Introduction of on-line automatic noise monitoring system

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Abstract. The on-line automatic noise monitoring system has superior working performance, and the on-line monitoring is convenient, fast and accurate, which is the trend and trend of noise monitoring in the future. The on-line automatic noise monitoring system is mainly composed of data acquisition system, front-end power supply system, data transmission system and data center. This paper briefly introduces the on-line automatic noise monitoring system.

Keywords: Noise, On-line, Automatic monitoring system.

1. Introduction

Any sound that interferes with people's normal rest, study and work, as well as the sound that interferes with the sound people want to listen to, belongs to noise. The noise is generated by the instantaneous superposition of sound energy from different noise sources. A considerable number of monitoring points and intensive monitoring frequencies can reflect the real situation of regional noise. If we rely on traditional manual operation, the work efficiency will not be improved, and human and material resources will be wasted to a certain extent. Therefore, the superiority of the on-line automatic noise monitoring system is self-evident.

At present, the online monitoring of environmental noise has been basically realized in major urban areas in China, and the online monitoring of highway traffic noise has also been gradually implemented. Now the so-called automatic noise monitoring system is a system that can automatically and continuously collect noise data. Its components include noise monitoring substation, transmission network and noise monitoring and control center. The online monitoring system includes the noise data acquisition terminal, the noise data management center and the noise data processing center. The management center receives the data provided by the wireless communication data module. These data are actually obtained after the environmental noise is sampled, analyzed and processed. The automatic noise monitoring system is similar to this one. It can generally be divided into four parts: data acquisition system, front-end power supply system, data transmission system and data center.

2. Data acquisition system

As a professional technology, data acquisition technology is widely used in industry. At this time, the data acquisition system has a more advanced mode structure. In the face of different actual situations and requirements, the number of modules can be increased, and the functions of modules can also be changed. Through relevant programs, the expansion or change of the system can be completed, and a system that can solve specific problems can be formed in a short time. Distributed data acquisition system has been widely used in various fields at home and abroad. It is mainly composed of widely distributed data collectors and microcomputers. The rapid development of large-scale integrated circuits has greatly stimulated the growth and renewal of various new decentralized data collectors. Flexibility, reliability, front-end intelligence and other multi-function integration and strong anti-interference ability have become the development direction of distributed data acquisition system. The data acquisition system for the automatic noise monitoring system is to measure and collect the noise on site. Usually, the microphone is used to collect the noise, and the signal processing is undertaken by the analysis module. At present, condenser microphones are widely used because of

their good adaptability to the working range and working environment of noise monitoring system. The front-end instrument can work automatically under the control of the embedded microcomputer system program.

Microphone module and AD conversion module constitute a conversion module mode of the data acquisition system, and the other is the conversion module mode. The components of the conversion module mode are microphone module, AD conversion module and signal analysis module. Now more and more online systems use software to analyze and process signals, optimize front-end hardware design, and improve the economy of the system. The range of physical quantities of the data acquisition system is still relatively limited, so we can try to add some special physical quantities to increase the scope of application of the system. The high-speed and high-precision data acquisition needs further design improvement, and the data processing algorithm also needs more optimization. Wireless network data transmission can be adopted in the system, which can not only meet the communication rate, but also facilitate the use of data acquisition system and avoid redundant line laying.

3. Front end power supply system

There are two ways of power supply for the on-line automatic noise monitoring system placed outdoors, one is the use of batteries, and the other is the combination of batteries and mains power. Choose the former, you can install the system in any qualified place, which is more suitable for the monitoring of the time period; If it is a long-term noise monitoring, it is more appropriate to choose the latter, mainly using urban power supply and battery as backup to prevent the occurrence of power failure accidents. In addition, the on-line automatic noise monitoring should also have weather proof and other functions, and it can also collect stable signals under unconventional conditions.

4. Data transmission system

The rapid development of electronics, computer and information science and technology has laid a solid foundation for the rapid development of communication systems. From wired to wireless, from voice to image, from local area to wide area, data transmission system adopts more and more communication networks and communication methods. Data transmission can be divided into wired and wireless.

Many environmental noise monitoring systems use wired communication. In addition, wired plus modem or optical fiber communication is used in the monitoring system. There are two transmission ways to choose by using the telephone line. One is the equivalence between the two sides of transmission and reception. The monitoring instrument and data center are connected to the telephone line network by using the modem, so that the other side can be accessed at any time by dialing. Another way is to connect the data center to the computer Internet to receive data, and use the modem to connect the monitoring instrument to the telephone network.

From the actual operation, the more stable way to obtain data is to use optical fiber communication, because its anti-interference ability is very strong. The disadvantage is that the cost of laying optical fiber is too high, which is beyond the bearing range of the monitoring department. The rapid development of computer technology and communication technology promotes each other, which also improves the technical application level of wireless network, which makes wireless network technology the most important way to transmit noise monitoring data in the future. Wireless electric communication system uses public frequency band to realize data transmission, and its channel and equipment are cheap and easy to maintain. Its disadvantage is that it is only suitable for data transmission in cities with small distribution distance and small number, because the shielding of urban high-rise buildings limits its transmission distance.

Long distance data transmission has a special mobile communication network, whether it is radio communication, wired communication, or optical fiber communication, which is caused by many

factors, including distance, real-time requirements, cost, environment, etc. Therefore, it must be independently constructed and used by a specific department, and usually can only be used in a specific area, and the coverage is very limited. Therefore, they are not very desirable, because we should consider the scope of application and cost. Now it is advocated to use the existing cellular network to realize the wireless data transmission service, because it is effective and economical, and the frequency reuse technology is very effective. First, it realizes the full utilization of frequency resources, and the network coverage is also very high.

5. Data center

The last link of the noise monitoring system is the data center, whose main work is to analyze the noise data, calculate and count it. The nature of the signal transmitted by the data acquisition system determines the specific work content of the data center. The development of the scale of the existing data center requires that the infrastructure of the data center can support capacity expansion. However, because most of these data centers were previously planned and designed, their environmental indicators are often difficult to meet this expansionary demand, resulting in many problems. Integrating the signal analysis module into the data acquisition system to directly undertake the statistical analysis work can save costs, improve efficiency and improve data management.

6. Conclusion

The main components of the on-line automatic noise monitoring system are data acquisition system, front-end power supply system, data transmission system and data center. The on-line automatic noise monitoring system makes the monitoring not only convenient, but also fast and accurate. Its working performance is superior. It can provide accurate and detailed information for the treatment of noise pollution, and is also conducive to the smooth progress of the supervision and management of relevant departments, so as to improve the quality of the environment. The on-line automatic noise monitoring system is the development trend of noise monitoring in the future.

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