Research on Land Acquisition and Demolition Management Platform Technology for Guangxi Highway Traffic Construction

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Abstract: This paper proposes a solution in the developing of the land acquisition and demolition management platform, targeting the needs of land acquisition and demolition projects for Guangxi highway traffic construction. This solution describes the design of technical framework, business processes and business functions in detail. The functions mainly include the access control, basic data entry, land acquisition and demolition review, and management of land acquisition and demolition settlement. When the platform creates a contract, it can strategically and swiftly adopt different signing template adaptive to different local legislation for land acquisition and demolition. Finally, the platform has been put into practical use in some acquisition and demolition projects for Guangxi's main highways, and the results verify the feasibility and effectiveness of the proposed solution.

1. Introduction

At present, the land requisition and demolition business of the Guangxi Highway Project is facing problems such as uncontrollable total demolition workload, inconsistent compensation standards, repeated release of demolition funds, delayed settlement of demolition funds, deficiency of data, involvement with different departments and heavy workload. If these problems are not prevented in time, it would cause serious disputes about the business and the use of demolition funds, which would have a negative effect on social stability.

The main purpose of the land acquisition and demolition management system is to use information technology to manage the whole process of land acquisition and demolition business, to facilitate the processes of data entry, data review, compensation settlement, and automatically creating contracts and related report forms.

In the platform, the entire process is paperless, and compensation standards and related expenses are calculated automatically to prevent errors. The platform is able to produce a range of statistics reports as required, based on the real-time data in the land acquisition and demolition projects. The platform achieves advantages such as setting a standardizing work flow, improving work efficiency and speeding up data transfer. The platform not only reduces the workload of the front-line staff, but also enhances the leadership's real-time control over the whole progress of the project. Land acquisition and demolition projects involves the vital interests of farmers. For better services, the support of the land acquisition and demolition management platform is urgently needed.

In terms of theoretical research, the literature [1] introduces the constructive content of the urban land acquisition and demolition management system, expounds the technical roadmap of the system construction, describes the specific design of the system, analyzes the main characteristics of the system, and provides a complete designing scheme. Literature [2], taking the land acquisition and demolition project in a district in Guangzhou as an example, introduced the objectives and related modules of the management system, analyzes the function requirements, puts forward the system design, analyzes the system design requirements, adopts the service-oriented application(SOA) development method for the overall design and layered design of the system architecture, analyzes the main characteristics of the system, and elaborates the development

process of the land acquisition and demolition information management system. Literature [3] based on GIS technology, starting from the classification of land acquisition and demolition projects, designing a storage mechanism integrating spatial data and attribute data, and designing and developing a management information system that can realize data interconnection and data sharing. Literature [4] puts forward the construction goals of developing an Android-based land acquisition and demolition information management system, expounds the overall architecture of the system and the key development technologies, and analyzes the main functional characteristics of the system. As the number of land acquisition and demolition projects increasing, literature [5] argues that it is extremely necessary to continuously improve the management level of land acquisition and demolition projects, and to design and apply the management platform-J2EE platform, in order to avoid corruption incidents in the land acquisition and demolition operations. Based on GIS + BIM technology, literature [6] establishes a 3D digital terrain and 3D BIM model for the major land acquisition and demolition areas to create the virtual scene of the land acquisition and demolition areas with efficient visualization, parameterization and information functions. Based on the above research, this article reviews the existing land acquisition and demolition management platform, and proposes a solution to the land acquisition and demolition management platform for Guangxi highway traffic.

2. Business Requirements

The land acquisition and demolition business of Guangxi Highway projects urgently needs to use information technology to improve its management level. The specific requirements are as follows:

(1) The construction of the basic land acquisition and demolition data needs to realize superimposed display of vector and image data. The system should have basic map business functions, such as browsing, zooming, roaming, querying, as well as spatial analysis functions, such as length measurement, area measurement, buffer analysis, etc.

(2) The platform intuitively displays the complex business logic, greatly simplifies the the procedures and facilitates the smooth business of the land acquisition and demolition projects.

(3) The platform needs to provide convenient business query function and land acquisition project management function. Users can view and track the progress of the project in real time to ensure that the project progresses on time. The project-based management model is conducive to the refinement of work.

