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SM Architectural Design Firms Management Information System Design

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KEY WORDS

SME,
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ABSTRACT

Small and medium-sized architectural design firm in order to obtain the survival and development, it is necessary to improve their competitiveness and, therefore, to enhance their level of information technology. Development and use of management information systems to improve management efficiency, will become an important means of SM architectural design firms to enhance their competitiveness. This paper intends to take the project management of SM architecture firms as the research object, combined with the theory of project management and engineering information systems development, to design a practical, scientific management information system so that SM architectural firms can manage design project easily, fast and clearly, enables SM architectural firms to successful complete the information transformation.

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1 Introduction

The rapid development of China's construction market, making it the world's third largest market, it attracted a large number of foreign construction companies, including architectural firms competing to join. SM architectural design firm in order to obtain the survival and development, it is necessary to improve their competitiveness, therefore, to enhance their level of information technology, development and use of management information systems to improve management efficiency, will become the SM architectural design firms to enhance their competitiveness important tool. In fact, due to the isolation and one-sided understanding of the design project management, tend to make project management failed. The reason why most enterprises fail is that in practice the lack of scientific management indicators and decomposition tool, did not form a unified association, direction consistent design management objectives and targets chain. Personalized indicators in the management process, should be established for different employees, make the employees' behavior toward the direction of the organization's strategic objectives, and through efficient control of design quality, design schedule, designers deployment, improve the overall efficiency of the enterprises, and promote development of design project management's information technology, thus improving the competitiveness and economic benefits of enterprises, and enable them to remain invincible in the fierce competition.

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2 SM Architectural Design Firms Management Information System Requirements Analysis

2.1 The SM architectural design firms' characteristics

SM architectural design firm has a small staff, simple institutions, and its departments contacted relatively close. Therefore, its organizational structure uses more linear mode of management, with the advantage of unity of command, clear responsibilities, and also reduces the levels of management for instructions issued. But the paternalistic management mode will also make the chief engineer or manager the right to maximization, ignoring the role of team wisdom and maximize the impact of design managers. The above features make the SM architectural firms more management advantages and efficient than large-scale design enterprises. However, with the degree of information technology in large-scale enterprises, SM architectural design firm advantage in the management of design projects has gradually weakened, so it is an urgent need to according to their own conditions and characteristics to develop convenient, effective systems of design management information.

2.2 Problems exist in the SM architectural design firms' information management

(1) A lower level of information management

At present, the research and application of project management is more active than ever, project management techniques and application tools continue to mature and has been successfully applied to large construction projects, resulting in a very significant economic and social benefit. At this stage, only some large enterprises by means of independent research, reached a preliminary level of design management information technology. The majority of SM architectural design firms can not complete the information systems of design management, due to economic, technical and other reasons, their degree of information technology is still in a relatively low level.

(2) Low efficiency and poor collaboration of the project team

As the project team in SM architectural design firms constitute complexly, have more part-time designers, and its office location is not fixed, real-time control difficult to achieve, so its team collaboration and communication has been hampered. Project management must spend a lot of time or experience to control the design schedule, so that more time to waste, progress is difficult to accurately control, and project management did not measure.

2.3 Design information management system performance indicators

(1) The integrity of information: use of value constraint, default and other methods to ensure the integrity of the information. Once the staff input or modify to result in data errors, the system must be explicitly given the warning message prompting the user.

(2) System availability: the information system of design management is a practical application-oriented software systems. Its completion will replace the low efficiency of manual work, so during system construction must take into account the habits of the personnel.

(3) The scalability of the system: after the completion of the development, the system must ensure that when users have new demand, they can easily add some features or modules and timely solutions, but also to keep the style consistent with the rest of the system, making the software better scalability.

(4) The security of the system: the user into the system, you should first undergo a rigorous identity verification, based on their permission level, the use of certain functions and data.

3 Duties of the Design Team and Design Staff

3.1 Duties of the design team

SM architectural design firm has a small staff, simple institutions, and its departments contacted relatively close.

(1) Provide professional services, including assistance in the project management agencies to carry out project preparatory work;

(2) After receiving the design project, the professional person in charge need in charge of a list of their professional work, and with project team to discuss the work schedule;

(3) In accordance with established working standards, job content, work plan, work quality, and work program to complete the design task;

(4) The necessary internal co-ordination between the various professional and co-ordination with each other to provide the necessary design condition data;

(5) Attend the meeting of the Party or other related parties organized by the project management team, and the project manager or the professional person in charge finishing the meeting minutes or memoranda submitted to the project management team;

(6) Provide appropriate design parameters, indicators, drawings and other information to project management, and begin the design budget;

(7) Provide the documents about technical problems of the design project to Party;

(8) In the design project is completed, according to company organize complete project archive data and hand submitted to the

- company's project management team;
- (9) Responsible for upgrade the ability of the design team;
- (10) Responsible for evaluation all personnel involved in the project performance.

