Research on Fire Alarm Monitoring System Based on Computer

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Abstract. With the rapid development of urbanization, the number of buildings is increasing rapidly, and the density of buildings increases the difficulty of fire protection. Therefore, more and more fires occur in the city, which is not conducive to the improvement of people’s daily safety and quality of life. In order to ensure the quality of urban construction, the construction of fire alarm monitoring system is particularly important. In the new era of social development, we will comprehensively improve the traditional and single monitoring and alarm functions, integrate the functions of monitoring, linkage, alarm, regulation and prevention, and establish a comprehensive and intelligent fire alarm and monitoring system. With the rapid development of network technology, the realization of fire alarm monitoring system is inseparable from the support of network system. On this basis, we should strengthen the research on alarm monitoring system, realize the good integration of network technology and fire alarm monitoring system, constantly improve it, and play its maximum role to improve the quality of fire protection work, so as to contribute to the modernization of the city.

Keywords: Fire, Alarm Monitoring System, Computer

1. Characteristics of fire alarm and monitoring system

Compared with the common fire alarm and monitoring system, the new alarm system based on network can realize the automation and intelligence of alarm monitoring, and has a greater protection role in preventing and avoiding the occurrence of fire accidents.

Network supported fire alarm monitoring system mainly uses TCP or IP network protocol for internal connection of the system, including fire monitoring, monitoring management and garage transfer and other functions, to ensure that the system can always be in the best state, and realize the integrated control of information transmission and analysis of the alarm monitoring system, so as to be able to use the system to have Effective prevention of fire accidents\textsuperscript{11}. Based on the network, the fire alarm monitoring system of fire protection engineering can send out an alarm only after data processing and information analysis, and then improve the data, so as to realize the effective prevention of fire. Usually, the fire information mainly includes the number of the accident place, the occurrence time and the level of the fire and other important information. After the intelligent analysis of these relevant information, the alarm will be sent out, and the entire control system will use the
network to reasonably allocate the garage personnel, and arrange the rescue team to rescue, so as to realize the information and automatic network of the alarm system. The fire alarm system based on this system mainly has two functions of eliminating fire and preventing fire, and the whole fire system is designed for fire prevention and control (Figure 1).

In the operation of the system, it can analyze the causes of previous fires in the city, so as to formulate a scientific and reasonable fire prevention scheme, effectively avoid and reduce the probability of fire, and improve the effectiveness of fire protection work. The network-based fire alarm monitoring system can make full use of the network to check the problems existing in the fire-fighting, and effectively avoid the malpractice of "people moving, people walking and stopping"[2]. It can check the existing problems of the equipment through the network, so that the professional and technical personnel can timely eliminate and solve the problems, so that the control and management of the equipment become more convenient and efficient.

![Figure 1. Composition of information fire monitoring system.](image)

2. Components of fire alarm and monitoring system based on computer

2.1. Control

The fire alarm monitoring system is the system software controlled by the city fire department. The main working mode is to monitor the fire control network in the city. If there is a fire, the monitoring point will upload the fire situation to the fire alarm control system in time. Through the analysis of the fire, the system will give an alarm and realize the automatic control of the fire truck to the fire scene, so as to prepare for the realization of fire linkage control. The fire alarm monitoring system will be set up in the fire alarm monitoring system. Its main function is to monitor the monitoring points comprehensively. If the fire alarm is monitored, the alarm can be sent out in time. The design of the system mainly uses network protocol to connect the fire alarm control system with the fire monitoring point. When the fire occurs, the information can be transmitted to the fire control system. Through the analysis of the data, the important information such as the number, level and time of the fire place can be determined, and the alarm can be realized. In the automatic and intelligent control, according to the garage information and the firefighters' attendance of the fire brigade was scientifically assigned to the fire scene for rescue.

Garage transfer function is mainly realized through the garage transfer system. According to the regional monitoring network and fire garage information, the fire geographic information is analyzed in the database, so as to select the nearest fire unit and the shortest fire path, and improve the efficiency of fire fighting and disaster rescue[3]. The first mock exam is to monitor and manage the fire
alarm in the garage transfer system. The main task of this module is to add, modify and delete the fire information including the location, number and distance of the monitoring points (Figure 2).

