Civil Engineering Construction Project Management Based on Computer Technology

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Abstract. With the rapid development of computer technology, has the construction project management changed a lot? In the construction engineering, information technology has played a very important role. In this paper, through the application of computer in project management related concepts are summarized, understand the relevant technology and technical characteristics, through the design and analysis of management platform, and test platform can be Reliability and stability, the platform can well meet the needs of project management, and can provide information utilization maximization for the efficiency and quality of construction projects.

Keywords: Computer Technology, Construction Engineering, Project Management, Management Platform

1. Introduction
Under the background of economic globalization, different industries in various countries have begun to enter the stage of modernization development, among which informatization construction is the typical one. In a sense, the world has ushered in the information age. As a typical branch of the construction industry, civil engineering is of great significance for economic construction, which mainly constructs public works and living environment for people. In recent years, China has accelerated the pace of economic construction, and domestic civil engineering has put forward higher requirements. How to adapt to the challenges and development opportunities brought by modernization to civil engineering is a problem that the government departments and relevant construction enterprises must think about and solve [1].

Social development has entered the 21st century, with the Internet into thousands of households, so that all industries have begun to commit to information reform [2]. China's civil engineering construction and management information construction started late, but in recent years in the context of the information age, its development is very rapid, the status of civil engineering construction and management system has been improved [3]. China's civil engineering construction and management informatization mainly refers to the application of various information technology in the process of civil engineering construction and management to improve the construction level of civil engineering, such as strengthening the application of various information technology and computer simulation technology, so as to strengthen the surveying and mapping of civil engineering projects and prepare for civil engineering construction. On the other hand, it also includes the management informatization.
in the process of civil engineering construction. The whole process of civil engineering management is implemented with informatization, so that the level of civil engineering construction and management can be effectively improved, and the level of civil engineering construction and management can be effectively improved \cite{4}. In recent years, China's civil engineering construction and management information development speed gradually accelerated, civil engineering construction and management process in all aspects of the gradual improvement, gradually adapt to the background of the information age.

Each construction enterprise began to try to realize the network management gradually, and standardized the scope and time of civil engineering construction and management, which greatly improved the construction and management level of civil engineering. But there are still many problems, civil engineering construction and management information awareness needs to be strengthened: for example, still like to use the traditional management mode for civil engineering organization design, information transmission, etc., which has a great impact on the improvement of civil engineering construction and management information level, and will also make a lot of information in the process of civil engineering construction can not be effectively recorded. Nonstandard management is a very serious problem, which can easily lead to the loss of all kinds of information. Second, civil engineering construction and management information system is not perfect. As the development of civil engineering construction and management informatization is an important and tedious work, in the process of gradually realizing informatization, due to many departments involved, almost comprehensive reform, and the construction of some management systems in the process of informatization application is not perfect, so the construction and management informatization level of civil engineering is greatly affected \cite{5}.

2. Related Concepts of Civil Engineering Construction Project Management

2.1. Information Management System

MIS is an integrated man-machine system. It is a human-oriented, using computer hardware, software, network communication equipment and other office equipment to collect, transmit, process, store, update and maintain the information, provide information support for the operation, management and decision-making of the organization, and support the comprehensive man-machine decision-making, middle-level control and grass-roots action and efficiency interaction system for the purpose of improving efficiency \cite{6}.

Construction project management system is a computer-aided management system that collects, stores and provides various information services for the organization, planning and decision-making of construction projects. It includes information source, information acquisition, information processing, information storage, information receiving and information feedback. The purpose of establishing the project management information system is to realize the comprehensive and effective management of project information, and to serve the project objective control and contract management \cite{7}.

2.2. Construction Project Management and Control Method

Engineering project refers to the work or task that is completed at one time according to the limited time, budget and quality standard as the management and control object. The project has three characteristics, namely one-time project, clear project objectives, and integrity of the project as a management object \cite{8}.

