Analysis of Equipment Anti-interference Problem in Electronic Information Communication Engineering

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Abstract: This article analyzes the role of equipment anti-interference in electronic information and communication engineering. This paper studies how to improve equipment operating efficiency, reduce the probability of leakage problems, and improve the quality of information transmission. Combining the principle of equipment anti-interference in electronic information and communication engineering, the author studies the related causes of equipment anti-interference problems, how to deal with transmission interference problems, how to deal with external environment and receiving interference problems. In addition, the author also proposed preventive measures against the above problems and countermeasures for the integration of technical work. The purpose of this article is to improve the operational stability of electronic information and communication engineering equipment and improve the anti-interference ability of the equipment.

1. Introduction
Electronic information communication is subject to many technical limitations and interference from external factors in the process of transmitting information. With the improvement of electronic information and communication research and development capabilities and research levels, these interference factors have basically been overcome. However, there are still some problems in the actual application of electronic information communication. Among them, the anti-interference of equipment in electronic information communication engineering is one of the main problems. It not only affects the operational performance of electronic communication projects, but also has certain hidden dangers to the safety of staff. Therefore, in order to ensure the effectiveness of anti-interference, we need to take reasonable measures to deal with it in the actual operation process to improve the reliability of the equipment during operation.

2. The Role of Equipment Anti-interference in Electronic Information Communication Engineering

2.1 Improve Equipment Operating Efficiency
There are many application equipment such as transmitter equipment, receiver equipment, computer and so on in electronic information communication engineering. These devices will produce some interference signals when they are affected by the principle of electromagnetic induction. These interference signals are similar in frequency to some transmitter equipment signals. As a result, the mixing of these interference signals will form a new signal source, which will interfere with the normal operation of electronic equipment. If we take corresponding measures to deal with equipment interference problems, we can reduce the impact of equipment problems on signal transmission. Moreover, we can optimize the signal transmission environment during processing. This way can also
improve the operating efficiency of the equipment, so that it can better meet the application requirements of the work.

2.2 Reduce the Chance of Leakage Problems
The working environment of many equipments in electronic information communication engineering is located outdoors. The basic conditions of the outdoor environment are relatively harsh, so that many electronic devices are easily affected by external conditions such as lightning, rainfall, and strong wind. The occurrence of these situations can easily lead to damage to the circuit, which leads to the emergence of equipment leakage problems. The internal leakage of the system will form an electromagnetic field in a small area, which will interfere with the signal transmission. Relevant data shows that the occurrence of internal leakage in the system will also increase the probability of signal loss by 10%-15%. Relying on scientific means to deal with the leakage problem in time can improve the safety of the circuit operating environment and increase the system's anti-interference ability by 20%-35%. This method can also improve the operating efficiency of electronic information and communication projects and enhance the application effect of the system itself.

2.3 Improve the Quality of Information Delivery
The quality of information transmission has always been the primary concern for researchers in the operation of electronic information and communication projects. The quality of information transmission will be affected by factors such as intermodulation interference and out-of-band interference in the actual application process. This can easily cause common problems such as missing information, duplication of information, and unsuccessful information transmission. These failures will also bring about 15%-25% of information loss, thereby affecting the operation of the system. However, the application of equipment anti-interference measures can effectively solve these application problems. Moreover, in this process, some potential problems can be reduced, and the quality of information transmission can be improved by 30%-50%. In addition, the anti-interference mode can also ensure the stable improvement of the quality of information transmission during operation, thereby improving the application quality of information transmission.

3. Anti-interference Principle of Equipment in Electronic Information Communication Engineering
Communication signals will inevitably be interfered by many factors in the process of information transmission. These factors may come from the external environment or internal equipment failure. The entire communication project contains many equipment and lines. In order to improve the safety and reliability of these equipment during operation, we have adopted relevant technical equipment to ensure the sustainable and normal operation of the entire project, thereby improving the ability to resist interference. At present, these devices have become an indispensable part of electronic communication engineering. What we need to pay attention to is that there is still a condition for the equipment to fully exert its anti-interference ability and function in operation, that is, when other communication equipment is operating, there is no voltage inside the entire equipment system and lines. This also means that there is no current in the equipment and lines, and the equipment is in a relatively stable state. Only in this way can the equipment play a corresponding role and ensure safety and stability. In communication engineering, when the equipment is in operation, we can clearly see from the specific work practice that the design and planning of these systems are not as satisfactory. These systems have problems in the design structure. At this time, voltage and current will appear in engineering equipment, and the potential difference of the system will also appear to be quite different. This also causes a lot of uncertainty in many systems during operation, and at the same time brings greater interference to the signal transmission quality, which can easily lead to poor signal transmission. This is also one of the issues we need to focus on when dealing with follow-up issues.
4. Equipment Anti-interference Problems and Related Reasons

4.1 Equipment Leakage
Because the working environment of many equipment in electronic information and communication engineering is located outdoors, it is easy to cause interference to the normal transmission of engineering signals due to the influence of external weather conditions [1]. In addition, electronic communication engineering equipment is also susceptible to climatic conditions during operation, causing line current overload problems, resulting in leakage faults in the equipment. From the corresponding statistical results, we can find that the probability of occurrence of equipment leakage problems is generally controlled within 30.2%-41.2%. Furthermore, some application problems are prone to occur during the operation of the system, which affects the stability of system transmission.