3.2 Duties of the design staff

Management and assessment of the designers, not only to understand the characteristics of its work, and also should be familiar with their work situation, so as to facilitate the the operation of management and assessment.

- (1) The professional person in charge
 - ① According to detailed work period and time node of the sponsor of project, compile the detailed work schedule of related discipline;
 - ② Control and master all technical details of related discipline;
 - ③ According to project requirement, and requirement of manager of sponsor of project, cooperate with site service during construction period;
 - ④ Dispatch design task order to designer and design assistant of lower level;
 - ⑤ The performance appraisal is done for designer.
- (2) Designer
 - ① According to requirement of chief person of discipline, plot the related construction drawing of project;
 - ② Performance appraisal is done for designer.
- (3) Design assistant
 - ① According to requirement of project manager and discipline chief person, cooperate with related drawing plotting work;
 - ② The construction drawing sorting, composition, layout, and dimension label, etc.

4 The Overall Design of the Information Management System for SM Design Company

4.1 Functional modules

SM design company information management system for design companies and design project management. It should be the main employee file information, wages and benefits information, employee task assignments, project schedule management, employee performance appraisal and other functions. The functional modules are shown in Figure 1.

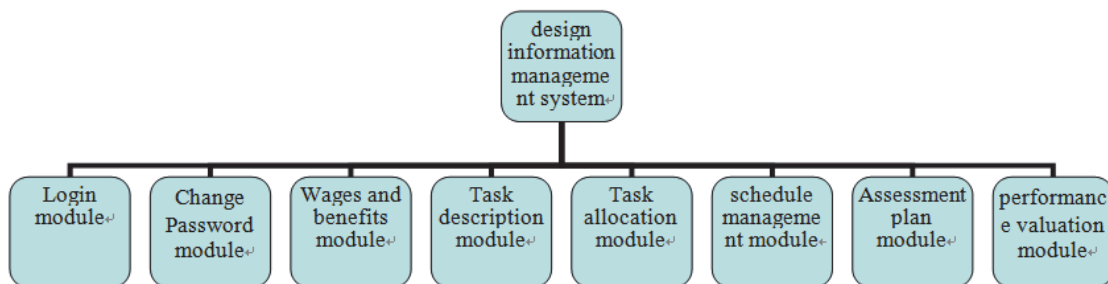


Figure 1 SM design information management system functional modules

4.2 The functional competence of the administrators and staff

Respectively shown in Figure 2, and Figure 3.

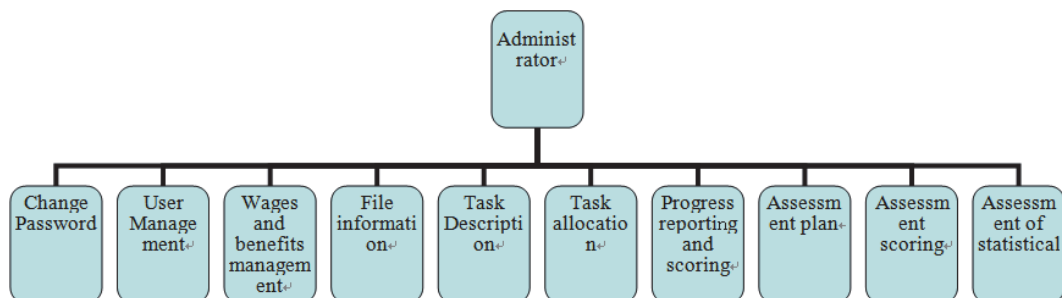


Figure 2 Administrator rights for SM design companies' information management system

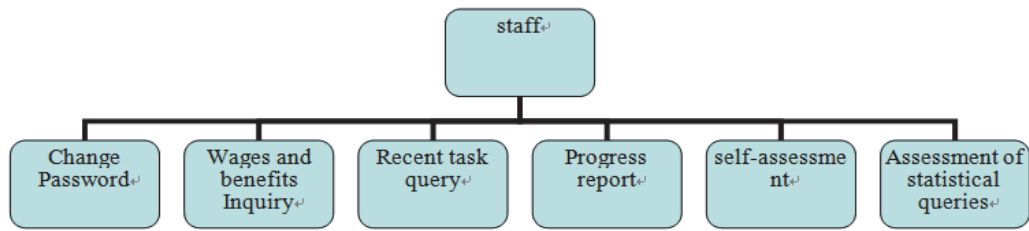


Figure 3 Staff rights for SM design companies' information management system

5 The Conceptual Design of the Information Management System for SM Design Company

Database system design is divided into four stages of needs analysis, conceptual design, logical design, physical design. The goal of conceptual design is to design a conceptual model of the database system to reflect the information needs of an organization's departments. The conceptual model of the database system is independent of the logical structure, database management system, and computer system of the database system.

