

Research on the visualization of dimming faulty signals in the middle of teaching

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Abstract: Practical teaching is an important aspect of the training of military personnel's ability to hold a post. Typical faults are very influential in the actual installation teaching. Through the study and training of typical faults, students can raise their understanding of equipment, develop good fault location and elimination ideas, effectively improve the student's equipment maintenance ability, and effectively ensure the successful completion of various tasks. In the teaching of practical type faults, the equipment shall not be damaged or destroyed due to the artificial setting of faults. Through the use of LabVIEW and VC++ languages to realize the visualization of dimming fault signals, the signals on the key nodes of each subsystem in the dimming fault are scientifically, intuitively and concretely displayed, the signal testing methods, methods and precautions are proposed, and the fault phenomenon that the abnormal signal may lead to the equipment is given. In the teaching process, teachers generally reflect that the visual teaching method of dimming fault signal is more conducive to impart dimming knowledge and operating skills, and improve the actual teaching ability. Students can more easily master the knowledge and skills they have learned, and effectively improve their ability to take up positions.

Keywords: Real teaching; Dimming; Typical fault; Signal; visualization.

1 INTRODUCTION

With the continuous development of vocational and technical education in China, the construction of teaching informatization and the continuous promotion of practical training, the practical teaching training is becoming more and more important, and its proportion in the teaching process is also getting higher and higher. Through the practical teaching training, students can not only deepen their understanding of the professional theoretical knowledge they learned earlier, understand the basic application of theoretical knowledge in the actual equipment, but also understand and master the information relationship and signal process between various subsystems in the actual equipment. It also contributes to training students' equipment operation skills, strengthening style cultivation and quality cultivation, and improving students' comprehensive application ability of equipment. In the definite teaching and training, the learning and training of typical faults play a very important role. Through the learning and training of typical faults, students can further deepen their understanding and grasp of equipment composition, signal process and the working role of each subsystem, cultivate

their ability to analyze and locate faults, effectively improve their equipment maintenance ability, and effectively ensure the successful completion of various tasks. In the teaching of typical failure of real equipment, because the actual equipment cost is expensive, the level of integrated automation is high, and various signals are complex, if the failure is set manually and the signal is tested on the actual equipment, it is very likely that the failure setting is unreasonable or the student test signal is wrong, which will lead to equipment damage and damage. Through the visualization of typical fault signals, the composition relationship, information relationship and signal flow of the tangible equipment are formed. Through signal simulation, graphics, text and other means, the signals on the key nodes in the signal flow of typical faults are displayed scientifically, intuitively and concretely, and the types and sizes of typical signals and the faults that may occur to the equipment due to abnormal signals are given. The visualization of typical fault signals can not only enable students to understand the composition and function of the equipment as a whole, as well as the information relationship and signal flow among subsystems, but also provide visual data for equipment operators to comprehensively and systematically master the signal flow of equipment. In the process of equipment fault location and elimination, students can select the corresponding signal detection node according to the fault phenomenon, quickly check all kinds of signals required when the equipment is in a good technical state, which can be used as the basis for real installation signal detection, guide the post personnel to conduct detection and analysis on the real installation, and quickly and accurately locate and eliminate the fault, To provide fast and accurate visual support and support for maintaining good technical status of equipment.

2 ANALYSIS OF THE PRESENT SITUATION OF THE PRACTICAL TEACHING

Practical teaching training is an important way to improve students' pragmatic operation and equipment repair and maintenance. It is also the main teaching method for students to contact with actual equipment and get familiar with the equipment composition and performance during school study. It can promote the integration of students' professional theoretical knowledge and equipment practical operation, effectively improve students' post holding ability, and lay a sound technical and operational foundation for subsequent career development.

2.1 Less equipment sets, difficult to maintain technical status

At present, the equipment employed by colleges and universities, especially high-tech mainstream equipment sets, is relatively small and expensive. In the process of actual teaching, in order to meet the authentic teaching training, the equipment has been basically in the running state. At the same time, because many students carry out the actual equipment operation training for the first time after learning of the professional theoretical knowledge, it is very likely that human operation errors will occur. When students carry out equipment operation training, a trivial operation error often leads to equipment damage or even paralysis, which seriously affects the process of actual equipment teaching and training. As the equipment is located in a long running state, with the continuous increase of service time, some subsystems may suffer from performance degradation with the increase of temperature, and some sensitive components may be burnt. Therefore, it is particularly important to maintain the fine technical

state of the actual equipment in the actual teaching and training. Only by effectively ensuring that the equipment is in a good technical state can be the actual teaching and training benefit be improved.

