The Implementation and Application of Construction Safety Supervision and Management System based on Web server

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***Abstract*—This paper focuses on the basic principles and main components of web server-based construction safety supervision and management. Comparative and analysis of the characteristics and advantages of the system, its application for safety of the construction enterprises in production controlled and the closed-loop management provides strong guarantee and support.**

Keywords- Web Server, COMS Image, Construction Safety Supervision and Management

I. INTRODUCTION

In recent years, it has become the focus of attention which the society pays attention about the pros and cons of building product quality in construction safety and production, because this relates everyone the benefit. Particularly in the last years, production of construction enterprises have been expanding, how to improve the management of the construction site, thereby improving the quality of construction products, it is the product key that good production management system is to protect the safety and quality. In recent years, as computer networks、image processing and transmission technology rapid development, the video surveillance technology has made substantial progress. The video monitoring by its content rich and direct-viewing convenient used in many occasions, but relates to the construction safety supervision and management system in its infancy. The existing construction supervision and management of system is installed at the site of the video camera through the video cable sent to the monitor by the video switch, the analog video cable will generate losses, and sending the image limited to 500m range, can only be used Local monitoring[1].The system is based web server construction safety supervision and management, using integrated design, information technology and video through the COMS the most advanced digital video compression theory, combined with network technology and multimedia computer hardware and software control, breaking the traditional video surveillance system for remote real-time image transmission constraints, realization of a computer network management, to maximize resource sharing, provides users with a good human-computer interaction and rich and reliable control interface. Different parts of the construction site can conduct real-time, comprehensive monitoring and management, so that more comprehensive monitoring and more timely information. Not only to provide timely and accurate information for business decision makers, but also the management were more immersive and intuitive as to the construction site management and supervision[2].

II. DESIGN PRINCIPLES OF CONSTRUCTION SAFETY SUPERVISION AND MANAGEMENT SYSTEM

System is the use of computer network technology, set up their own independent web server, through a wireless base station, AP points connected to the video equipment of each hard drive. The video equipment used CMOS image sensor capture video images, to achieve control purposes about object of remote supervision and management. Video can be in the computer network (LAN or WAN) to transmit is essentially unlimited distances, and the signal less susceptible to interference, can greatly improve image quality and stability; Secondly, the video transmission using computer networks, network bandwidth can be reused without re-wiring; In addition, compressed video data can be stored in the disk array or stored in CD-ROM, the query is very simple and quick [3].

Construction safety supervision and management system is a comprehensive systems engineering, various control signal monitoring system of the receiving device through the transmission to the monitoring host, the host and site monitoring of other computers to form a local area network, and connect to the Internet through fiber, using the TCP / IP protocol and effective rights, on-site computer and remote monitoring center can monitor the real-time camera images and related data.

III. THE CHARACTERISTICS OF SYSTEM

A. TheHigh-speedImage Acquisition System Based on COMS Sensor

The image acquisition system using COMS sensor (see Figure 1), at present, the image sensor products are divided into CCD, CMOS and CIS sensor. CMOS-type not only has high integration, more power, low price and so, and has achieved digital output, software-programmable control, greatly reduce the difficulty of system design, increase system design flexibility, noise immunity and stability. COMS sensor has now become the dominant technology engineering applications [4].

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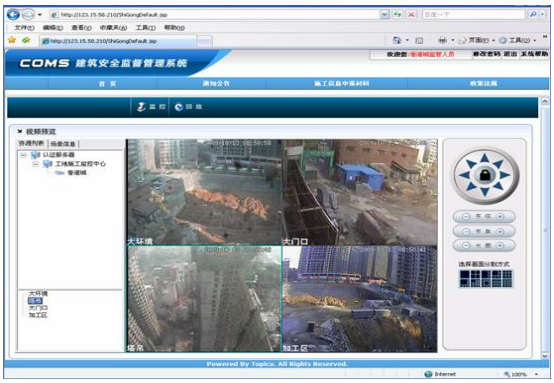

Figure 1. COMS image sensor acquisition interface.

B. *Advanced*

Use of advanced technology, client / server architecture and master-slave distributed WEB query. 2M upload bandwidth via fiber directly connected to the Internet, to the Internet directly through the IE browser to the system.

Portability

(1) Using java to develop cross-platform operating system.

(2) User-system platform no correlation between back-end database.

C. *Flexibility*

(1) The structure of the table describes the system menu, system expansion to plug-in modules and menu to resolve, simply modify the main program.

(2) Provides data query and open WEB inquiries for users to select and adjust.

(3) Process flexibility, the use of a large number of parameters.

D. *Data accuracy*

The data will be strictly logical examination before it is saved to the database, and system with error correction to ensure the accuracy of the data, while ensuring the uniqueness and integrity of data. System also provides data backup, logging and fault recovery, maintenance of registration means the system in unexpected situations to ensure the recovery operation and data security.

