ISSN: 2710-0588

# Development of Construction Workers Information Management System

Bi He[1], Chuanzhi Geng[2]

[1]School of Civil Engineering, Shandong Jiaotong University, Jinan 250357, China

[2]Beijing Sunway Technology Co., Ltd., Beijing 102206, China

## Abstract

**The construction industry has the typical characteristics of large scale and high output value, and it employs a very large number of workers. Efficient and safe management of the large number of workers is an important requirement of construction industry. In order to meet this requirement, this research studied and developed construction workers information management system. This system adopts network structure, and the main body structure is B/S. on the server side, MySQL was used as database tools and PHP was used as the development language, on the browser side, HTML, CSS and JavaScript was used as develop language. This system can provide the basic functions of increasing, deleting, modifying and searching workers' information, and can count the workload and efficiency of workers, realize the scientific management of human resources, and provide great help for the development of enterprises.**

## Keywords

**MIS; Construction Workers; Software.**

## 1. Introduction

In most countries, construction is mainly industry of national economics. Take China as an example, in 2017, the construction industry contributed 3.15 trillion in output value, this output has surpassed the GDP of Britain, only after the United States, Japan and Germany; and this industry employed 55 million workers in China, that is more than the population of South Korea or Spain. The huge output value and the number of workers have brought many management problems, if we can not manage a large number of workers efficiently and scientifically, then we can not achieve the efficient operation of the whole enterprise and industry. To realize this management target, this research studied and developed an management information system, the system adopted network structure, provided various functions of worker information management.

## 2. System Overall Design

The overall design is the first step in the design process of any information system, the overall design is the guiding work of the system, and all the specific work will be carried out around the overall design, so the overall design determines the success or failure of an information system, it is the most important link in the whole information system development.

The main tasks of the overall design are functional objectives, overall structure, functional objectives of each unit, data flow and business flow.

The functional objectives of the construction workers information management system includes users management, workers information edit and save, information query, index calculation, generate reports, etc.

And the overall structure of system is shown as Figure1.

ISSN: 2710-0588

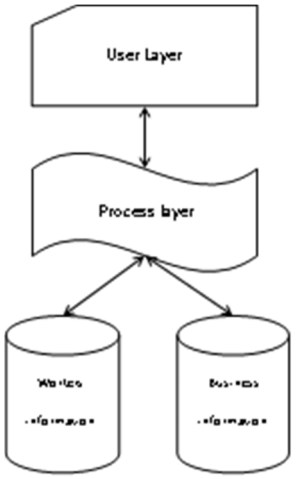


**Figure 1.** Overall structure of system

The main structure of system include three parts, they are data layer, process layer and user layer. The data, which include workers information and business information of system, were saved in data layer. Computation and other processing tasks are completed in the processing layer. The user layer provides GUI mode for users to issue various instructions and obtain the results of system processing.

Another result of the overall design is to determine the system development mode and development tools. Data layer will be developed by MySQL, and it will be deployed on server. Process layer will be developed by PHP, it will be deployed on server too. User layer will be developed by JavaScript, its main task is to provide GUI to user, and it will be displayed on user's browser.

## 3. Database Design

Data, and the management of data, are the foundation of each information system. Without data, information system cannot provide function. In the construction workers information management system, database was built to manage the data of system. There are many database management tools for create and operate database, in this research , MySQL was selected for this project, MySQL is most popular relational database management tool on website, and it is an open sources tool.

As all the relational database management tools, MySQL uses tables to save data. The main structure of table are column and row, each column represents an attribute of an object, and each row represents an object, different tables was connected through relationships, standard SQL language can be used for operate MySQL database.

Database design includes table design and relationship design. In this research, some tables were created, just like employee table, project table, workload table, etc. After all tables were created, the relationship between each tables should be carefully designed, this work determined the operation efficiency of the later system. The relationship includes three kinds: one-one, one-many, and many-many.

## 4. Funtion Module Design

The main function module of construction workers information management system include system users management, workers information edit(input, delete, edit), information statistics, information query, etc. It is important link to realize these function.

