

## 2-1 Structuring Knowledge on Geological Disposal Technology — Development of a Knowledge Management System —

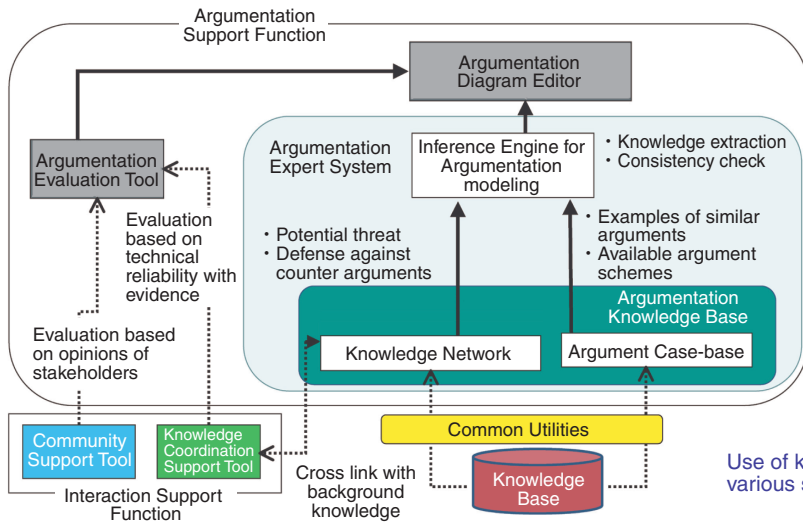


Fig.2-3 Overview of the knowledge management system

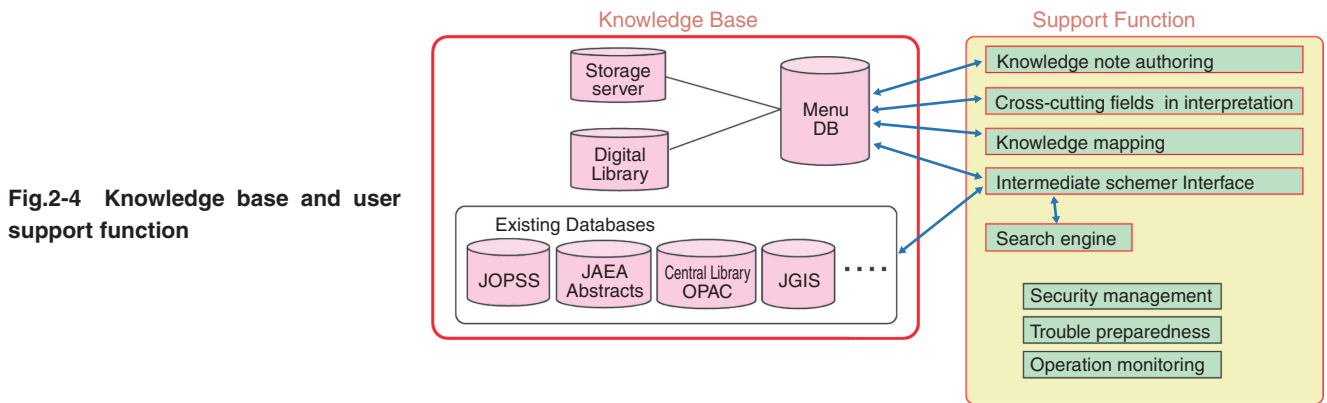


Fig.2-4 Knowledge base and user support function

“Knowledge” of geological disposal technology consists of many different types, ranging from “explicit knowledge”, such as databases, literature and software, to “tacit knowledge”, such as experience and know-how stored in the brains of experts. This knowledge will continue to increase during a repository development program spanning several decades. In order to show throughout the program that the demonstration of safety is sufficiently reliable, it is necessary to make full use of all this knowledge. It is not sufficient to compile individual items of knowledge from a range of sources - this knowledge has to be positioned within the context of a safety case, providing an innovative platform that allows knowledge to be shared among the users concerned. JAEA is developing a knowledge management system for the purpose of appropriately managing key knowledge on geological disposal technology. This is challenging work that cannot be done using traditional search tools and needs to utilize, to the maximum extent, state-of-the-art information technology and the latest knowledge engineering methodology.

Fig.2-3 provides an overview of the knowledge management system. The main elements of this system are the knowledge base and the management function. Data,

software, information and knowledge that have been obtained through research and development work are structured and the tacit knowledge of experts is externalized in the form of expert systems and stored in a knowledge base. The main part of the management function is the argumentation support function, which shows how the knowledge stored in the knowledge base is used in the demonstration of safety. The argumentation model expresses the logic for the demonstration of a certain argument, for example the long-term safety of geological disposal, with a chain of “arguments” and “counter-arguments”.

As shown in Fig.2-4, a user support function is extended in order to make the system accessible to a wide range of users, not only disposal implementers and regulators but also politicians and the general public. Two examples are a powerful and efficient search engine constructed with optimum use of the newest technology and the “cross-cutting interpretation support function”, which interprets the differences in technical terms in different fields and extracts the relevant knowledge effectively.

To make the knowledge management system common intellectual property, JAEA is planning to make a prototype publicly available in 2010.

### Reference

Hioki, K., Development of Knowledge Management System, Genshiryoku eye, vol.54, no.7, 2008, p.31-33 (in Japanese).