A project needs to be operated according to certain steps and procedures. First, we need to think about the general assumption of the project, determine the nature, characteristics and objectives of the project; secondly, we should consider how to do it, that is, we should choose the appropriate scheme, formulate the planning and make necessary preparations; secondly, we should organize the implementation to control the progress, cost and quality of the project. Finally, the completed project is checked and analyzed to determine the effect and summarize. The processes in a project are closely related, and all these tasks are often not completed by one department or unit, so unified command and
coordination are also required. These steps and procedures must be followed for any project to be successful\cite{9-10}. To plan, organize, control and coordinate is project management. In short, project management is the whole process, all-round planning, organization, control and coordination for the success of the project. Project management involves many aspects, we only study a project involving the construction phase of project management. To achieve the goal of the project, it is necessary to control the implementation of the project. The key to effective project control is to measure the actual process regularly and timely and compare it with the planned process. If necessary, corrective measures should be taken immediately. The project control process includes collecting information about project performance regularly, comparing actual performance with planned performance; if actual performance is worse than planned performance, corrective measures should be taken. This activity should be carried out regularly during the project. The construction project information management mainly deals with the actual system, which refers to the sum of all work links involved in the whole process of completing the construction task of a construction project by the project management department, and the information system is the sum of the information, information flow and information management subjects involved in the process. In engineering project management, it is a dynamic system with investment, progress and quality control as the goal and contract management as the core. Therefore, the project management information system should at least have the function of dealing with three major objectives and contract management tasks.

2.3. Module Design

(1) Project management module

The engineering management of the construction project management system of the Engineering Bureau is mainly divided into three aspects, which are the engineering progress information management, the engineering accounting information management and the relevant statistics of consumables in the project management. The staff log in to the project management part of the construction project management system of the Engineering Bureau, and use the project progress management to manage the progress information of the relevant construction projects in detail. The operator logs in to the engineering management part of the construction project management system of the Engineering Bureau, uses the engineering accounting management, carries out the corresponding daily and monthly statistics for the relevant engineering accounting part, logs in to the engineering management part of the construction project management system of the Engineering Bureau, uses the consumables statistical operation, and carries out the quantity, cost and cost of the relevant engineering materials used in the construction project Statistics of specifications, numbers and other relevant information.

(2) Equipment management module

The equipment management part of the construction project management system of Engineering Bureau is divided into four aspects, which are equipment warehousing, equipment damage reporting, equipment outbound and equipment statistics, etc. The staff log in to the equipment management part of the construction project management system of the Engineering Bureau for equipment warehousing management, and carries out warehousing management operation for relevant construction project data information. Enter the basic information such as stock in order No., stock in date, amount, purchaser and supplier. The staff log in to the equipment management part of the construction project management system of the Engineering Bureau to report the equipment damage. If there is corresponding equipment damage in the construction project management process, it needs to use this function to report the loss management. It mainly inputs the basic information such as the loss report number, loss reporting date, operator, equipment quantity, unit, category and number. The personnel log in to the equipment management part of the construction project management system of the Engineering Bureau to carry out the equipment warehouse out management. The main purpose is to manage the warehouse out information of the relevant construction project equipment, manage and operate the basic information such as the quantity and category of the equipment. The staff log in to the equipment management part of the construction project management system of the Engineering Bureau, and carries out warehousing management operation for relevant construction project data information.
Bureau to carry out the equipment information statistics operation. Material category, name, number, etc. for detailed data information statistics.

(3) Financial management module

The main part of the project management information, such as the financial management of the Project Management Bureau, is the project management information.

(4) Supplier management module

The supplier management part of the construction project management system of the Engineering Bureau mainly aims at the management of the contract information and the basic information of the supplier. The staff log in to the supplier management part of the construction project management system of the Engineering Bureau to manage the contract information. It mainly manages the basic information of the contract signed between the construction project party and the supplier Make.

(5) System management module

The system management part of the construction project management system of the Engineering Bureau provides three aspects of information management for system-related management personnel, which are user information management, user authority management and system data information management of the Engineering Bureau construction project management system. Staff log in to the system management part of the construction project management system of the Engineering Bureau. The authority management function is to manage the authority of different users. The staff log in to the system management part of the construction project management system of the Engineering Bureau, and use the data management function to manage the initialization, data backup and data recovery of relevant data information.

3. Platform Design and Implementation

3.1. Development Environment

The simulation platform of large-scale construction project management is an integrated and comprehensive project management system, which integrates project overview query, data information processing, project diagnosis evaluation, early warning report publication, archives management, public notice release and password modification and reset. The platform is mainly set up for multi-user such as design unit, contractor and supervision unit with the owner as the core. It is supported by many software development tools such as Internet, database, server and system software.

