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Research Article

Application of the Food Displaying System in Intelligent Building

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Abstract: Given the importance of food-storage intelligent buildings, The study makes full use of the data and reasonably designs food displaying system in intelligent buildings which is more appropriate to the characteristics of specific sites of high-rise buildings than determining seismic input based on a simplified method and limited data. Website survey data is generally in great detail. The reasonable design of ground motion has a critical influence on the aseismic design of building structures. The design of ground motion, including the response spectrum design and seismic wave design, is one of the important parameters for aseismic design of building structures.

Keywords: Aseismic design, food displaying, intelligent buildings, seismic waves

INTRODUCTION

Intelligent buildings, according to the standards in China, can be defined: "it is a set of facilities with the characteristics of safety, comfort and convenience, including various kinds of electrical equipment, office environment and communication system via optimizing construction structure, system management and service quality". The food displaying intelligent system, which also has the function of warmness and ventilation, is a part of intelligent buildings (Wang *et al*., 2001). Moreover, it also possesses the necessary food displaying equipment of construction structure and electrical equipment. Intelligent design can provide venue and other services for food displaying and storage, including information services, network communications services and presentation services, etc.

Nowadays, such a huge market is both opportunity and challenge for each intelligent system integrators. The intelligent system design, planning, research for China is on the initial stage and many problems are to be dealt with in the process. In this thesis, we have set Zhuzhou intelligent system for example. Through practical summary about the existence of problems concerning intelligent system plan, design and project management etc, we have found out the resolutions and summarized relevant experience, hoping to be beneficial to the later stadium intelligent system and to provide reference for the criteria stipulated by government.

With the arrival of the Olympic project construction boom, Food security is also a important theme nowadays. China's food security construction has entered a new and unprecedented stage. Currently Beijing National Stadium (Bird's Nest) has begun to take shape, many domestic provinces and cities have built stadium one after another. Moreover, Shandong, which won the right to host the 2009 Eleventh National Games, has already devoted in Jinan Olympic construction (Li and Zhang, 2008). Design and implementation of intelligent food displaying systems is also an important component in stadium construction which can ensure the smooth proceeding of sports, provide comfortable and safe environment for people and improve the management level of property personnel.

MATETIALS AND METHODS

Theory of response spectrum: Let be the converted weight of the system, g the gravity, amax the peak acceleration of ground motion and k the seismic coefficient, then the seismic load of the static method is shown as follows:

$$P = \frac{W}{g} a_{\max} = kW \tag{1}$$

Another factor can be considered with the acceleration response spectrum, i.e., the power factor, which is the power amplification effect to ground motion input in the case of constant damping ratio and the specific expression is:

$$\beta(T;\lambda) = \frac{S_a(T;\lambda)}{|a(t)|_{\max}} \tag{2}$$

Taking into consideration the power amplification effect, then the corresponding formula is:

$$P = \frac{W}{g} S_a(T;\lambda) \tag{3}$$

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With the substitution of power factor, it can be obtained:

$$P = k\beta W \tag{4}$$

The possibility of earthquake hitting a certain project site and the understanding of its effects can be applied to a specific project site and given the so-called standard response spectrum (site-related response spectrum) with the nature of statistics, the seismic analysis and design of structures can be then conducted according to that.

Response spectrum given in seismic design standards for all kinds of engineering structures is also a specific standard response spectrum. As they contain more statistical information, experience related to earthquake damage and design than the site-related response spectrum, so they are naturally more widely applied.

Seismic influence coefficient curve a (T) listed in the current seismic design of buildings, though it is a spectral curve, is different from the acceleration response spectrum curve Sa (T) or power coefficient β(T). Let a(T) be the structure factor, the relationship between the three is:

$$a(T) = \frac{cS_a(T)}{g} = kc\beta(T) \tag{5}$$

The actual formula of seismic load after considering the power amplification effect is:

$$P = a(T)W \tag{6}$$

RESPONSE SPECTRUM

Response spectrum is the fundamental basis for selecting seismic waves from the shake and site evaluation. Although the response spectrum cannot independently synthesize seismic waves, the conversion of it to Fourier amplitude spectrum by virtue of the approximate relationship between seismic response spectrum and the power spectrum can still provide important information to synthesis of seismic waves.

