Design Project Management in Project Management Informatization: Postprint

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Abstract

This paper first introduces the organizational structure of a comprehensive design institute and the business processes of design project management. Then, based on these business processes, it presents a design project management information system, elaborating in detail on the system's business functions, position definitions, function allocation, and other related aspects.

Full Text

Solution

The system described in this paper implements full lifecycle management for design projects—specifically, projects entirely undertaken and executed by the design unit itself, excluding those where portions of the design work are subcontracted to other organizations. As illustrated in Figure 1 [Figure 1: see original paper], the system manages design project scope, time, and resources (human resources) from engineering marketing contract signing through payment collection. The following sections detail the main components of each management phase.

2.1 Marketing Contract Signing

After the marketing contract is signed, the marketing manager must record it in the software system, documenting key information such as the names, addresses, and account details of both contractual parties, the contract signing date, responsible persons from both sides, contract value, deliverables, and other auxiliary information.

2.2 Project Team Establishment

Following contract signing but prior to execution, the department head from the business management department assigns a project manager for the mar-

keting contract, who then establishes the project team. This involves recording the name of the managing organization, project name, code, project cost, establishment date, and other details, while also defining the management structure. The system defines four standard roles: project manager, design manager, control manager, and records manager. The project manager allocates personnel to each role and records their contact information and other relevant data.

2.3 Project Scope Management

Project scope management involves determining what work is included and excluded within the project. The design manager is responsible for defining the project scope in consultation with the client and preparing a detailed project scope statement for approval by the project manager. Specific activities include:

2.3.1 Project Scope Definition This process involves further refinement of the project work scope, resulting in a detailed description that makes the project scope concrete, hierarchical, and structured to achieve manageability, controllability, and implementability. It defines project boundaries by identifying which functions and tasks should be accomplished within the project and which should not. The process involves structural decomposition of required functions through Work Breakdown Structure (WBS) analysis, breaking down project work into measurable work packages. Work packages serve as the foundation for defining work scope, organizational structure, product quality and specifications, cost estimation and control, and schedule development. The system records information for each WBS element, including name, code, deliverable name, planned start and end dates, planned duration, planned drawing count, and planned text volume.

2.3.2 Project Scope Adjustment During project execution, client requirements may become increasingly detailed and specific, or other factors may necessitate scope changes. The design manager must promptly adjust the project scope in the software system and obtain approval from the project manager. This requires recording the names and codes of adjusted WBS elements, reasons for scope changes, dates, and related information.

2.4 Project Time Management

Project time management refers to the systematic application of theories and methods to efficiently plan, implement, and control projects and their resources within specified timeframes to achieve target deliverables. In this system, the design manager is responsible for preparing and adjusting the project schedule for project manager approval, while design personnel from business departments provide actual progress feedback, which is then reviewed by both the department production manager and the project control manager. Specific activities include:

2.4.1 Project Schedule Development After project scope is defined, the project design manager develops the project schedule based on WBS results and interdependencies among tasks, recording for each work package the planned start date, planned end date, planned duration, planned drawing count, and planned text volume.

2.4.2 Project Schedule Adjustment Changes in project scope and feedback on actual progress (such as early or delayed completion of tasks) require project managers to adjust the project schedule, primarily updating the planned start dates, planned end dates, and planned durations of affected work packages.

2.4.3 Actual Progress Feedback During project execution, design personnel must promptly report actual progress upon completing each task, recording the actual start date, actual end date, actual duration, actual drawing count, actual text volume, and responsible designer for the completed work package.

2.5 Project Resource Management

Human resource management plays a crucial role in overall project resource management. From an economic perspective, human resources are the decisive factor among productivity elements and occupy a dominant position in social production processes. Since design projects are primarily executed by specific designers, resources here mainly refer to project human resources. The project design manager is responsible for decomposing design tasks to appropriate business departments, where production managers analyze and assign specific designers. The design manager then prepares and adjusts the resource plan for project manager approval. Specific activities include:

2.5.1 Project Resource Planning The project design manager prepares the project resource plan, recording the specific designers assigned to each work package and the business department production managers responsible for approving work package completion.

2.5.2 Project Resource Plan Adjustment The project design manager must promptly adjust the resource plan when production managers or specific designers change, or when project scope is modified.

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. Records managers are responsible for collecting and organizing all project-related documents, entering electronic versions into the software system. The system records document name, classification,

keywords, version number, creation date, document owner, and archivist information.

2.7 Marketing Contract Payment Collection

Contract payments are categorized as down payments, progress payments, final payments, and warranty deposits. The marketing manager must diligently and promptly record all payment receipts from the client, including contract information, payment date, client representative, company representative, payment amount, and payment type.

2.8 Basic Information Management

Basic information management maintains shared foundational data within the software system, including:

2.8.1 Organizational Structure Information This module maintains the design organization' s structure, including all management and functional departments, displayed in a multi-level tree structure as shown in the gray-shaded boxes of Figure 2 [Figure 2: see original paper]. The structure includes: 1) Engineering marketing departments: domestic marketing, overseas marketing; 2) Business management departments: civil engineering management, installation engineering management, 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 This module maintains personnel and account information for individuals within each organizational unit.

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

Table 1 presents the relationship between system positions and their corresponding business functions, indicating which roles can maintain ( ) and approve ( ) various business processes.

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 both original and all revised versions, with the ability to mark the final scope and track all historical changes; 2) Project Progress Monitoring: Displays the work breakdown structure in a tree format. Clicking on tasks at different levels reveals Gantt charts

showing variances between planned and actual progress, including planned versus 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 generates reports showing personnel allocation, including names of assigned staff and their time investment; 4) Project Personnel Dynamic Distribution: Presents personnel information for each position in the current project team in report format. Clicking on a person' s name reveals their participation in other projects and their roles 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 organization' s project management processes have been optimized and adjusted. The system has clarified work content, positions, and personnel responsibilities throughout the entire design project management lifecycle, significantly accelerating task processing times and reducing office costs. Concurrently, as management processes continue to evolve, the software system' s functionality requires ongoing refinement and upgrading.

References

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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.