Development of Information Management System for Plant Life Cycle Management

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1. Introduction

This study intends to improve the sharing and reuse of the information by systematically storing and controlling the information of nuclear facilities in the design, construction, operations phases from the perspective of Information Management, as part of project management, where the information management by principle should be data-centric.

The study subjects are S. Korean NPP(Nuclear Power Plant) construction projects. Design, construction, operations companies have different nuclear power plant construction project structures, and each company has its own Information Management System. In this study, the end user developed an Information Management System early in the project, and developed a management structure that systematically integrates and interfaces with information in each lifecycle phase. The main perspective of Information Management is moving from the existent document-centric management to the data-centric management. To do so, we intend to integrate information with interfaces among systems.

2. Methods

The key to integrating Information Management System and the application program is to analyze actual work that will use the stored information in the future, and to use that information for making a model for incorporation into the system. This study built a data warehouse by implementing information Management process modelling [1]. Moreover, we built a structure that can interface with PLIMS(Plant Life-cycle Information Management System) by developing or using a system that specifies and manages major information in each NPP lifecycle stage as shown in Figure 1.

In this structure, Design Information Management System(Smart Plant Foundation(SPF) of Intergraph) of the design company has data handover among databases, whereas interfaces are placed among systems in the construction(Including Start-Up) phase and O&M phase, because they are internal systems of the operations company. PLIMS User Interface allows searching for database data through interfaces among databases within PLIMS as well as interfacing at real time with the information about various operations companies stored within PLIMS. PLIMS stores information that not only includes design properties, but also documents such as CAD Data, Requirement Data, various test results; stored information is interfaced with by the unique identifier. Identifiers use tag no. for the design/construction stages, or functional location ID for the O&M stage, etc. For database transmission, we provided a basis of information management of operations companies to obtain the data meeting requirements, and this information can be used in Construction Management System or O&M legacy System, etc in conformance with user requirements.

3. Results and Discussion

Figure 2 shows that related information is integrated and referenced via the interface between PLIMS and Design DB. The tag number certainly allows for an interrelationship between P&ID and 3D model, as well as a cross-reference with requirement information, where all the interface information has traceability.

4. Conclusions

Integrated information management structure and management system are essential for an effective management of the lifecycle information of nuclear
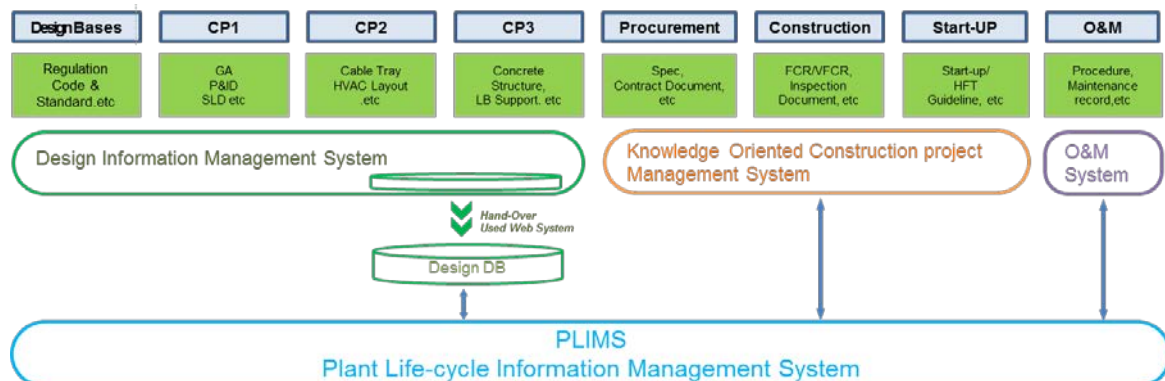
power plants that have a lifespan over as much as 80 years. The concept of integration management adopted by the defence, ocean industries or various PLM solution providers is important. Although the NPP project has application systems in each key lifecycle phase, it is more effective to develop and use PLIMS in consideration of the interface and compatibility of information among systems.

As an initial study for development of that integrated information management structure, this study is building the system and has interfaced it with a design-stage system. However, to use in an actual project, we still need to elaborate on incorporating related organizations, work processes, etc, and supplementing system interfaces and data processing speed, UI(User Interface) easy to use, etc. After, we will make improvements on the system with further studies.

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