Let a(t) be the natural shake records and T the duration, the Fourier transform is:

$$H(f) = \frac{1}{2\pi}\int_0^T a(t)e^{-j2\pi ft}dt \tag{7}$$

Since the Fourier transform is a complex function of frequency variables, here the method of the real part R(f) and the imaginary part I(f) can be used, namely:

$$H(f) = R(f) + jI(f) = \left|H(f)\right|e^{j\theta(f)} \tag{8}$$

Its phase information is:

$$\theta(f) = tg^{-1}I(f)/R(f) \tag{9}$$

The following approximate relationship is used for the conversion of Earthquake response spectrum S(f) to Fourier amplitude spectrum C(f):

$$C(f) = \left\{\frac{2\xi\Delta f}{\pi f}S^2(f)/\left[-2\ln(\frac{-\ln P}{2fT})\right]\right\}^{1/2} \tag{10}$$

In the case of given amplitude spectrum and phase spectrum, the time domain characteristics of seismic waves can be expressed as:

$$W(t) = \int_{-\infty}^{\infty} h(f)e^{j2\pi ft}dt \tag{11}$$

$$h(f) = C(f)e^{j\theta(t)} \tag{12}$$

RESULTS AND DISCUSSION

Intelligent power distribution system: Currently, food displaying system has assumed various kinds of food displaying and performances and the extent of storage is on the rise. Meanwhile, the demand for system is becoming higher. Therefore, for the intelligent displaying construction, electrical distribution system usually applies intelligent design to improve the reliability of electrical distribution system (Sterne and Sanack, 2002). Accumulate the data in each system by light of sensor technology and then transfer data to computer and tackle comes last. Calculation results can be visually displayed on the screen; meanwhile, power distribution system operation can be manipulated. Since the computer can be programmed, it is valid to realize automation and enhance working efficiency.

Lighting system: Lighting System is critical for displaying; moreover, light Illumination mode should also change accordingly in different cases. And an intelligent system is needed. At present, intelligent lighting system can design hierarchically to realize different functions through the communication network platform. Then control the lights and detect the lamp use automatically by light of compute and the malfunctions can be found and excluded timely, thus ensuring the normal function. In addition, you also need to consider emergency lighting design to prevent accidents from happening.

Security monitoring system: When displaying or activities in system, for the venue managers, top priority is to ensure the safety of all the people entering the stadium. Therefore, there is a need to control the

site during displaying or activities, including the scope of venues and venues around. The surroundings around the venue mainly apply closed-circuit TV monitoring system and exit and entrance of venue is camera in order to confirm the emergency timely (Tennenhouse, 2007). Once unforeseen circumstances happened, security personnel can arrive at the site immediately, thus enhancing the ability of tackling emergency. In addition, the door in the internal access is installed with FI detectors in order to prevent the illegal entrance.

Smart display system: When displaying food products, the real-time situation or game screen should be presented to the spectators directly in order to be convenient to watch the game. In the intelligent displaying system, every part of the game is set with cameras. Then, transmit the screen to LED display on top of the venues via network platform. The display screen is able to present the competition process from various perspectives. Then process the data by light of integrated circuits and spectators can watch the highlights of the replay camera.

CONCLUSION

Recently, in the process of food displaying intelligent system construction, cabling is an effective platform for information and data transfer. In order to save costs and facilitate management, cabling must be designed according to venues function and plan (Jansen *et al*., 2010). Try to choose a more optimal solution; meanwhile, future development plan of network equipment and the reservation for power should also be taken into consideration. The system uses a star structure and is designed based on the standards of non-shielded Category 6 which can meet the use of fast Ethernet, Gigabit Gigabit Ethernet and other network. Through the study, it can expand the development space, display technology and develop rapidly.

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