, it can also reduce the research and development cost of the insulation operation lever. Generally speaking, The external type is more suitable for this research.

There are also two options for the operation head of the multifunctional insulated operation lever, namely a metal operation head and epoxy operation head. Through related investigations and studies, it is found that the safety and durability of the metal operation head are poor, so this time, the research and development choice of epoxy resin operation head is more durable and lower cost. After confirming the use of epoxy resin operating head, the research team conducted a clear investigation and research on its electrical insulation performance and mechanical strength. The final experimental results show that the epoxy resin operating head meets the requirements and can be used as a lever [5].

In the process of selecting the power testing device, the research team made clear the method of using PDPC to study it, and drew the relevant decision-making program diagram:

Decision-making Procedure Diagram of Electrical Apparatus Selection Process:

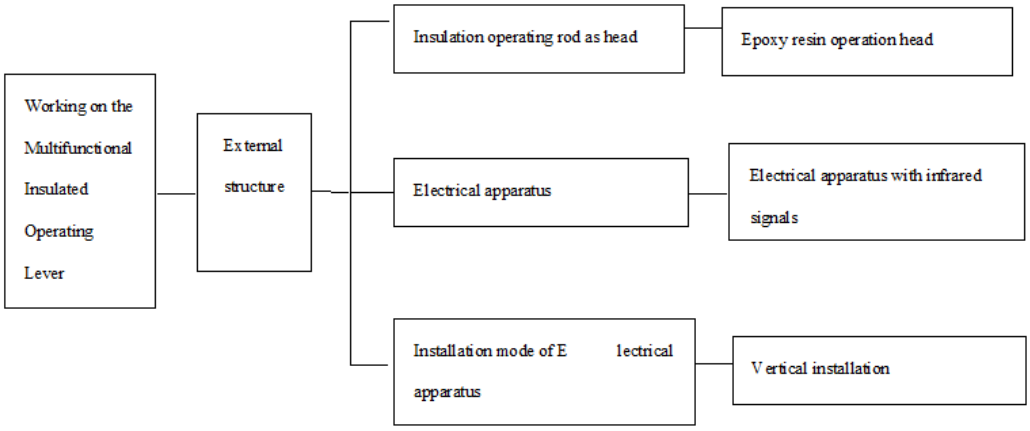


And through related experiments and investigations, it is found that the problem with traditional electroscopes is that when the electroscope is 6 meters away from people, the signal becomes very

weak, which is only 31%, so the traditional electroscope cannot be used. The final choice is the infrared transmission method [6].

5. Implementation Scheme

After this investigation, the research team made clear the actual situation of each part of the operating lever, and carried out a detailed experiment and investigation on the practicability of the operating lever according to the current use environment and staff's own safety, and made clear what materials should be used for different parts, so as to form a perfect operating lever. The scheme system of the operating lever is shown in the figure below:



On this basis, the staff of the research team carried out detailed experiments on the installation methods of the insulated operation lever operation head, the electric inspection device, and the electric detection device. The methods all meet the requirements of development [7].

6. Conclusion

The above is the entire process of this development. This process is based on the actual working environment and the actual needs of the design of the operating lever. Therefore, the entire research process is authentic and authoritative, hoping to provide a certain reference for the development of the multifunctional low-voltage distribution box insulated operating lever in the future.

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