Large-scale construction project management simulation platform has entered the test and trial operation. In terms of software and hardware of operation environment, the equipment configuration should meet the following requirements:

(1) Windows XP and above: Windows XP operating environment.
(2) The hardware of software development: main frequency: 1.6g; memory: 1g; hard disk space: 30g.

Hardware for running software: minimum main frequency: 1.6g; memory: 1g; hard disk space of server is not less than 5g; hard disk space of client is not less than 1G; one DVD drive.

Due to the needs of the server-side database, the platform has set up two kinds of application software with slightly different functions (the difference only lies in the welcome interface): one is installed on the server side, the other is installed on the client side. Among them, the software and hardware requirements of the target platform for the server-side PC are as follows:

(1) The host has a fixed IP address;
(2) If the system is Windows XP system, SP4 patch should be installed;
(3) Install SQL Server 2005 database.

Note that the SA server and password should be installed on the server for the first time. In addition, after the installation is completed, it is also necessary to set up the software to allow remote access.

3.2. Platform Module

The target system adopts the VS 2005 development tool which supports multiple programming
languages, safe and concise C language, powerful SQL Server 2005 database and mature and stable C / S architecture. Using these tools, this chapter designs the interface and realizes the code function of the project overview module, information system module, diagnosis system module, early warning system module, query system module, public notice module and password modification module. By means of target integration, organization integration and information integration, the target simulation platform carries out information processing for each integration module, which fully reflects the application and promotion of informatization and integration technology in China's large-scale construction project management means, and also meets the industry demand and development trend of China's current construction industry for engineering project management.

4. Analysis of Test Results

4.1. Detection and Analysis of Bug Number in Different Periods

![Figure 1. The Number of Bugs in Different Periods of the Platform](image)

According to figure 1, after four rounds of testing, the number of bugs at level a and level B is 0, and other low-level bugs have appeared more or less. Level D is the most common, accounting for about 60% of the total number, followed by level C. However, the number of bugs after the final test is 0. There are three unresolved bugs in the system, which are not enough to affect the normal use of the platform, so the platform can run normally.

4.2. Platform Pressure Test

The response speed of each function of the platform is tested by continuously applying the parallel usage of the platform.
Table 1. Pressurization of System Performance Test

| Test items                              | Test value         |
|-----------------------------------------|--------------------|
| Time consuming for continuous pressure testing | 180min             |
| Maximum run concurrency                 | 40,000             |
| Total throughput                        | 41,286,222,900     |
| Average throughput                      | 641,741            |
| Total hits                              | 216,420            |
| Average hits per second                 | 3.04               |

![Figure 2. Number of Concurrent Tests](image)

Table 2. Response Time of Each Module

| Function                  | Target response time | Actual response time | Result |
|---------------------------|----------------------|----------------------|--------|
| Project data check        | ≤3S                   | 1.1                  | satisfy|
| Project data check        |                       | 1.4                  | satisfy|
| Classification of project data |                   | 2.1                  | satisfy|
| Project information query |                       | 2.3                  | satisfy|
| Project data processing   |                       | 2.1                  | satisfy|
| Project data processing   |                       | 1.9                  | satisfy|
|                           |                       | 1.8                  | satisfy|
|                           |                       | 2.2                  | satisfy|

According to figure 2 and table 2, the system has strong compatibility; it runs well under the condition of 500 people on-line at the same time, and there is no obvious jamming. Through the performance test, the results show that the response speed of the system is extremely fast after the command is sent out, which meets the goal at the beginning of the design; the system has strong adaptability to overload and extreme condition test.

5. Conclusion

In the construction project management, the use of computer technology can not only reduce the cost of project management, but also improve the quality of the project, so as to save resources and improve efficiency. Therefore, only in the construction project management to strengthen the
application of computer technology, in order to do a good job in project management. Under the function of computer technology, to realize the modern management of engineering projects, we should not only pay attention to the investment of software and hardware, but also attach importance to the active participation of people, so as to form a high-quality project management team, so as to make the construction project management work more comprehensive.

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