3. Overall Solution

3.1 Technical Framework

The platform mainly uses B / S as architecture, uses MySQL as database, uses springboot as the core framework, uses Mybatis as the persistence layer framework, uses Thymeleaf as the template engine, uses Bootstrap for the layout, uses bootstrap-table for the table display, uses bootstrap-select for selection plugin, jQuery plugin, jQuery. The platform's server-side is written in Java and its client-side is written in HTML + CSS + JavaScript.

3.2 Overall business Process Design

1) Entering data: junior operator or general department operator enter the compensation data and submit the data for review.

2) Data review: The reviewer from the General Department of the Construction Office reviews the compensation data.

3) Create contracts: based on the approved compensation data and specific situation, the general department operator create the contract and submit it for review.

4) Contract review: The General Department reviewer of the Construction Office review the contents of the contract.

5) Create settlement: the General Department operator of the Construction Office settle the approved contract by area, and submit the settlement for review.

6) Settlement review: the settlement data is reviewed by the General Department reviewer and the Financial Department staff. The settlement data will be firstly reviewed by the General Department, then it will be automatically passed on to the Finance Department. The settlement review will be completed after these two reviews.
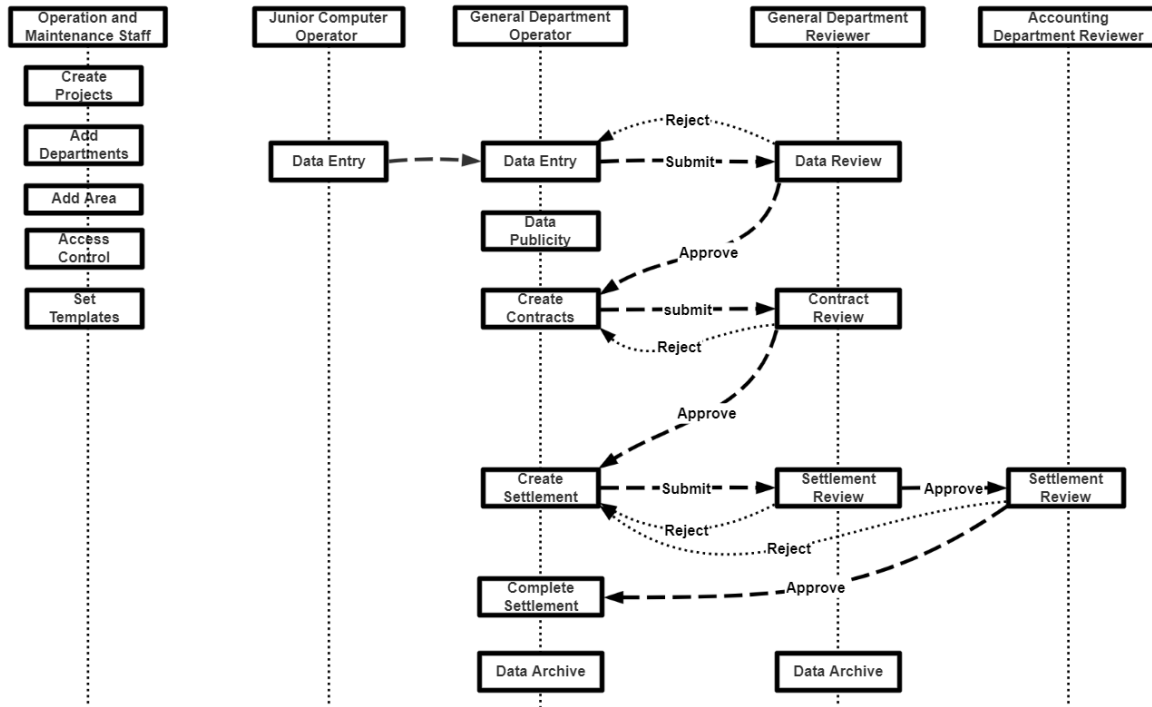

Figure 1 Overall business flowchart

3.3 Main business function design

(1) The Design of Role-based Access Control

The platform uses role-based access control to manage authority issues. As a promising alternative to the traditional access control (autonomous access, mandatory access), role-based access control has received widespread attention. In RBAC, users' access rights are associated with users' roles. A user can get the rights of a certain role by becoming a member of this role. The design of role-based access control greatly simplifies the management of authority control. In an organization, roles are created to accomplish various tasks, and users are assigned corresponding roles based on their responsibilities and qualifications. Users can be easily reassigned from one role to another. The new roles can have new access based on the new needs, and the old access can also be withdrawn. Role-to-role relationships can be established to encompass a wider range of practical situations.

