Research on Intelligent Building Demand for Quality Supervision and Management Mode Innovation

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Abstract

With the development of China's social economy and the progress of science and technology, the development speed and construction scale of China's intelligent buildings have been enhanced and expanded. The development history of China's intelligent buildings is relatively short, but its development speed is extremely fast. At the same time, the quality problems of intelligent buildings have emerged. There are great differences between intelligent buildings and traditional construction projects, which requires us to innovate in quality supervision and management, keep pace with the development of intelligent buildings, match with intelligent buildings and produce win-win results. In this regard, this paper analyzes the development of intelligent buildings and the traditional quality supervision and management mode, and summarizes the analysis of the demand of intelligent buildings for quality supervision and management mode by combining the problems and characteristics in the field of intelligent buildings in China at present.

Keywords

Intelligent Building; Social Economy; Quality Supervision; Demand Analysis.

1. Introduction

With the large-scale promotion and application of intelligent buildings in China, they will become more specialized and complicated and will also be affected by various external factors during construction. Therefore, in the process of construction and installation of intelligent buildings, we must do a good job in the identification of factors affecting construction quality, further innovate the project quality supervision and management mode, and ensure the overall construction quality of intelligent building system.

Construction quality supervision and management is an important part of intelligent building work, intelligent building work directly affects the quality of the building's overall construction effect. Therefore, it is of positive significance to the development of China's construction industry to strengthen the quality supervision and management in the construction process of intelligent buildings, improve the level of engineering quality supervision and management, innovate the mode of engineering quality supervision and management, and promote the improvement of the overall level of intelligent buildings.

1.1. Background of Intelligent Buildings

Intelligent buildings include the following technologies and management systems: 1. BIM & Simulation Analyze. 2. Prefabrication & 3D Print; 3. Healing & Robot Techniques. 4. Precision Measurement & Control. 5. Structural Safety & Health Monitoring. 6. Build Environment Perception. 7. Personnel Safety & Health Monitoring. 8. Information Management. [5]

Technical background: At the end of the 20th century and the beginning of the 21st century, electronic information technology developed rapidly and constantly, which greatly promoted the development of social productivity and changed people's production and life style to a certain extent. The global information revolution is under way, the knowledge economy and sustainable development are attracting people's attention, and the "digital earth" has been boldly proposed recently. Under such technological background :(1) the emergence of e-commerce, online information services, e-shopping, e-banking and financial services, online degree study; (2) the change of administrative work; (3) With the globalization of manufacturing industry and economic activities, intelligent buildings emerge as The Times require. With the Internet, new devices can be designed in America, printed in China and made in Russia. [7]

Social background: The rapid development of science and advanced technology in the 20th century has brought serious changes to the industrial structure. According to the classification of various occupations in Japan, the number of working population engaged in the tertiary industry in 1955 was 1 million, accounting for 26% of the total number of employed workers; In 1985 it was 28 million, or 47 percent of the total number of employed workers. This means that with the advent of the new era of information technology, the tertiary industry has been very far from the industrial society. Information resources, the dominant resource of social production, has become an important factor of human survival and development. The production of information industry occupies the largest proportion in GNP. It is an indispensable and important industry in a country and even the world, with distinct independence and comprehensive characteristics. [7]

1.2. Status Quo of Intelligent Buildings

As Beijing is the political, economic and cultural center of China, its smart buildings are among the top in the country in both quantity and level, which is highly representative. Through research, we found that intelligent buildings have the following characteristics.

1.2.1. Intelligent Building Boom Swept the World

In today's world, the "intelligent" boom, "3A intelligent building", "5A intelligent building" advertising can be seen everywhere, with the building gradually intelligent, intelligent building development has been divided into three stages. Four or five years ago, intelligent buildings basically have automatic control functions such as building, fire, security and so on, with computers as the main control equipment, usually using centralized control and DOS operating system, simple monitoring mode, relatively low software level. Many smart buildings built in the past year or two have relatively complete building automation (BA), communication automation (CA) and office automation (OA) systems, known as 3A systems.

