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Project Management Informatization: Postprint on Design Project Management

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Abstract

This paper first introduces the organizational structure and business processes for design project management at a comprehensive design institute, then presents a design project management information system based on these business processes, and elaborates in detail on the system's business functions, position definitions, function allocation, and other related content.

Full Text

Preamble

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Design Project Management in Project Management Informatization
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Abstract: This paper first introduces the organizational structure and business processes of design project management at a comprehensive design institute. It then presents a design project management information system developed based on these business processes, detailing the system's business functions, position definitions, and function allocations.

Keywords: Design Project; Project Management; Work Breakdown Structure; WBS; Work Package

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A project is a one-time endeavor completed collaboratively by multiple individuals within defined time, resource, and budget constraints to achieve a clear objective. Resources refer to the human, financial, and material assets required

for project completion, while the defined timeframe refers to explicit start and end dates for project execution.

Design project management constitutes self-management by design institutes of their work during the design phase of construction projects. To effectively manage design projects, institutes must oversee project scope, time, and cost, conduct comprehensive and detailed technical and economic planning for schedule implementation, produce design drawings and specifications, and perform supervision and acceptance during implementation.

Solution

The system described herein achieves full lifecycle management of design projects (referring exclusively to projects undertaken and executed entirely by the design institute itself, excluding projects where portions are subcontracted to other design firms). The specific management stages are illustrated in [Figure 1: see original paper], spanning from engineering marketing contract signing to contract payment collection, while managing project scope, time, and resources (human resources). The main content of each management stage is detailed below.

2.1 Marketing Contract Signing

Following the signing of a marketing contract, the marketing manager must record it in the software system, documenting primary information such as the names, addresses, and account details of both contractual parties, contract signing date, responsible persons from both parties, contract amount, deliverables, and other auxiliary information.

2.2 Project Team Establishment

After marketing contract signing but before execution, the department head of the business management department appoints a project manager for the contract, who then completes project team establishment. This involves recording the name of the managing organization, project name, code, project cost, project team establishment date, and other information, while also specifying the management team structure. This includes assigning positions relevant to the project team (the system defines four positions: project manager, design manager, control manager, and records manager), identifying personnel for each position, and recording their contact information and other auxiliary details.

2.3 Project Scope Management

Project scope management involves determining what work is included within and excluded from the project. The design manager of the project team is responsible for defining the project scope with the client, preparing a detailed

project scope statement, and submitting it to the project manager for approval. Specific tasks include:

2.3.1 Project Scope Definition This process further refines the project work scope, producing a detailed project description that makes the scope concrete, hierarchical, and structured to achieve manageability, controllability, and implementability, thereby reducing project risk. The process involves decomposing the functions to be implemented within the project—that is, performing WBS decomposition—to break down project work into measurable work packages (the fundamental basis for defining work scope, project organization, setting product quality and specifications, estimating and controlling costs, and estimating time cycles and scheduling). The system primarily records the names and codes of work breakdown structure components at all levels, deliverable names, and other information.

2.3.2 Project Scope Adjustment During project execution, as client requirements become increasingly detailed and explicit or due to other factors, project scope changes may occur. The design manager must promptly adjust the project scope in the software system and submit it to the project manager for approval, recording information such as the names and codes of adjusted components, reasons for scope adjustment, and adjustment dates.

2.4 Project Time Management

Project time management refers to the systematic approach of efficiently planning, implementing, and controlling projects and their resources within specified timeframes using systematic theories and methods to ultimately achieve project deliverables. In this system, the design manager is responsible for preparing and adjusting the project schedule, which is then submitted to the project manager for approval. Design personnel from business departments provide feedback on actual progress, which is reviewed and approved by production managers from business departments and the control manager from the project team. Specific tasks include:

2.4.1 Project Schedule Planning After project scope determination, the project team design manager prepares the project schedule based on the work breakdown structure and the interdependencies among various activities. The system primarily records planned start dates, planned end dates, planned durations, planned numbers of drawings, and planned numbers of text pages for each work package.

2.4.2 Project Schedule Adjustment As project scope adjustments are made and actual progress feedback is received (with some work completed ahead of schedule or delayed), project managers must adjust the project schedule. This

primarily involves maintaining updated planned start dates, planned end dates, and planned durations for work packages requiring adjustment.