(2) Basic Data Entry

The land acquisition and demolition data is the main part of the core process of this platform. The platform is mainly used to create compensation information of the householders or the demolition information of the special facilities. The platform also supports the level-by-level review, compensation contracts printing, and then it can be used to issue compensation payments to householders or the facility owners. Once the payment is received, the owners of the demolished building need to sign the Confirmation of Compensation Issuance Forms. The platform operator then enter the settlement information and pass it on to settlement review.

(3) Land Acquisition and Demolition Business Management

The core function of land acquisition information entry is to record the compensation information of each land owner, usually by the junior computer operator. Take the land owner as the basic unit and enter six types of information: OffsetGroundDO, OffsetPlantDO,

OffsetHouseDO, OffsetHouseDesignDO, OffsetGraveDO, and OffsetSepecialDO. These information can be automatically filled after selecting from the basic data, they are saved separately and associated with the compensation information.
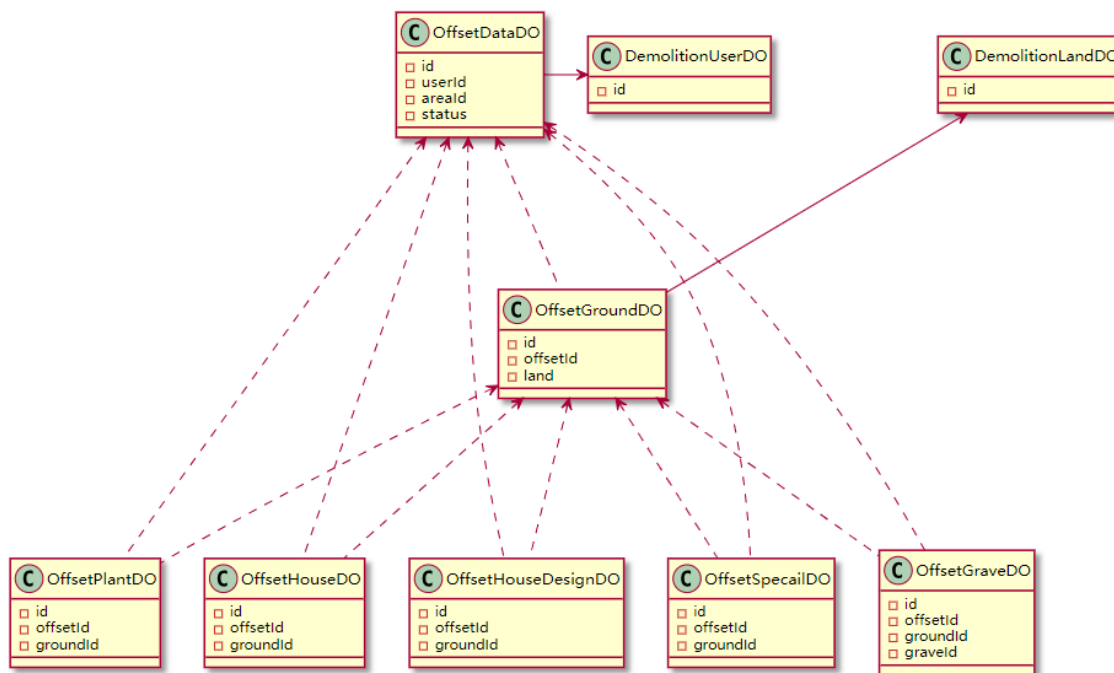
The class diagram is as follows:

Figure 2 The class diagram

The main process is as follow:

1) Select the land acquisition and demolition area;

2) Choose the land owner;

3) Generate compensation records;

4) Enter the editing page and select various compensation labels according to the actual situation;

5) Enter various types of compensation information and submit it for review.

Land acquisition information review:

After entering the land acquisition information and submitting it to the review, it comes to the land acquisition information review stage. The land acquisition information review stage includes three steps of review: town review, county review, and owner review(include general department review and financial department review).

Specific steps are as follows:

1) View detailed information on land acquisition compensation;

2) According to the specific situation, choose to "approve" or "reject" the data;

3) If approve, enter the next level of review. If reject, fill in the reason for rejection and return directly to the entry status.