ISSN: 2710-0588

## 4.1. System Users Management Function

Users of workers information management system were divided into two categories, one is the administrator, the other is the ordinary user. The difference between the two types of users is that the system permissions are different, both types of user information are stored in the user table, and the four main attributes of a user are index, username, password, and category. The structure of the user information table is shown in Table 1.

**Table 1.** Structure of user information table

| Index | Username | Password | Category |
|---|---|---|---|
| 1001 | Xiaoli_Shen | ****** | Ad |
| 1002 | Qiang_Li | ****** | us |
| …… | …… | …… | …… |
| 1802 | Wei_Cai | ****** | us |

When any user tries to log in to the system with a username and password, the system compares the user name and password entered with the corresponding information in the table. If the information matches, the user is allowed to log in to the system.

## 4.2. Worker Information Edit

When the original data is input into the system, with the development of enterprise business and personnel changes, the workers' information needs to be edited immediately.

Because of the need to ensure the security of the system, the editing of workers' information cannot be done directly in the database, an information editing module needs to be developed to finish this task so that the editing is not directly connected to the database. The operation process is shown in Figure 2.

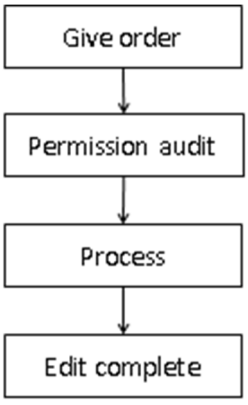


**Figure 2.** Operation process of information edit

## 4.3. Information Stastistics

Information statistics is very important function of workers information management system. Its task include various statistical work on workers' information. For example, the number of workers in each position, worker's work load, salaries of workers, etc.

Information statistics function was developed by SQL and dependent on the basic data in database.

## 4.4. Information Query

Information query function means query the information from system(database) which required by users. It is the key function of workers information management system.

ISSN: 2710-0588

The implementation of the query function goes through the following steps:

#### 4.4.1. Query Task Creation

The first step of information query is to create a query task. When users want to query information, they should enter the query page in the web page, and set task to system. If the users have the right permission, the query task was creation.

#### 4.4.2. Get the Query Parameters

The system provide many query mode, in every mode, the query parameters was required, the system allows the user to select one or more fields to enter parameters, and the user can limit the parameters of the exact match or fuzzy match. After the query parameters was determined, they will be saved by the system for query execution.

#### 4.4.3. Execution of a Query Operation

After the query task is established and the query parameters are determined, the system begins the query operation. Query operation mainly use SQL, a typical query statement is:

Select * from *.table where parameters=*

Which means select terms from a data table by the parameters. After the corresponding SQL statement operation, the specified query task can be completed.

#### 4.4.4. Return Query Results

After query operation completed, the query results should be returned, so the users can get the answer they want. At first, the query results were returned to specified variable, then , the GUI get the value of these specified variable, and display them to the users.

These steps can be shown in Figure3.

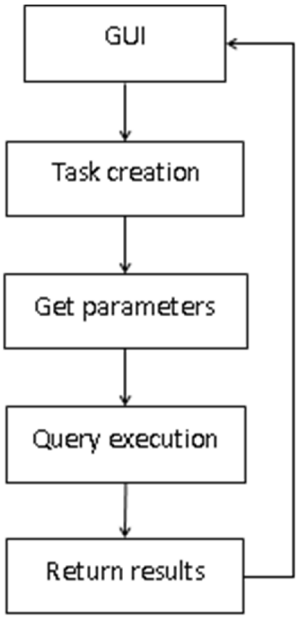


**Figure 3.** The steps of information query

### 4.5. Generate Reports

Reports are very important files for management. The production of the report is also a very complicated and time-consuming work. And because of the information management system, can develop the corresponding report automatically generated procedures, the rapid completion of the report generation. There are two main difficulties in automatic report generation. One is the summary of relevant data; the other is the design of reports format.

ISSN: 2710-0588

### 4.5.1. Summary Data

Data of system was saved in database table, when the users want to summary data to generate reports, this operation is auto-completed. The associated action commands are preset in PHP code, when users issues a build report command, these PHP code summary data from system database, complete report data preparation.