1.2.2. Intelligent Building Engineering and Technical Personnel Shortage, Low Management Level

Intelligent building, as the complex of modern multi-disciplinary high-tech development edge technology field, the installation of intelligent building has also shown its indispensable role, especially it in the intelligent building of different modern advanced equipment desktop capability improvement. However, China is currently facing an important problem is that many imported equipment, from the installation, debugging, operation, training, maintenance and repair, are paid by foreign companies to spend a lot of foreign exchange, and China itself and the lack of intelligent building equipment design, construction, management and maintenance of technical personnel.

1.3. Development Trend and Existing Problems of Intelligent Buildings

1.3.1. Problems of Intelligent Buildings

At present, China's intelligent building system construction system is constantly developing and improving, but compared with some developed countries abroad, China's intelligent building is still fledgling. In addition, management has not kept up, which has led to some large and small problems in the current construction of intelligent building systems.

(1) Theoretical research cannot adapt to the development of intelligent buildings

(2) The planning, design and construction teams of intelligent building projects do not have strong technical capabilities

(3) The lack of Chinese-made system integration products

(4) Technical obstacles

1.3.2. Development Trend of Intelligent Buildings

As we all know, people's living standards are improving day by day, and intelligent construction industry is gradually appearing in our life. With its emergence, more and more advanced technologies are filling this field, making intelligent buildings further mature and perfect. Intelligent building is a combination of human intelligence, information and working environment. It is a synthesis of architectural design, industrial science, information science, environmental science, social engineering and ergonomics. Intelligent building will become an important symbol of future architecture.

2. Project Quality Supervision and Management Mode

2.1. New Situation of Construction Project Quality Supervision

2.1.1. With the Increase of the Number, The Requirements for Supervised Projects are Also Increasing in Direct Proportion

At this stage, serious and exaggerated construction quality accidents have been basically controlled, but there are often general construction quality problems, and there are obvious differences in the quality level between various regions and between urban and rural areas. (for example, the construction of a new building, the completion of a new house, etc.). With the rapid development of China's economy, the construction industry is also developing rapidly, and the number of large-scale public buildings and infrastructure projects under construction is increasing day by day. More and more new technology, new technology, new materials are used, the level of the construction industry is higher and higher, at the same time, it is also more and more high requirements for supervision and management.

2.1.2. Common Quality Problems Often Occur in Engineering Construction

Under the new situation that economy is getting better and better and people's living standard is improving gradually, the quality of the project has been paid more and more attention. In addition, the use of new technology, new construction methods and new materials resulting in the quality of construction workers and the supervision and management of the construction process of the conflict between frequent. Diseases (e.g., influenza, infectious diseases, COVID-19) can also arise and affect the normal use of the building. Some buildings almost had serious accidents and some rejected materials flooded the construction site and escaped construction inspection. All this caused great dissatisfaction among the people.

2.1.3. There are Many Main Construction Projects, and the Construction Force Needs to be Improved

The quality of construction projects concerns an increasing number of units, including construction, exploration, design, execution and supervision.

Of course, this also includes the drawing review mechanism, inspection units, material suppliers, etc., which improve the quality and management of the construction process. Construction industry is a labor-intensive industry, but according to a survey, 1/3 of the labor force in China's urban work is engaged in construction industry, but the skill training level of migrant workers in China is very low, and their skills are not high, the comprehensive quality is not high, so at the present stage we should pay attention to improve the quality of construction workers.