4) After completing all the review steps, proceed to the contract printing step.

For the demolition of special facilities, a tripartite agreement and demolition details shall be printed. The data needed for these documents is mainly from entering the second party, special facility demolition category, construction office and other detailed data.

Specific steps are as follows:

1) Select the project and the area;

2) Add new Compensation for demolition of special facilities, enter the information of the Second Party, the Special facilities demolition category,and the construction office;

3) Enter the edit page and edit details;

4) Submit for review.

The process of the special facilities demolition review is similar to the process of land acquisition compensation review. There is no need for town review, only county review and owner review.

Specific steps are as follows:

1) View detailed information on special facility compensation;

2) According to the specific situation, choose to "approve" or "reject" the data;

3) If approve, enter the next level of review. If reject, fill in the reason for rejection and return directly to the entry status.

4) After completing all the review steps, proceed to the contract printing step.

(4) Land acquisition and demolition settlement

After the contract is printed, the corresponding contract can be settled in installments at the county level. Specific steps are as follows:

1) Select the area;

2) Fill in the government funds already in place;

3) Select the contract;

4) Submit for review.

The process of settlement review is similar to the process of the special facility demolition compensation contract review, and also does not require the step of town review.

Specific steps are as follows:

1) View detailed information of settlement application;

2) According to the specific situation, choose to "approve" or "reject" the data;

3) If approve, enter the next level of review. If reject, fill in the reason for rejection and return directly to the entry status.

4) After all the reviews are completed, the settlement is completed.

4. Application Verification

(1) Access Control

The platform achieves access control through the association of roles and functional modules in the menus. The default set of roles include maintenance personnel, project administrators, entry personnel, contract management personnel, settlement management personnel, town review, county review, general department review, and finance department review.
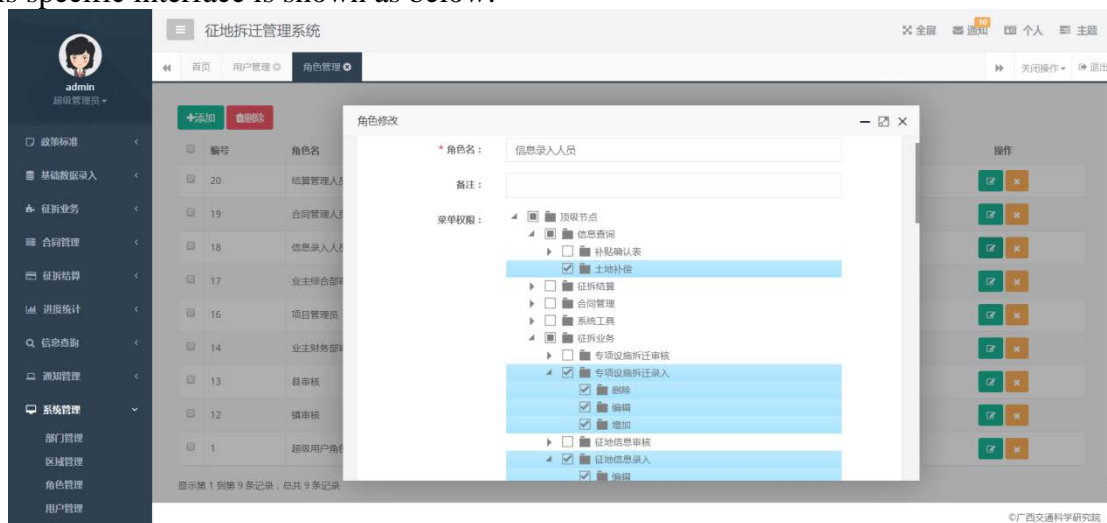
This specific interface is shown as below:

Figure 3 Access Control on Roles

As in the land acquisition and demolition projects, the compensation information of each project and area is different, the permission to access the compensation data needs to be distinguished. The users in the system are bound to the land acquisition and demolition projects and areas. When

querying data, the platform distinguishes permissions based on the project and area to which the user belongs.