4.2 Missing Information Transmission
The guarantee of the quality of information transmission is one of the very basic contents in the normal operation of electronic communication engineering. However, from the actual operation situation, there is a probability of 8.5%-12% that there will be problems such as missing information transmission, information duplication, and unsuccessful information transmission. The main reason for such problems is that communication equipment is prone to leakage current in practical applications. Under the action of this current, interference signals will appear, which will affect the transmission of normal signals [2].

4.3 Intermodulation Interference
Communication engineering equipment is often affected by intermodulation interference during operation. This problem mainly refers to that communication engineering is susceptible to interference from two or more types of signals of different frequencies or similar frequencies when transmitting signals. If the staff does not handle such signals well, it is easy for the signal to be transmitted to the receiving equipment and its complication is relatively high. If the number of other signals incorporated is too much, it will also cause signal transmission distortion and affect the final transmission quality of the communication system. The negative impact caused by such problems is greater. If such problems occur in special industries such as trains and airplanes, they can easily lead to major accidents [3].

4.4 Out-of-band Interference
The signals transmitted in communication engineering are mainly electromagnetic waves. Compared with wired signal transmission, electromagnetic waves are susceptible to interference from harmonics during long-distance transmission, that is, they are affected by out-of-band interference. From the perspective of practical application, the transmitter often releases some spurious radiation during the signal transmission process. However, there is no specific rule for the formation of these stray radiation. Moreover, the transmission of information will also bring strong interference to the transmission of equipment signals, making the signal transmission in an environment with poor stability. In addition, the equipment will also release harmonics during operation. Such signals will also affect the signal transmission of the system to the extent of 20%-35%, which will cause a greater negative impact on system stability [4].

4.5 Blocking Interference
Electronic communications are also vulnerable to jamming during actual operation. The emergence of this type of interference problem is mainly related to the operating power of the transmitter in the communication system. In addition, the blocking interference problem will directly cause greater interference to the operation of the device itself. Especially in the process of signal transmission, some high-frequency interference signals are very strong, so it is easy to cause large undesirable interference during signal transmission, which will also make it difficult for the receiver to receive the complete signal. Cite an instance, in some densely built areas, there are more interference factors. Therefore, the
signal transmission quality is easily affected, which affects the safety of system operation [5].

5. Countermeasures for Equipment Anti-interference Problems

5.1 Transmission Interference Problem Handling

As shown in Figure 1, the transmitter will involve many application structures in the working process to ensure the smooth transmission of the signal. When dealing with interference factors during the operation of such equipment, the staff generally choose to optimize the antenna system and adjust the transmitter operation. In the actual adjustment, we will first optimize the elastic span of the processing signal, so that the receiving range of the transmitter can be effectively improved. Moreover, we can also properly shield equipment interference signals during this process. Otherwise, we added a filter device during the operation of the signal device, which can filter some useless signals, thereby improving the stability and effectiveness of the signal transmission process [6]. Finally, in the process, we can also optimize the signal transmission environment, which can also improve the operating efficiency of the equipment, so that it can better meet the application requirements of the work.

![Figure 1 Schematic Diagram of Transmitter Operation](image)

5.2 External Environment Interference Processing

Since many devices in communication engineering are concentrated outdoors, the interference signals they bring are also uncontrollable. Moreover, we can also rely on current information technology to build a data signal transmission monitoring platform in the process of problem response. This is helpful to discover some potential operation problems in time and speed up the processing speed of fault problems [7]. Simultaneously, with the help of the monitoring platform, we can monitor the daily operation status of these devices in real time and record the corresponding data information. Staff can also use the database to organize data once a week and store useful data to improve system reliability and effectiveness.

5.3 Handle Receiving Interference Problem

Corresponding to the problem of transmitter interference is the problem of receiver interference. This is because the signal will continue to transform in the process of transmission. If the equipment is running in a very unstable state at this time, it is easy to cause signal loss [8]. For such situations, we can dynamically adjust the receiving frequency of the receiving device. Besides, we added a filter device during the operation of the signal device, which can filter some useless signals, thereby improving the stability of the signal transmission process and reducing the probability of interference problems. Finally, during the treatment process, the relevant staff also need to do a good job of recording the location of the problem, its severity, the treatment plan and the result. These records can provide data reference for the optimization of the management system and speed up the efficiency of handling interference problems.
5.4 Preventive Measures
The staff needs to draw up corresponding preventive measures in advance in the process of handling interference problems, so as to reduce the probability of signal interference problems and improve the stability of the system operation process. In specific practice, we can use big data technology to organize historical data information to understand the cause, probability, and countermeasures of related problems in the past. According to the corresponding ranking results, the researcher will propose corresponding preventive measures. In the implementation process, we also need to adjust the signal so that it can meet the basic transmission requirements, thereby improving the operating quality and application effect of the system [9].

5.5 Technical Work Integration
In addition to the above-mentioned content, we also need to do a good job in the integration of technical work in dealing with the interference problem of communication engineering. We should integrate PLC technology, PID module, database technology, and automation technology into communication engineering in a reasonable manner. Furthermore, we also need to do a good job in technical combing to make it more suitable for the application process, so as to improve the reliability and rationality of system operation.

6. Conclusion
In summary, the handling of anti-interference issues plays a very important role in the operation of electronic communication projects. Formulating corresponding treatment measures for some common types of problems can not only improve the operational effect of electronic information and communication projects, but also optimize the operating environment of the project and provide a good application environment for the subsequent development of the project.

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