### 4.5.2. Design of Reports Format

Generally, every company has corresponding regulations on the format of reports. For some important reports, the government authorities have set the format and necessary contents, so, design of reports format in system is a necessary task. The report format of the system is mainly designed according to the regulations of government departments and companies. It is also important that the report be associated with the printer program, when the report needs to be printed out, the system can directly operate the printer for printing.

## 4.6. Web Page Design

Web page is the GUI(Graphic User Interface) of this system, A beautiful GUI enables users to better use the system. The web page consists of two parts, the static part and the dynamic part. The static part was developed by HTML and CSS, and the dynamic part was developed by JavaScript. The main task of the static part is to display information, while the main task of the dynamic part is to transmit and process data. Both parts were developed in the same integrated development environment: Dreamwaver. After the web page development is completed, it was upload to the server and command it as mainpage, and it was set as the home page of the system. When the user logs in to the system, it is first displayed on the user's browser, then the users can operate the system through the web page.

# 5. System Effect

After this system development, it was applied to three construction companies and achieves a better effect. The relevant benefit indicators are shown in Figure 4-6.

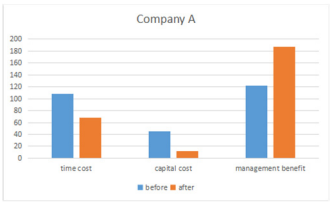


**Figure 4.** The system effect in company A

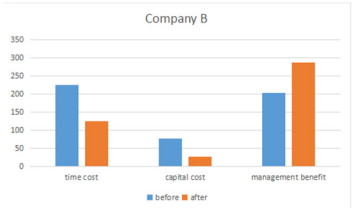


**Figure 5.** The system effect in company B

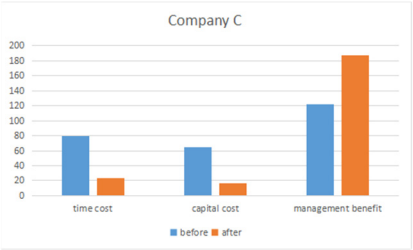


**Figure 6.** The system effect in company C

ISSN: 2710-0588

From the figure4-6, we can see that the application of the system has achieved good benefits in terms of time cost, capital cost and management benefit.

## 6. Conclusion

Scientific management of workers is an important guarantee for construction enterprises to achieve their goals, in view of the management of a large number of workers, it is necessary to adopt the means of information technology. This paper uses JavaScript, PHP and MySQL to develop a worker information management system, and achieves the goal of scientific management. There are still some deficiencies in the database management and network operation guarantee of this system, for example, in terms of database indexing and caching, there is no in-depth optimization, and there is not much in-depth research on the number of concurrences in network access. In the next step, we can optimize these aspects to make the system more efficient.

## References

[1] TANG chunqiu, TANG jiansheng and MO yimin, Research on an Integration Platform of Railway Maintenance Information based on SOA, JOURNAL OF WUT(INFORMATION AND MANAGEMENT ENGINEERING), vol.40, Apr. 2018, p. 236-244.

[2] ZHA Dao-gui, XU Cai-fang and YANG Qiu-ju, The Design of Folk Art Data Management System Based on Data Mining Algorithm, Journal of Changchun Normal University, vol.37, Jun. 2018, p. 201-106.

[3] HU Jun-ping, TAN Ying, Reyhangvl Arken, Design and development of Lezhu, an information sharing service for Huayang community based on iOS platform, Journal of Southwest Minzu University (Natural Science Edition), vol.44, Mar.2018, p.184-193.

[4] CHOI J, NAZA RETHD, JAIN H, Implementing service-oriented architecture in organizations. Journal of Management Information Systems, vol.26, Apr.2010, p.253-286.

[5] SWAIN S K, MOHAPATRA D P, MALL R, Test case generation based on use case and sequence diagram. International Journal of Software Engineering, vol.123, Mar.2010,p.21-52.

[6] MO J L. Design and implementation of distance teaching platform based on ASP.Net, Energy Procedia, vol.13, May.2011,p.7281-7287.

[7] ZHOU Tingmei, SONG Dandan, MO Yimin, Research on Material Management Information System Based on ASP. NET, JOURNAL OF WUT(INFORMATION AND MANAGEMENT ENGINEERING), vol.38, Aug. 2016, p. 490-493.