2.4.3 Actual Progress Feedback During project execution, design personnel must promptly provide feedback on actual progress upon completing each work item. The system records actual start dates, actual end dates, actual durations, actual numbers of drawings, actual numbers of text pages, and design personnel information for completed work packages.

2.5 Project Resource Management

Human resource management occupies a crucial position in overall project resource management. From an economic perspective, human beings are the decisive factor among productive forces and play a dominant role in social production processes. Since design projects are primarily completed by specific designers, resources herein refer mainly to human resources. The project team design manager is responsible for assigning design tasks to corresponding business departments, whose production managers analyze the assignments and identify specific designers. The design manager then prepares and adjusts the project resource plan, which is submitted to the project manager for approval. Specific tasks include:

2.5.1 Project Resource Planning The project team design manager is responsible for preparing the project resource plan, primarily recording specific designers for each work package and the production managers from business departments responsible for approving completion results.

2.5.2 Project Resource Adjustment When production managers or specific designers change, or when project scope changes occur, the project team design manager must promptly adjust the project resource plan.

2.6 Project Document Management

Project document management involves the systematic collection, processing, decomposition, cataloging, and archiving of information carriers during project information management, providing both specialized and commonly used information to all project participants. The records manager is responsible for collecting and organizing all project-related documents, entering electronic versions into the software system, and recording document names, classifications, keywords, version numbers, creation dates, document responsible persons, and archivists.

2.7 Marketing Contract Payment Collection

Contract payments are divided into initial payments, progress payments, final payments, and warranty deposits. The marketing manager must diligently and

promptly record all payment collections from the client, including contract information, collection date, client contact person, company contact person, collection amount, and payment type.

2.8 Basic Information Management

This module maintains public basic information within the software system, including:

2.8.1 Organizational Structure Information The system maintains the organizational structure of the design institute, including all levels of management and functional departments, displayed in a multi-level tree structure as shown by the gray-shaded boxes in [Figure 2: see original paper]. The structure includes: 1. Engineering marketing departments: domestic marketing department, overseas marketing department; 2. Business management departments: civil engineering management department, installation engineering management department, etc.; 3. Business departments: civil design department 1, civil design department 2, installation design department 1, installation design department 2, etc.

2.8.2 Personnel Account Information The system maintains personnel information within each organizational unit, including names, contact details, and account information.

2.8.3 Standard Position Information The system maintains information on standard positions involved in design project management, as shown by the white boxes in [Figure 2: see original paper]: 1. Engineering marketing department: marketing manager; 2. Business management department: department head, project manager, design manager, control manager, records manager; 3. Business department: production manager, designer.

lists the relationship between positions and various business functions within the system. Additionally, the software system provides comprehensive multi-dimensional statistical functions, including:

1. **Project Scope Overview:** Displays the project work breakdown structure in a tree format, including original and all revised versions, with the ability to mark the final scope versus historical changes.
2. **Project Progress Monitoring:** Displays the work breakdown structure in a tree format. Clicking on tasks at different levels shows Gantt charts comparing planned versus actual progress, including planned/actual start dates, end dates, and durations.
3. **Project Personnel Input Monitoring:** Displays the work breakdown structure in a tree format. Clicking on tasks at different levels presents reports showing personnel input for each task, including designer names and time invested.

4. **Project Personnel Dynamic Distribution:** Provides reports on personnel information for each position in the project team. Clicking on a name reveals the person's involvement in other projects and their positions in those project teams.
5. **Project Document Overview:** Displays the work breakdown structure in a tree format. Clicking on tasks at different levels lists all documents generated upon task completion.

Through the design, development, implementation, and application of this software system, the design institute's design project management processes have been optimized and adjusted, clarifying work content throughout the entire design project management process, involved positions, and personnel division of labor. This has significantly accelerated processing times for various tasks and substantially reduced office costs. Concurrently, as management processes continue to optimize, the software system's functions require continuous improvement and refinement.

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Design Project Management of Project Management Informatization

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Abstract: This paper introduces the structure and business process of design projects of a comprehensive design organization, and then demonstrates a design project management information system based on the business process. Finally, the paper shows the business functions, job definitions and function distributions of the system.

Key Words: Design Project; Project Management; Work Breakdown Structure; WBS; Work Package

Note: Figure translations are in progress. See original paper for figures.

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