E. *Data Security*

Each user table in system authorized to use is maintained through the process to determine the types of data sharing, and the way users log on account in accordance with rights recognized by the system, user can choose to implement the menu functionality. The data entry changes are required to issue the command to receive one by one to record implicit operator account, if necessary, procedures for inspection by the executor of monitoring the situation.

F. *Flexible Intervention*

date transmission of system is mainly classified into two kinds of wired and wireless transmission, cable transmission in the wider application of the construction site, it has the advantages of low cost signal stability, but there are also The transmission distance close, complicated wiring and other shortcomings; Wireless transmission is developed in nearly two years, it has a transmission distance and adjust the direction of a directional antenna and omni antennacan be any exchange and easy installation , its drawback is that the signal more vulnerable to outside interference and system relatively high cost[5].The system according to the field situation, the use of cable transmission and wireless transmission combination.

IV. THE COMPOSITION OF THE SYSTEM

The system consists of front-end system, transmission system, and center-side remote control system of three parts (see Figure 2), described separately below:

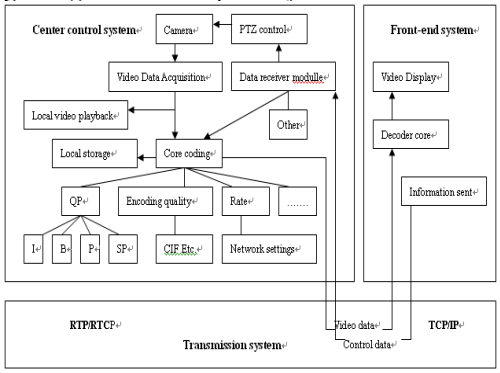

Figure 2. System structure diagram

A. *Front-end System*

Front-end system consists of signal acquisition equipment elements. It includes video, alarm analog signal acquisition and other acquisition equipment, mainly by the cameras, infrared / microwave alarm detectors, temperature detectors, these devices monitor the site responsible for collecting video images, illegal intrusion, temperature, and other relevant data. Among them, the video capture device is an important part of front-end system, the use of current video surveillance is widely used in color or black and white COMS camera, optical lens with it, through the photoelectric conversion of light signals into electrical signals, to complete the monitored target; another important component of the multi-function decoder, which is the nerve center of the front-end system. The device has a bi-directional codec functions, one can accept clients from the center of the control signal sent by the decoded to control the power zoom lens for zoom, focus and actions such as opening and closing the aperture; the other hand, it can receive on-site alarm sensor alarms and temperature signals, analog current and voltage data, and the reverse side of the control back to the center of the host.

B. *Transmission System*

Transmission system is the digital remote video surveillance system, a key component, is responsible for uploading all kinds of signals and instructions issued. The

system can make use of digital fiber optic, digital microwave, satellite, wireless spread spectrum digital transmission, and other remote media, image and data compression signal tens of kilometers away from the remote base station to send to the center console, while the center-side control signal issued by the remote base station returns. Real-time, high-resolution moving images and rich data interface makes the system has a very high practical value; create well-designed high-quality production and high stability of the system makes the system a high degree of environmental adaptability, can be applied to all Trades of a variety of applications in fact, the system has been in the building system has been widely used, and for the use of sector management has brought enormous benefits.

C. Center Control System

Central control system is the brain of construction safety supervision and management system, responsible for the overall management and control system, receiving from the remote monitoring site monitoring images, a variety of on-site alarm signal and status data to the remote monitoring Site to send voice and action commands. The system uses the latest multimedia control theory, advanced computer software and hardware technology and network technology to provide a full built-in host operating systems and good software management interface, monitoring system not only inherited the tradition of all the features and achieve a number of new technological breakthroughs, will monitor the images involved, alarm, device status and control for intelligent data management; established based on the TCP / IP communication protocol, application sub-classification of LAN technology control management System, achieved with the perfect combination of the existing computer network and a high degree of resource sharing. Core code of system to manage data through the network is shown below:

```
function( elem, name, data )
{
    elem = elem == window ?  windowData :elem;
    var id = elem[ expando ];
    // Compute a unique ID for the element
    if ( !id )
        id = elem[ expando ] = ++uuid;
    // Only generate the data cache if we're
    // trying to access or manipulate it
    if ( name && !jQuery.cache[ id ] )
        jQuery.cache[ id ] = {};
        // Prevent overriding the named cache with
undefined values
    if ( data !== undefined )
        jQuery.cache[ id ][ name ] = data;
    // Return the named cache data, or the ID for the element
        return name ?
    jQuery.cache[ id ][ name ] :id;
}
```

V. CONCLUSION

The comprehensive system to promote information sharing and information exchange, so that the safety management in the work organization, procedures, efficiency, and quality has improved significantly, to achieve a safe work plan , Layout, inspection, summary, rating the whole process of assessing the closed-loop management. More than one year of trial operation, portability of the software system proved a good system is stable, simple, functional, good compatibility. Variable application of the software system management as flat tree level by level management, strengthen the responsibility to implement, after the results of the disposition to advance prevention and control factors, enterprise security architecture for the realization of the production of "controlled and in control ",in addition the closed-loop management provides strong security and support.

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