2.2 More operation training, and students' enthusiasm for independent thinking is not high

At present, when teachers organize students to carry out practical operation training. Generally, they first briefly introduce the basic composition and work role of equipment, and sort out the operational steps of the operation subject and the problems that need attention. Secondly, the instructor will establish the operation on the actual equipment, and the students will observe the operation on the spot and memorize the operation contents and steps. Then, students learn how to operate in groups. In the process of student training, the teacher overemphasizes whether the students' actions to operate the equipment conform to the operating procedures for the equipment, and whether there are dangerous operations. In case of misoperation or sudden equipment failure, generally speaking, the instructor will correct the operation content or locate and eliminate the sudden failure in person, and the students are only required to conduct operation training according to the operating steps, There is basically no opportunity and time for independent thinking, which seriously affects students' enthusiasm for learning. They do not have a comprehensive understanding of the equipment information relationship and signal process, and it is more difficult to have the ability to analyze, locate and eliminate failure when equipment failure occur, reducing their ability to take up their posts.

3 VISUALIZATION OF TYPICAL FAULT SIGNALS

In the tangible equipment teaching, students should not only master how to operate and use equipment, understand how to give full play to the maximum efficiency of equipment, but also need to maintain equipment in a good technical state through scientific and reasonable maintenance. In order to better teach students to repair and maintain equipment, typical fault training of equipment can help students master the composition, information relationship and signal process of equipment, so as to further the means and methods of repair and maintenance equipment. Characteristics of teaching equipment used in colleges are high integration and automation, complex information relationship between subsystems, various signal types and different types. In order to better cultivate students' ability to analyze, locate and eliminate faults, it is necessary to sort out the signal relationship of typical faults, visually display the signal type and size of key nodes, so that students can clearly understand the fault mechanism, and then carry out practical operation training. Through the visualization of typical fault signals, the students' ability to analyze, locate and eliminate faults is trained, and the excellent technical state of the actual installation is effectively maintained.

3.1 Main contents of signal visualization

The signal of the equipment in the actual teaching is characterized by "invisible and intangible". After the students arrive at their posts, in addition to operating the equipment through skilled operating skills, they also need to be able to quickly test the relevant signals through the fault

phenomenon when the equipment fails, and be familiar with the relevant characteristics of the test signal and its impact on the equipment, so as to locate and handle the fault. In the process of everyday teaching, students can understand and master the signal characteristics of corresponding equipment through the explanation and training of typical faults. Therefore, the purpose of signal visualization of typical faults is to intuitively display the signals of equipment, specifically to scientifically, intuitively and concretely display the signal transmission relationship formed by the signal processing process and the signal characteristics at different nodes, so that students can understand and master them.

3.2 Realization of visualization of typical fault signals

The visualization of typical fault signals is mainly to summarize and sort out the faults of real equipment, screen out representative typical faults, present them in the form of fault trees, sort out the signals to be tested, extract the relevant characteristics of signals, use LabVIEW and Vc++ languages to realize the visualization of typical fault signals.

3.2.1 Sorting out typical equipment faults

Here we choose a certain photoelectric equipment as an example to solve typical faults. First of all, we need to build the basic composition block diagram of the equipment, focusing on the important subsystems of the equipment, so that students can understand and master the signal process of the entire equipment, and more conducive to the analysis and positioning of related faults. Secondly, by consulting and investigating the equipment advance units and users, we can understand the use characteristics of the equipment, the occurrence of faults in the process of development and use, sort out and screen the faults, and form a typical fault library. The equipment composition block diagram is shown in Figure 1. the fault tree of no change in dimming is shown in Figure 2.

