

Practice on Design Knowledge Management and Transfer across the Life Cycle of a New-Built Nuclear Power Plant in China

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Abstract : As a knowledge-intensive industry, nuclear industry highly values the importance of safety and quality. The life cycle of a NPP (Nuclear Power Plant) can last 100 years from the initial research and design to its decommissioning. How to implement the high-quality knowledge management and how to contribute to a more safe, advanced and economic NPP (Nuclear Power Plant) is the most important issue and responsibility for knowledge management. As the lead of nuclear industry, nuclear research and design institute has competitive advantages of its advanced technology, knowledge and information, DKM (Design Knowledge Management) of nuclear research and design institute is the core of the knowledge management in the whole nuclear industry. In this paper, the study and practice on DKM and knowledge transfer across the life cycle of a new-built NPP in China is introduced. For this digital intelligent NPP, the whole design process is based on a digital design platform which includes NPP engineering and design dynamic analyzer, visualization engineering verification platform, digital operation maintenance support platform and digital equipment design, manufacture integrated collaborative platform. In order to make all the design data and information transfer across design, construction, commissioning and operation, the overall architecture of new-built digital NPP should become a modern knowledge management system. So a digital information transfer model across the NPP life cycle is proposed in this paper. The challenges related to design knowledge transfer is also discussed, such as digital information handover, data center and data sorting, unified data coding system. On the other hand, effective delivery of design information during the construction and operation phase will contribute to the comprehensive understanding of design ideas and components and systems for the construction contractor and operation unit, largely increasing the safety, quality and economic benefits during the life cycle. The operation and maintenance records generated from the NPP operation process have great significance for maintaining the operating state of NPP, especially the comprehensiveness, validity and traceability of the records. So the requirements of an online monitoring and smart diagnosis system of NPP is also proposed, to help utility-owners to improve the safety and efficiency.

Keywords : design knowledge management, digital nuclear power plant, knowledge transfer, life cycle

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