5.1 Conceptual data model

The conceptual model is designed on the basis of the needs analysis, using conceptual data model (ER model) to represent the linkages between the data. The conceptual design is to accurately describe the application areas of information models, to support a variety of applications of users, so that both easily converted to the database system logic model, and easy for users to understand. For example, the ER diagram of 'Task allocation module' and 'Schedule management module' are shown in Figure 4.

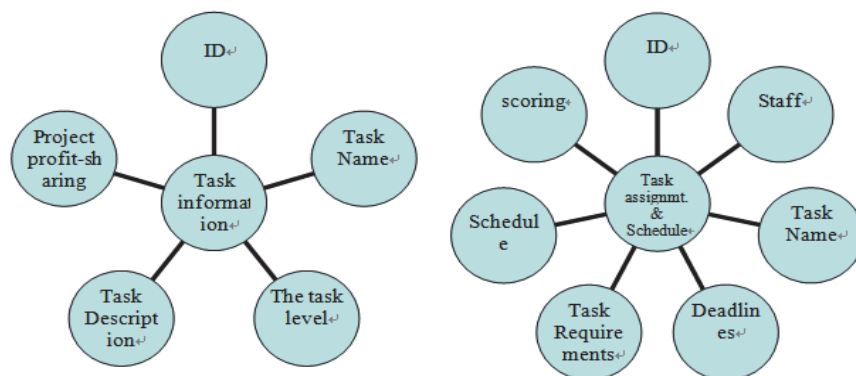


Figure 4 ER diagram of tasks and schedule information

5.2 Basic information management data flow

The basic information management data flow diagram of this system is shown in Figure 5.

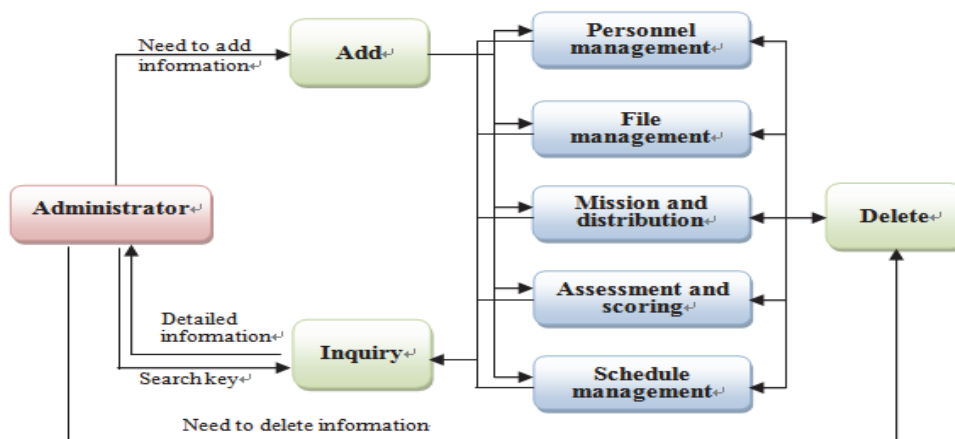


Figure 5 Basic information management data flow diagram

After carrying out the design of conceptual structure and the physical structure, the structure and function of the target system has been analyzed more clearly, and then through the database implementation, operation and maintenance, will be able to provide users with a stable and efficient system.

6 Conclusion

Through research and implementation can be drawn:

- (1) The development of design firms need a comprehensive scientific information management system, for small and medium-sized architecture firms, design management system is necessary to consider the characteristics of SMEs, but also to combine the characteristics of knowledge workers and the designer's job responsibilities, in-depth understanding of enterprise the actual situation.
- (2) The target indicators of the design management system requires a combination of business development goals, staff analysis, consideration of the integrity of the information, availability, scalability and security of the system.
- (3) To establish the management mechanism of the system engineering, need to the multi-agent design process management, multi-coordination of participation, in order to ensure the design task quality and efficient to achieve the project objectives.

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