This specific interface is shown in Figure 4 below:

Figure 4 Data Access Control

The super administrators can give other administrators access to different functional modules or data, but the project administrators can only operate users created by themselves. Super administrators has the highest authority and is responsible for creating projects and project administrators. The project administrator has the authority to manage the project, and the authority to create the roles needed to operate the project. The authority initialization process is that when the database is initialized, two roles are created by default: super administrator and ordinary administrator, distinguishing the marking bit role_sign.

(2) Basic Data Entry

Acquisition item management: the main function of this module is to enter the acquisition item name and acquisition category, and the system does not distinguish between items and areas when entering. After the entry is completed, it can be done once and for all, and the name and category information of the acquisition item can be used in all projects. If there is a lack of information about a certain acquisition item, it can be easily added in time.

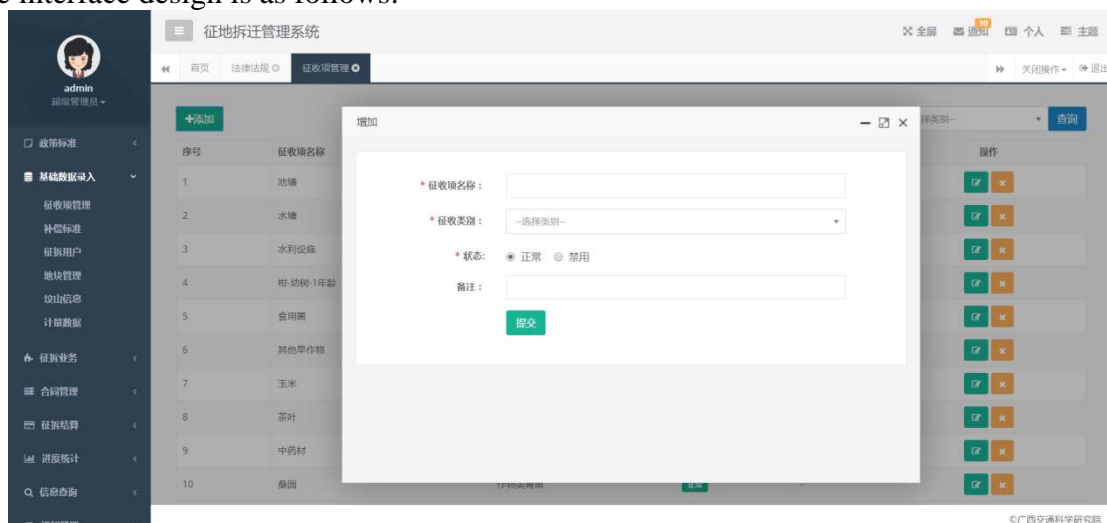The interface design is as follows:

Figure 5 Acquisition item management

Compensation standards generally vary with different county-level regions. Compensation standards are mainly related to acquisition items, record units and compensation amounts. The module of compensation standards management are designed to distinguish between projects and

areas, so the platform manages the compensation standards information for projects and regions separately. The interface design is as follows:

Figure 6 compensation standards management

The information entry function of the landowner is similar to the above function. When entering, users need to associate the project and the area, then enter the basic information of the landowner, such as the ID card number, bank card number and other information. Because the entry of landowner information is fallible and time-consuming, the platform supports the function of automatically identifying and entering the ID card and bank card information. The information entry function of the parcel is similar to the above function as well. When entering, users need to associate the project and the area, then enter the basic information parcel, such as the number, area, pile number of the parcel. In the function of parcel information management, the data is not associated with the landowners until the compensation information is entered. The information entry function of the graveyards is similar to the above function as well. When entering, users need to associate the project and the area, then enter the basic information such as the number, pile number of the graveyards. Finally, the entry function of measurement data is mainly to record the design area and design amount of the land acquisition and demolition projects, which is used to reflect the progress of land acquisition and demolition projects in the statistical progress module.

5. Conclusion

The land acquisition and demolition management platform proposed in this article is designed specifically for the Guangxi's road construction projects, has been applied to some secondary road construction projects in multiple sections in Guangxi Provence, and has achieved good application results. It has realized the functions of access control in land acquisition and demolition operations, the management of land acquisition and demolition data, operations and settlements. The platform has met the informational needs of the Guangxi's roads management system, and has provided technical supports to the management of Guangxi's road system. With the accumulation of data in land acquisition and demolition projects, how to mine the existing big data and how to improve the capacity of value-added service for the entire road system are the next questions to be solved.

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