A study on DB schema of the electronic SAMG

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1. Introduction

As a part of the Ministry of Science, Ict & future Planning (MSIP) Project, we at KAERI are developing electronic SAMG (e-SAMG, severe accident mitigation guideline) for a general SAMG for nuclear power plants. For the eSAMG, all of the procedural contents are saved in a database, and the database schemas are contrived through trials and error. To make possible the application of the eSAMG system for most of the NPP site, the database schemas are important for a rapid and exact confrontation.

To contribute a rapid and accurate processing for a severe accident, based on the eSAMG framework, database systems have been studied and developed [1]. This paper describes a study on the e-SAMG database.

2. Methods and Construction

In this section the database construction for the eSAMG is described.

2.1 Methods for the database construction

For the use of the eSAMG system, a frame of the SAMG content is necessary. The SAMG content can be updated through the release, and the differences in the site-specific SAMG need to be adjusted [2,3]. Thus, the database system is an effective tool for both the SAMG contents and eSAMG system.

All contents of SAMG are analyzed and classified. As a total, 8 schema models are made. The major schema modeling for the database system is shown in Table 1.

2.2 Database Construction

For the eSAMG system, all contents for the SAMG are saved in the database system. There are two types of database system. In user mode, the records of the logs and confirmation tables are accumulated through eSAMG processing. In administrator mode, the SAMG contents can be modified through the SAMG release. A summary of the database system is shown in Table 2.

When eSAMG is stared, the database system is connected and the control of the eSAMG is processed according to the specific conditions of the database system.

The database of the SAMG contents is only readable. However, using the log database and confirmation table, the database systems can be read and written to.

Table 1: Schema modeling for major database

FLOWCODE
NO : integer
STEP_CODE : nvarchar(32)
STEP_TITLE : nvarchar(32)
STEP_CONTENT : text
STEP_COLOR : nvarchar(32)
STEP_AFTER : nvarchar(32)
STEP_FORM : nvarchar(32)
STEP_YES : nvarchar(32)
STEP_NO : nvarchar(32)
STEP_DOCUMENT : boolean

(a) DB schema for flow code

DOCUMENT
NO : integer
DOC_TYPE : nvarchar(32)
DOC_PAGENO : integer
DOC_SQE : integer
DOC_CODE : nvarchar(32)
DOC_TITLE : nvarchar(32)
DOC_BUTTON : nvarchar(32)
DOC_LOCATION : integer
DOC_CONTENT : text
DOC_STEP : nvarchar(32)
DOC_BACKSTYLE : nvarchar(32)
DOC_JUMPTYPE : nvarchar(32)
DOC_JUMPPAGENO : nvarchar(32)
DOC_WARNING : boolean
DOC_CHAT : boolean
DOC_DIS : boolean

(b) DB schema for document

Attachments such as the confirmation table, design drawing, and graph are also saved in the database system. The types of database fields consist of various types such as text, XAML, and PDF.

Table 2: Summary of Database Construction

Guidance Class (Data Type)	Step (TXT)	Number of Records (TXT)	Table (XAML)	Attachment (TXT, PDF)	Amount of DB (KBytes)
Emergency-01	26	139	5	5	454
Emergency-02	30	157	5	5	512
Control-01	34	34	-	7	111
Mitigation-01	14	70	5	5	228
Mitigation-02	12	62	6	6	202
Mitigation-03	12	66	7	12	215
Mitigation-04	13	61	5	7	199
Mitigation-05	62	245	16	13	800
Mitigation-06	12	63	4	8	205
Mitigation-07	47	182	13	11	594
Mitigation-08	14	72	6	9	235
Monitring-01	7	23	-	11	75
Finish-01	9	24	-	-	78
Total	292	1,198	72	99	3,914

3. Results

When processing the eSAMG, some branches are decided according to the database field values. The next step of the branch is automatically decided by the database field value. These procedures are related and processed automatically according to the eSAMG and database systems.

The results of the database system are shown in Figs 1 through 4.

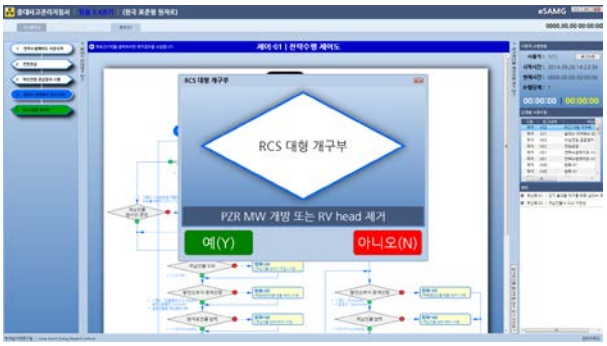

Fig. 1. Screen image for the processing of control guidance (user mode).

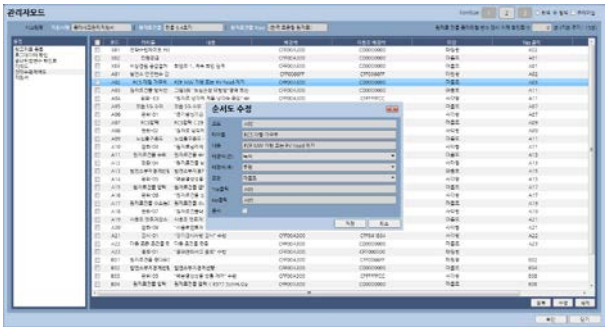

Fig. 2. Screen image for the flow chart modification (administrator mode).

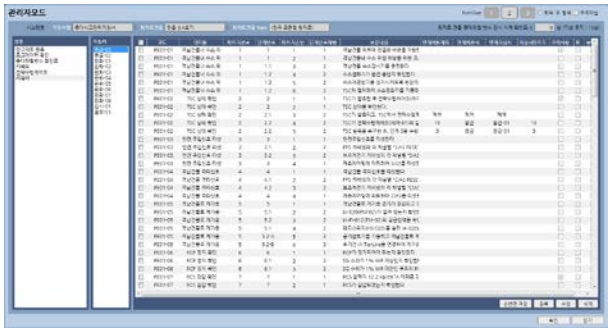

Fig. 3. Screen image for the guidance contents (administrator mode).

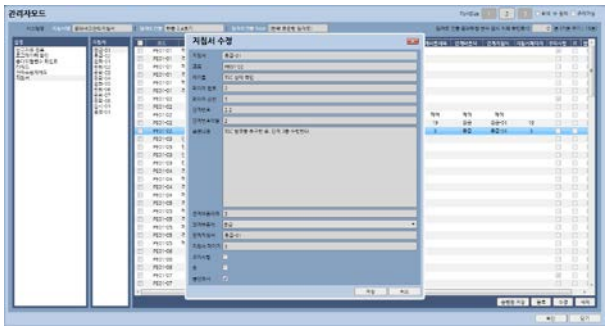

Fig. 4. Screen image for the guidance modification (administrator mode).

4. Conclusions

Through the database construction for the eSAMG system, the management for the guidance contents can be consistent and the basis of the site-specific SAMG adjustment can be prepared. In the future, the refinement of the database system will be continuously processed and the effectiveness of the database sub-schema will be refined. This system will be extended into the entire SAMG for the complete eSAMG.

Acknowledgements

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