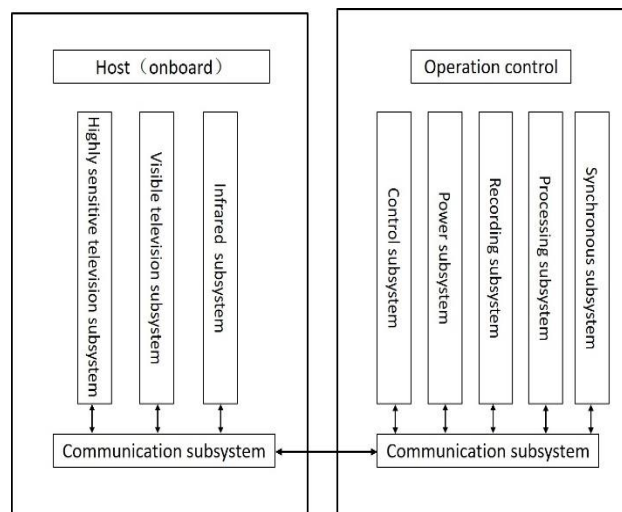


Figure 1. Block Diagram of Equipment Composition

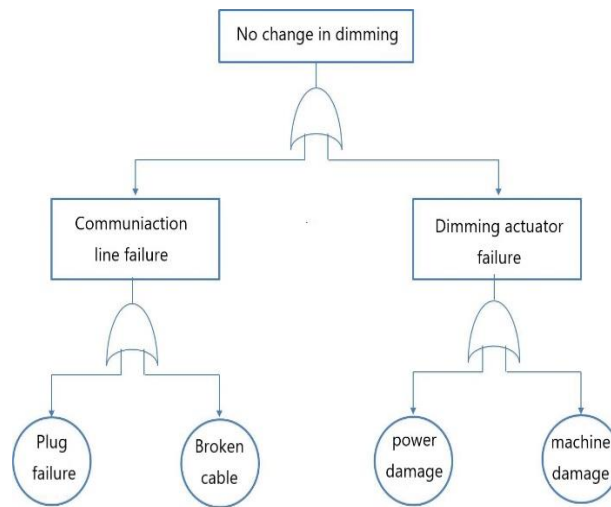


Figure 2. Dimming without change

3.2.2 Signal visualization

According to the fault tree signal flow of predictable faults, find out the key nodes to be tested in fault location, the type and size of signals, build test graphs, and use programming tools to simulate the relevant characteristics of signals. In the operation training, students test the signals of the corresponding fundamental nodes according to the signal flow, and identify whether the tested signals are normal according to the characteristics of the test signals. Through the sequential testing of signals, combined with the fault phenomenon, the fault is located and the faulty solution is given. After the simulation training, master the signal testing method of key nodes and test the actual equipment, so as to get acquainted with the equipment and be able to locate and eliminate the fault, and effectively improve their post holding ability. The test hole is shown in Figure 3, the signal is abnormal, as shown in Figure 4, the signal is normal as showed in Figure 5.

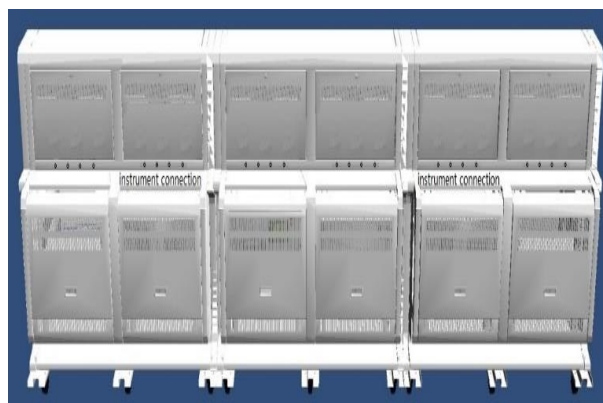


Figure 3. Test hole

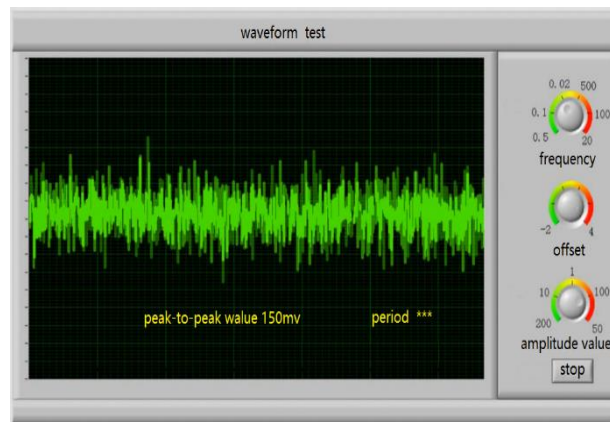


Figure 4. Abnormal signal

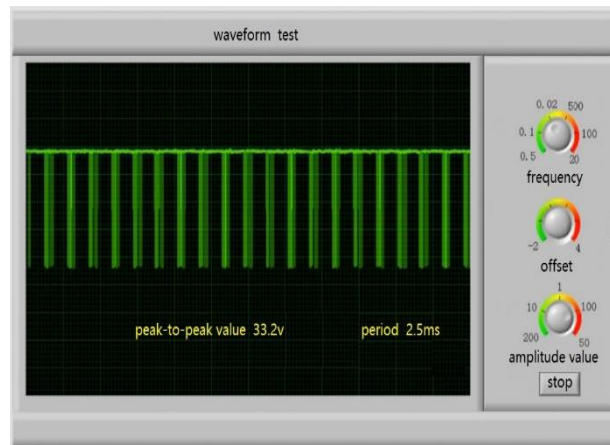


Figure 5. Normal signal

4 CONCLUSION

In the actual equipment teaching, the equipment is frequently used, the technological state is difficult to maintain, the relationship between subsystems is complex, the signals are diverse, and it is difficult to explain intuitively and visually. In order to better understand and master the equipment and improve the student's ability to operate, repair and maintain the equipment, the typical fault library of the equipment is formed by summarizing and sorting out the equipment faults. In the actual installation operation training, typical faults are taken as the traction to learn and master relevant knowledge and skills, and the signal characteristics of key nodes are visualized by means of the signal visualization of dimming faults, so that students can have a deeper understanding of the signal characteristics of key nodes in typical faults, thus improving the teaching efficiency and students' post ability. In the process of practical operational training

of related course, in combination with the teaching process, visual teaching methods of typical fault signals are used. Teachers generally report that visual teaching methods of dimming fault signals are more conducive to impart dimming knowledge and operating skills, so that students can more easily master the knowledge and skills they have learned, and effectively improve their post holding ability.

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