2.2. Analysis of Problems Existing in the Construction Project Quality Supervision and Management Mode

2.2.1. The Construction Project Quality Supervision and Management Mode is too Single

Supervision and control and quality management are the main problems existing in the quality supervision and management mode in the construction process. At present, the problems in the application of our country are as follows: the engineering quality supervision and control level is low, the supervision method is relatively single, and all parties involved in the construction are unable to carry out quality supervision. Comprehensive project quality supervision and management, only relying on the supervision of the supervision unit, is not able to omni-directional, accurate inspection and evaluation of the construction project quality, cannot improve the quality level of the construction project. In addition, at the present stage, some quality inspection work is completely dependent on engineers. Due to the lack of economic and legal means, government departments in the quality inspection of units, due to the supervision and management capacity and depth is not enough, lack of authority and effectiveness, so that it cannot be realized. Therefore, in order to reverse this situation, it is necessary to strengthen cooperation and exchange in the degree of mobility, the effect of benefit, on this basis, improve the quality of construction supervision and management level. In order to promote the development of China's construction industry.

2.2.2. The Overall Quality of Construction Project Quality Supervision and Management Mechanism is not High

Construction supervision is an important means to ensure quality in the construction industry. If there is no help from construction supervision desk, the development of this facility will be affected. At present, these efforts are hampered by the poor quality of construction personnel and the deterioration of quality management. For more than 20 years, governments have been working on quality control of construction schemes in terms of personnel, knowledge and equipment, but the quality of quality control has not improved and is deteriorating. Therefore, it is necessary to improve the comprehensive quality of quality supervision and management personnel in our country, and promote the development of construction project quality supervision in a deeper and broader direction.

3. Methods to Solve the Engineering Quality Problems of Intelligent Building in China

3.1. Methods of Quality Supervision and Management Mode Innovation

(1) Strengthen the quality and supervision of intelligent building work

Strict review and design during construction to ensure normal construction progress. Quality smart buildings are the product of advanced integration, and their equipment and components are composed of a large number of large integrated circuit chips, so their products must be tested and verified before installation, and their architecture and installation must be tested and verified before use. Therefore, intelligent buildings put forward relatively high requirements for construction. In order to ensure the operation and construction quality of

intelligent buildings and the vital interests of future residents, it is necessary to strengthen the construction and supply of construction quality control system. Each working procedure has fixed technical guarantee operation, inspection, maintenance and completion measures. Meanwhile, the construction enterprise and personnel responsible for intelligent construction operation are assigned to complete the working procedure for the contracting enterprise, and carry out professional inspection and test on the specific construction operation.

According to the construction organization design and construction drawings, this paper formulated the detailed safety supervision regulations, discussed the quality and safety supervision of intelligent building engineering, pointed out the importance of safety supervision and its practical significance to the quality of intelligent building engineering. The necessary safety supervision of the quality of intelligent building engineering is the careful compliance with the relevant regulations of the current national system and the embodiment of responsibility to customers. With the rapid development of smart buildings in China in the past few years, it is particularly necessary to carry out necessary safety supervision.

(2) Innovation of supervision and management methods and information-based supervision mode

Construction project quality supervision inevitably needs to create new management methods, and then must be incorporated into the construction project supervision. In construction engineering supervision, supervision personnel can irregularly set an example and carry out comprehensive supervision of construction projects without prior notice. At the same time, a new electronic supervision mode can be developed and innovated by using the most advanced information technology. Through in-depth and comparative analysis of information data, the supervision and management level of construction process can be improved comprehensively.

(3) Strengthening innovation supervision and management and re-supervision of supervisory personnel

In order to achieve the innovation of engineering quality supervision and management mode of intelligent building, we must innovate the concept of engineering quality supervision and management. The only way to do that is to establish an exact science first. Management concept, only in this way can promote the process of construction units, bring it into the work category of management is advanced. In the management and supervision of a construction project, different construction processes assign personnel to work on the construction project, clarify their responsibilities and prevent them from working on the construction project. If something goes wrong in the process, the person in charge will not be found. Therefore, construction companies will carry out construction work and clarify the roles of employees in order to carry out the work better. Project progress and effective management and supervision. On the other hand, it is necessary to train management and supervision personnel to effectively organize and control construction personnel. Prevent the personal safety of construction personnel, promote the development of the construction industry.

