Improvement of Support Structure & Facilities Management System in NPP

Joon Hyun Park[a*], Hong Pyo Lee[a], Myung-Sug Cho[a]

[a]*Korea Nuclear & Hydro Power Central Research Institute, Daejeon, Republic of Korea*
Corresponding author: pjham@khnp.co.kr

1. Introduction

Periodic inspection and data management of Safety Structures including the containment building in the operational Korean Nuclear Power Plants (NPP) have been performed since 1997 after developing the Structural Life Management System (SLMS). The results are utilized as evaluation data in the structural field when performing the Periodic Safety Review (PSR) and evaluating the feasibility of continued operation.

In case of support structures, however, the systematic maintenance management system was not applied; instead, maintenance management for everyday inspection activities was performed.

Thus, for the implementation of systematic and effective maintenance management for support structures in NPP, the trial Support Structure & Facilities Management System (SUMS) has been developed since 2007 by establishing the "Support Structure & Facilities Management System Construction Plan in NPP" for Kori 3 and 4 units.

This study constructed SUMS for all NPPs and improved the system after rechecking it from the user's point of view.

2. Major features of SUMS

7.1. System Flow

The data inputted in SUMS are composed by site data on the support structure, various inspection area drawings, guidelines, reports, and other information. All inputted data are stored in the main D/B by subject field such as concrete, steel structure, finishing material, etc., and they are finally used for maintenance management service.

Fig. 1. System flow of SUMS

The maintenance management service in this system consists of a total of 6 menus: corresponding structure management, aging management, aging survey, history management, data management, and open plaza.

7.2. Improvement of SUMS

The menus in SUMS, which was developed in the 1st stage for Kori 3&4 units, were revised by reflecting the opinions of workers as the direct users. Some functions were also changed and simplified.

First, the main menu was revised. As shown in Fig. 1, the existing SUMS was composed of a total of 7 menus such as corresponding structure management, aging management, aging survey, maintenance management, management guideline, data management, and open plaza. Note, however, that menus with low use frequency were removed. Thus, SUMS was revised to have a total of 6 menus such as corresponding structure management, aging management, aging survey, history management, data management, and open plaza.

Fig. 2. Main Menu of SUMS

The management guideline was merged to the data management menu; the maintenance management menu, which recorded a low use frequency, was removed and replaced by the history management menu.

The history management function as a revised menu is described below.

The history management menu consists of a total of 3 submenus: inspection history management, maintenance history management, and structure register management. Inspection history management is the menu that manages the inspection history for the corresponding

structure as shown in Fig. 3. It makes a D/B of the information such as the date of inspection of the corresponding structure, inspector, etc.

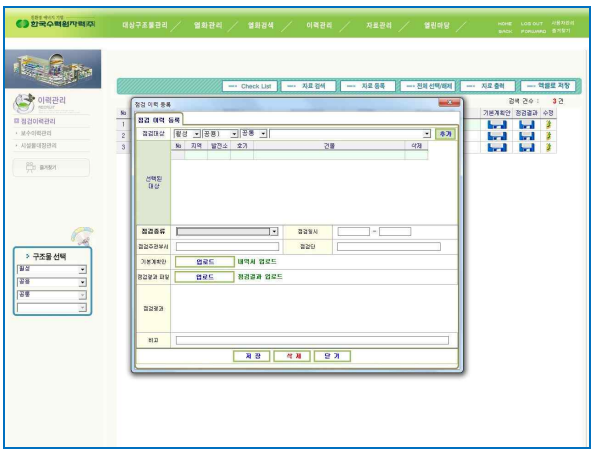

Fig. 3. Inspection History Management

The maintenance history management menu is the menu that manages the information on maintenance works for the corresponding structure as shown in Fig. 4. It makes a D/B of the information such as date and time of the maintenance work, work name, work price, work descriptions, etc.

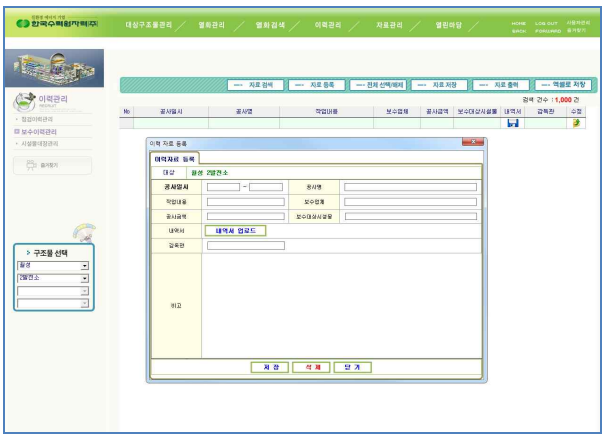

Fig. 4. Maintenance History Management

The structure register management menu is the menu for history card and management register management for structures managed by the facilities team in each NPP division. The existing facilities team in each NPP division managed the structure management register as shown in Fig. 5, but systematic management was not performed because the format used by each division varied. Thus, the system was developed to manage the structure management register by inputting the data into SUMS as shown in Fig. 6 and to enable each NPP division to manage it as a unified format.

Fig. 5. Existing Structure Register Management

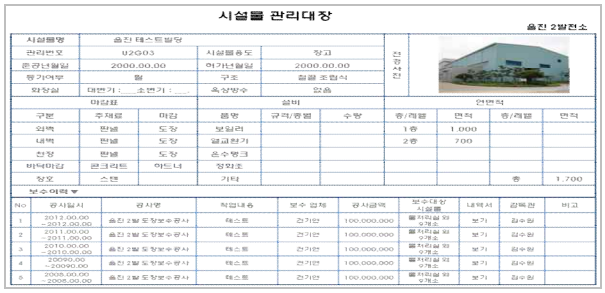

Fig. 6. Improved Structure Register Management

3. Conclusion

In this study, SUMS was developed to manage systematically the support structures in all NPPs, which had not been managed systematically to date. The completeness of the system was enhanced by improving the menus based on the opinions of department workers as the direct users.

The systematic maintenance management of support structures in all NPPs is expected to be enabled with the use of this system.

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