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Research on the Reliability Testing of Electrical Automation Control Equipment

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Abstract. According to the author's many years' work experience, this paper first discusses the concepts of electrical automation control equipment reliability testing, and then analyzes the test method of electrical automation control equipment reliability testing, finally, on this basis, this article discusses how to determine the reliability test method of electrical automation control equipment. Results of this study will provide a useful reference for electrical automation control equipment reliability testing.

Keywords. electrical automation; reliability; testing

0 Introduction

The degree of electrical automation usually signs the developing level of a country's power industry. In recent years, with the continuous improvement and upgrading of our electrical automation control technology, electrical automation control equipment has been widely used in every field. As the electrical automation control technology is important safeguard of the normal operation of power system, how to further improve the reliability of electrical automation control equipment becomes the issue that worthy of concern to users. There are a variety of methods that can test and evaluate the reliability of electrical automation control equipment. The reliability of the electrical automation controls equipment i the key to power quality, and also have some impact on the social productive forces.

1 The basic concept of the reliability testing of electrical automation control equipment

Generally speaking, the reliability of electrical automation control equipment mainly refers the capacity that has time and environment to watch the certain functions that the electrical automation control equipment accomplished under certain conditions. Whether a set of electrical automation control equipment can ensure the normal operation and the safety of our electrical system and whether a set of electrical automation control equipment can to complete the required functionality are the areas we need to consider when related to the reliability of electrical automation control equipment.

2 The method of the reliability testing of electrical automation control equipment

According to the current development status of China's electrical system, the reliability testing methods that suitable for our country's electrical automatic control equipment are three, namely, field testing method, guaranteed test method and experimental test method.

2.1 Field testing method

Field testing method is a method that tests the reliability of the equipment based on the site conditions where the electrical automation control equipment is. The main methods of equipment data recording is its statistical analysis and then get some basic indicators, thus to analyze the reliability of the equipment. There are three types of field test method (see figure 1).

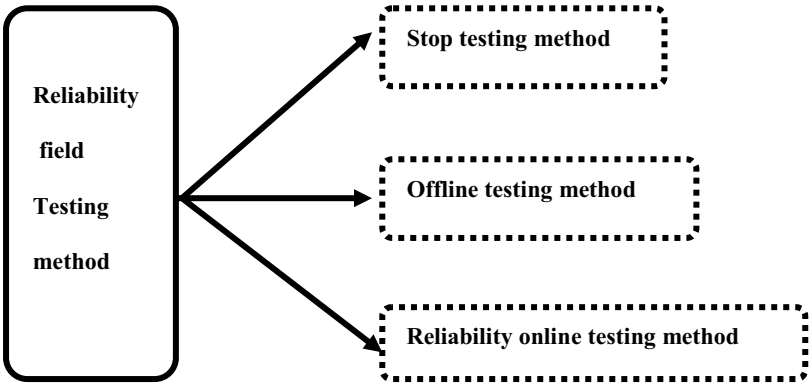

Figure 1. The Field testing method of the reliability testing of electrical automation control equipment

Online testing is a method that tests the equipment when they are in the normal operation, stop testing is that test the equipment when they are in stop functioning, and the offline testing is that we need to remove a part of detection of the equipment when testing. And when we are in specific operations, we need to select the test methods based on the equipment failure conditions or site-specific conditions. And of the three types of tests, the latter two is relatively simple.

2.2 Guaranteed test method

Guaranteed test method is a method that testing the equipment before it produced, and carrying out the trouble-free operation test of the product to be tested, under certain conditions. Guaranteed test method is what we often say "roast machine". Guaranteed test method subject to some affect of the production limitations, and more time will be cost when test the reliability of electrical automation control equipment in this method, and could not test the large quantities of products one by one, but only a sample for testing. Therefore, this method is used less in daily tests. However, for small quantities, this test method is more desirable, because it can carry out the most comprehensive test on the various parts of the equipment and the reliability of the detection result is relatively high.

2.3 Experimental test method

Experimental test method is a method that test the equipment by analog the using conditions of the equipment in the laboratory, which aims to response the real operation of equipment as much as possible. Experimental test method is relatively simple to use, the reliability of the tested data is relatively high, and the experimental results can be reproduced. However, the cost of the experimental test method is relatively high, and the required experimental conditions often suffer some limitations. So considering all the factors, experimental test method is more suitable for detecting the large quantities of the product.

3 How to determine the method of the reliability testing of the electrical automation control equipment

Seen from the conditions of above three test methods, we believe that when select the method of the reliability testing of the electrical automation control equipment we received four restricted conditions (see figure 2).

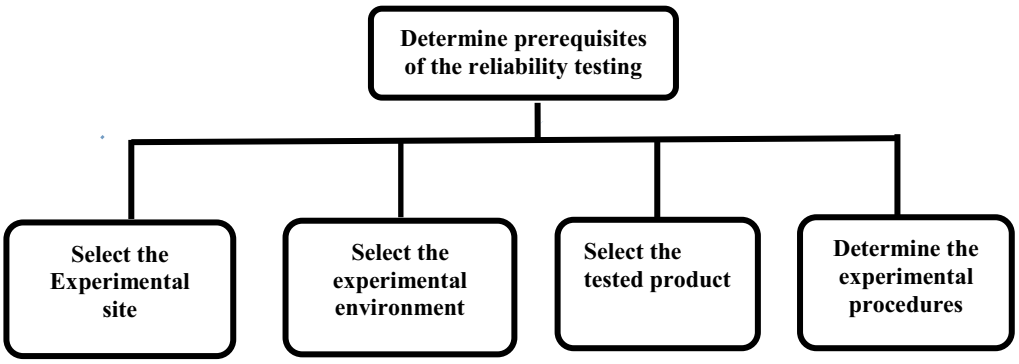

Figure 2. The four conditions of the reliability testing

3.1 Experimental site selection

If you just want to test the reliability of electrical automation control equipment in its normal operating environment, you can choose the test site that can perform their work scene representatively. If you need to get a most accurate and reliable data, you might consider choosing the test site which is closest to the real operation of the equipment.

3.2 Select the experimental environment

Experimental environment plays a vital role in the whole test result, therefore, different selection of the experimental environment may impact the whole reliability testing. In order to obtain a more objective test results we must choose the experimental environment carefully before the reliability testing of electrical automation control equipment.

3.3 Select the tested product

In order to make the test results has a typical effect, you need to select the appropriate tested product, which is representative, before the reliability testing of the electrical automation control equipment. From the experimental scale, large and medium-sized equipment equipment; From the perspective of the functioning of laboratory equipment, including continuous and intermittent operation of equipment operation equipment. Seen from the experimental scale, it consist of large-size equipment and medium-sized equipment ; And seen from the operation of the laboratory equipment, it consist of continuous operation of equipment and intermittent operation of equipment.

3.4 Determine the experimental procedures

In order to obtained an most real data in the reliability testing of the electrical automation control equipment, we must have professional and technical staff to determine the process in accordance with the formal experimental procedure, before the experiment, and then operate it in accordance with the identified program. Only operate the individual steps in accordance with specifications can we ensure the accuracy of the experimental data.

4 Conclusion

The reliability testing of the electrical automation control equipment is the critical test to maintain the normal operation of the device, which needs to select the most appropriate method according to the scene, in the specific testing process.Only to get the most accurate data, can the device be properly assessed, the reliability test leve be improved and the judgments be made accurately. In the long run, good reliability testing of the electrical automation control equipment, is conducive to the continuous development of China's electrical automation engineering.

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