

核特色诊疗平台项目全流程设计进度管理优化研究

摘要

随着核技术应用产业的高速发展, 医疗领域对核特色诊疗平台建设的需求日益增长。由于常规医院项目设计管理模式难以适配核技术医学应用工程的特殊技术要求与管控逻辑, 亟需加大核医疗项目精细化设计管理体系的研究投入。随着核技术在医学领域的应用深度与广度不断拓展, 核特色医疗工程建设有望成为核领域新质生产力培育的重要载体, 成为我国医疗装备与核技术融合发展进程中不可或缺的核心板块。为了保障核技术医学应用项目按期高质量开工建设, 全流程、精细化的设计进度管理在项目工程准备阶段的应用显得尤为重要。现有的核医疗项目设计进度管理大多局限于单一专业领域, 即依靠传统线性管理模式开展固定流程的设计任务管控。但上述方法协同性不足, 易出现并行设计进度不匹配、工期滞后等问题, 对核医疗项目设计中的迭代增量特性与行政审批不确定性适配性较差。事实上, 核技术医学应用项目的设计进度管理是一个多模块、多节点、强耦合的动态管控问题, 项目实施过程中无法完全预判行政审批流程波动与设计方案迭代带来的进度风险, 传统管理方法存在显著的应用局限。基于上述限制, 本文创新性地提出了一种基于混合型开发方法与 WBS 工作分解结构的核技术医学应用项目设计进度管理优化体系。它通过对设计任务进行层级化拆解与模块化管控, 实现设计关键节点的精准识别与进度偏差的动态调整, 在保障设计成果满足核医疗技术规范与使用要求的同时, 可有效提高设计进度管控的稳定性与预见性, 并具备全流程闭环优化的管理能力。通过北京核工业医院核技术医学应用项目工程准备阶段全流程设计管理实践, 开展上述管理体系的可行性及应用成效验证。结果表明, 基于混合型开发方法的 WBS 进度管理体系可以显著提升核医疗项目设计进度管控效率。与传统的线性设计管理模式相比, 项目整体设计工期较同类型项目缩短 3 个月, 顺利完成全套施工图设计交付与全部行政审批手续办理。通过三大设计模块的分级管控与里程碑节点的动态跟踪, 有效化解了设计方案高频迭代、行政审批不确定性带来的进度风险, 从而大幅提升了核医疗项目前期设计管理的精细化水平, 为核技术医学应用类工程项目的设计进度管控优化与高质量工程建设提供了实践参考与技术支撑。

关键词

核医疗核特色

Abstract

With the rapid development of the nuclear technology application industry, the demand for the construction of nuclear-featured diagnosis and treatment platforms in the medical field is growing rapidly. Since the conventional design and management mode of hospital projects is difficult to adapt to the special technical requirements and control logic of nuclear technology medical application engineering, it is urgent to increase the research investment in the refined design management system of nuclear medical projects. As the application depth and breadth of nuclear technology in the medical field continue to expand, the construction of nuclear-featured medical engineering is expected to become an important carrier for cultivating new quality productive forces in the nuclear field, and an indispensable core sector in the integrated development of China's medical equipment and nuclear technology. To ensure the on-time and high-quality commencement of nuclear technology medical application projects, the application of full-process and refined design schedule management in the project preparation stage is particularly critical.

The existing design schedule management of nuclear medical projects is mostly limited to a single professional field, that is, relying on the traditional linear management mode to control design tasks with fixed processes. However, such methods lack synergy, prone to problems such as mismatched parallel design schedules and construction period delays, and are poorly adaptable to the iterative incremental characteristics and administrative approval uncertainties in nuclear medical project design. In fact, the design schedule management of nuclear technology medical application projects is a multi-module, multi-node and strongly coupled dynamic control problem. The schedule risks caused by fluctuations in administrative approval processes and design scheme iterations cannot be fully predicted during project implementation, and traditional management meth-

ods have significant application limitations.

Based on the above constraints, this paper innovatively proposes an optimized design schedule management system for nuclear technology medical application projects based on the hybrid development method and Work Breakdown Structure (WBS). Through hierarchical decomposition and modular control of design tasks, it realizes accurate identification of key design nodes and dynamic adjustment of schedule deviations. While ensuring that design results meet nuclear medical technical specifications and application requirements, it can effectively improve the stability and predictability of design schedule control, and has the management capability of full-process closed-loop optimization.

The feasibility and application effectiveness of the above management system are verified through the full-process design management practice in the engineering preparation stage of the nuclear technology medical application project of Beijing Nuclear Industry Hospital. The results show that the WBS schedule management system based on the hybrid development method can significantly improve the efficiency of design schedule control for nuclear medical projects. Compared with the traditional linear design management mode, the overall design period of the project is shortened by 3 months compared with similar projects, and the complete construction drawing design delivery and all administrative approval procedures are successfully completed. Through hierarchical control of three major design modules and dynamic tracking of milestone nodes, the schedule risks caused by high-frequency iteration of design schemes and uncertainties in administrative approval are effectively resolved, thereby greatly improving the refinement level of preliminary design management of nuclear medical projects. It provides practical reference and technical support for the optimization of design schedule control and high-quality engineering construction of nuclear technology medical application engineering projects.

Keywords

nuclear medicine nuclear-featured

Author: 李, 思奇 (哈尔滨工程大学)

Presenter: 李, 思奇 (哈尔滨工程大学)

Session Classification: 核技术及应用、医学物理与工程

Track Classification: 口头报告: 核技术及应用、医学物理与工程