(4) Implementing the combination of modernization and specialization

Since the beginning of the 21st century, under the influence of the trend of information technology, All walks of life in China have witnessed rapid development, which has further improved China's economic benefits. Therefore, all industries need to constantly teach themselves to go beyond the traditional concept of economic development, and the same is true of quality control in the construction industry. Through the combination of modernization and specialization, the application of modern technology will help improve the quality and management of construction projects in China. Construction workers' expertise plays an important role in the actual construction process. Therefore, it is necessary to ensure that construction workers are qualified to carry out their work and to improve the quality of construction work. To this end, countries must continue to train technicians and engineers in

related fields, and the construction industry, in cooperation with universities and colleges, strives to promote the direct development of this industry. This is the only guarantee of a sustainable and healthy construction industry.

(5) Change the way of supervision

The transformation of supervision mode is to improve the key route of quality supervision and management mode in the construction process. The process quality supervision department must combine patrol and spot check. Supervision methods that take ensuring the use safety and environmental quality of construction projects as the main content; The main contents of quality actions in all links of ground infrastructure, structure, environmental quality and related construction projects; Construction with construction permit and completion certificate to construction, completion as the main means of supervision and inspection, instead of the traditional reservation and notice supervision. Strengthen the way of supervision and inspection, patrol inspection and random selection of inspection, inspection content and inspection content and location can accurately reflect the quality of construction projects. The inspection contents and parts can accurately reflect the quality of the construction project.

3.2. Introduction of BIM Technology Innovation for Intelligent Building Engineering Quality Supervision and Management

In the process of the construction industry gradually transforming to intelligent buildings, how to maximize the use of BIM technology to improve the construction management efficiency of intelligent buildings is a hot topic of current research. Intelligent building is nothing more than the product of information technology. In order to promote the development of its information technology, BIM technology is introduced to strengthen the whole process management of intelligent building engineering construction.

3.2.1. Application of BIM Technology in Intelligent Buildings

Through the way of BIM software modeling, the information data generated in each stage of the whole process of intelligent building construction project is substituted into the model, and the cost information data is fully reused. At the same time, this part of the information data is complete and continuous, which provides a safe and reliable data basis for the follow-up process management. This aspect of information data can be generated by modeling one click. On the one hand, artificial dynamic monitoring can also simulate the scene of field construction through modeling, to find and deal with some accidents and construction difficulties in advance, and reduce economic losses to a certain extent. In general, it is the application of BIM technology to create the design model, bidding model and construction model in the construction of intelligent building construction engineering, and show it in a simulated scene, which facilitates the communication between the various participants of the construction engineering to the maximum extent, and realizes the sharing of building information.

4. Conclusion

In the management and supervision of China's construction industry, some systems are not sound, lack of innovative management methods, the management level of construction projects across the industry, the development of the construction industry has been very slow. In view of these problems, the relevant management and supervision personnel will carry out professional knowledge training, strengthen the supporting management and supervision system, improve the effectiveness of construction project management, strengthen the concept management of construction enterprises, the introduction of new construction technology, in the construction process to establish a comprehensive construction project management work.

Predictably, traditional architecture in engineering quality supervision problems, similarly also exist in intelligent building, and the problems existing in the intelligent building many, compared with traditional building slightly more complicated and tedious, after all, is a new intelligent buildings, a lot of problems are the problems of the newborn, is also not solve the problem by predecessors, consult the relevant information, There are few papers and literature on the problems of intelligent buildings. This shows that this area is still a semi-blind area at present, but there are also moving towards a clearer direction, as the problems are put forward one by one, slowly solved.

Based on the analysis of the problems existing in the project quality supervision and management mode of intelligent building, this paper puts forward the corresponding improvement measures and methods, and analyzes the innovation demand of the quality supervision and management mode of intelligent building. In order to ensure the establishment and improvement of effective engineering quality supervision and control system, in addition to the above measures, it is necessary to establish modern information technology, network technology and computer technology government database. In addition, in terms of advanced technical skills, it is necessary to take foreign countries as examples and combine the actual situation of the country to adjust and improve the management methods accordingly, to better serve the domestic construction industry.

Acknowledgments

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