Transactions of the Korean Nuclear Society Autumn Meeting
Busan, Korea, October 27-28, 2005

Establishment of an Integrated Database System for Nuclear Materials

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1. Introduction

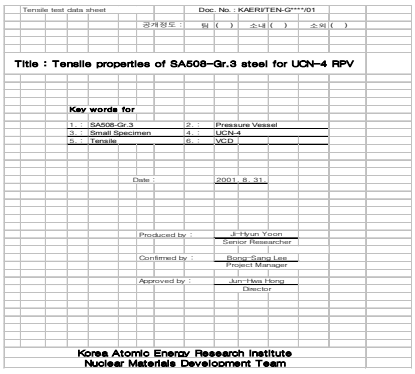
As a part of a project of high temperature materials characterization and advanced materials development, we are establishing integrated database systems for activation of R&D nuclear materials. The database constructions using the raw data produced from research experiment can increase the applications of final results. Also, we can easily obtain the basic and raw data from database system when we have plan the new and creative experiment and can produce high quality results by compare the previous data. In this present, the DBs of seven kinds of materials property were developed by internet method using Oracle 9i and JSP (Java Server Pages) tools.

2. Methods and Results

In this section some of the technical results used to format the database formations are described. The formats of data sheets were composed to formulate the experimental results, and to accept the approval of the project manager. The data sheets consist of material information, specimen information, tests condition and results sessions. These databases are operating on the bases of user-friendly WWW systems, and DBs of materials properties are accessible through the home page of Div. of Nuclear Materials Tech & Develop. of KAERI (http://matdb.kaeri.re.kr).

2.1 Development of impact and fatigue properties DB

Analysis of impact and fatigue experimental data is shown as a sheet formulation in Fig.1, for three part of information of materials, specimens and conditions & results that have been obtained as approval experiments.


Tensile test data sheet Doc. No. : KAERI/TEN-G****/01

관계원도 : 팀 ( ) 소내 ( ) 소외 ( )

Title : Tensile properties of SA508-Gr.3 steel for UCN-4 RPV

Key words for

1.	SA508-Gr.3	2.	Pressure Vessel
3.	Small Specimen	4.	UCN-4
5.	Tensile	6.	VCD

Date : 2001. 8. 31.

Produced by : Ji-Hyun Yoon, Senior Researcher

Confirmed by : Bong-Sang Lee, Project Manager

Approved by : Jun-Hwa Hong, Director

Korea Atomic Energy Research Institute
Nuclear Materials Development Team

Fig. 1. Example of standard data-sheet

2.2 Establishment of material corrosion properties DB

It is difficult to obtain the general corrosion data with one data sheet. So, analysis of corrosion experimental data is consisting of four part of information of materials, specimens, conditions and data-sheet. Analysis and design of application program was composed FHD (Function Hierarchy Diagram) (shows in Fig. 2)

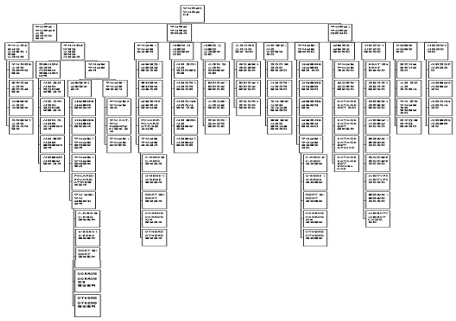


Fig. 2. FHD of the material corrosion DB system.

2.3 Establishment of material creep properties DB

The tensile property DBs analysis method was also used for analysis of creep DBs. The ERD (Entity Relationship Diagram) was applied for analysis and design of DBs of creep and can be obtained the source code for DBs system formation. Fig. 3. shows the ERD.

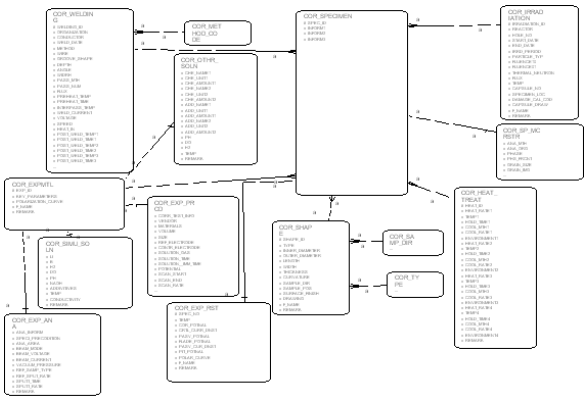


Fig. 3. ERD (Entity Relationship Diagram) of the material creep DB system.

2.4 Establishment of the database management system and application program

The database management system is programmed using Oracle 9iAS (Internet Application Server) and application program is made of Java, JSP and PL/SQL. Fig. 4. shows the web page of material property DBs.

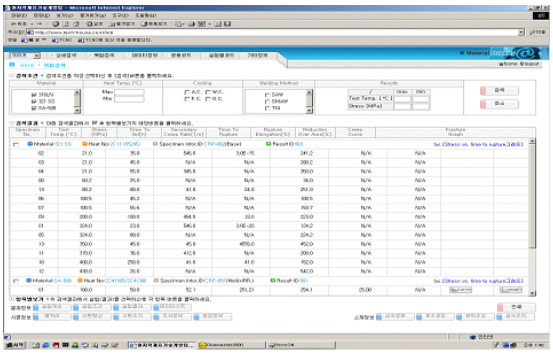


Fig. 4. The web page of material property DBs.

3. Conclusion

The results of this project are suggesting the management and establishment of information and detailed property result data of materials which have caused failures of structures and components in Nuclear Power Plants. The material researches and technologies for severe conditions are able to apply developing the advanced materials for Fusion and GEN-IV systems.

In order to establish the materials database, the formats of general datasheets were fixed to manage the experimental data with effectiveness and reliability. The database operating systems for data input/output were designed and programmed to open through an internet site. The material database systems have a significant role for the knowledge-base national property.

Acknowledgements

This work has been performed under the nuclear R&D support by the Ministry of Science and Technology, Korea.