![Figure 2. Fire alarm system.](image)

2.2. Analysis

The ultimate goal of fire engineering is to reduce the probability of fire and protect the safety of people’s lives and property. In the traditional sense of fire fighting, fire fighting is emphasized. However, with the continuous change of fire fighting ideas, the most important thing is to prevent fire. In order to achieve better prevention effect, the analysis system of fire alarm monitoring system emerges as the times require. The main function of this system is to analyze the fire data in the past, calculate the fire disaster area in the city by computer, and analyze the causes of the fire, and formulate a feasible intelligent simulation fire prevention scheme\(^\text{[4]}\). At the same time, according to the nature of the protected object, fire risk, evacuation difficulty and the degree of fire fighting, the fire alarm is classified. Through scientific analysis of the alarm situation, the corresponding personnel, equipment and materials are dispatched for fire fighting to ensure the effectiveness of fire fighting. Through the application of fire alarm monitoring system, we can monitor and manage the key areas of the city, do a good job in fire prevention preparation, reduce the probability of urban fire, and improve the quality of urban construction.

3. Practical significance of fire alarm and monitoring system in fire engineering
### 3.1. Determine the disaster situation as soon as possible to reduce fire losses

The network-based fire monitoring and alarm system can use its intelligent and effective to determine the disaster situation as soon as possible, so as to reduce the personal and property losses caused by fire disasters. In case of fire, the network is used to send information to the monitor in time, so that the disaster situation can be determined as soon as possible, and the real-time monitoring and unified scheduling of the work can be realized through the network, which greatly improves the efficiency of the rescue work.

### 3.2. It is conducive to the transformation of civil air defense into technical defense

At present, the fire alarm and monitoring system based on network realizes the alarm and monitoring of the whole disaster situation in the form of computer. The system can transmit the information to the monitoring center in the form of data through the network, so that it can effectively analyze and process the data, quickly formulate correct and reasonable countermeasures, so that the whole disaster can be effectively controlled, reduce the personal and property losses caused by fire, and ensure that the whole early warning system is always in a good running state.

In addition, the new fire alarm system based on network can operate continuously once it is started, which is beneficial to the timeliness of information. Once the abnormal situation of fire-fighting facilities is found, the system will automatically make a series of reactions, so that the staff can find out as soon as possible and take corresponding emergency measures for supplementary education, so that the firefighting facilities of the unit can be restored to normal state as soon as possible.

### 3.3. It is helpful to improve the scientific nature of fire control internal management

The fire engineering alarm monitoring system under the network state can realize intelligent internal management. In the whole management process, it can realize 24-hour monitoring well to save and backup the previous records. When a fire occurs, managers can quickly find out the relevant evidence, so that the effectiveness of fire rescue work has been greatly improved.

![Figure 3. Fire monitoring function.](image)

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### 4. Conclusion

Intelligent fire alarm monitoring system uses network technology and advanced hardware equipment to improve the judgment of fire authenticity, which has obvious advantages. For example, it can analyze the subtle changes of fire environment, realize the automatic detection of humidity and gray, and automatically process the distribution of lines in fire-fighting equipment. The computer-based alarm monitoring system mainly uses the combination of the main network and the slave network to improve the adaptability of the system, so as to ensure the reliability of the fire emergency function in buildings. In the operation of the system, the traditional management mode is changed, and the software technology is improved. The software code programming is used instead of the hardware combination form to effectively improve the repairability of the intelligent fire warning and monitoring system of fire engineering.

To sum up, the network-based fire alarm monitoring system has changed the previous single alarm function into diversification. At the same time, the modern fire alarm monitoring system can monitor and control the fire alarm regulation and fire prevention functions, effectively prevent and control fire accidents, reduce personal and property losses, and improve the effectiveness and timeliness of fire rescue work. In addition, in the future development, we should pay attention to strengthen the...
research in this area, so that its function can be expanded to provide more help for China’s fire industry.

References
[1] Wu Xuanzhong; Research and Design of new Intelligent fire alarm control system [C]; 2007.
[2] Xie; Analysis of fire alarm monitoring System of Fire engineering based on Network [J];
Scientific and technological innovation and application; 2017
[3] Xu Yu; Development of fire engineering based on Information Technology [C]; The electronic
world; 2018
[4] Wang Hongbei, YAN Tao. Analysis of fire alarm and monitoring System of Fire Engineering
based on Network [C]. Urban Construction Theory Research, 2013.
[5] Design and Implementation of Qinhuangdao City fire remote monitoring system [J]; Dalian
University of Technology; 2015.
[6] Review of networked technology of urban fire remote monitoring system [C], Annual Meeting
of China Association for Science and Technology, 2008.