TOPICS Fukushima July 1, 2015 No.68

Construction of the Naraha Remote Technology Development Center. Research management building located far right, Demonstration test building front left. Taken with wide-angle lens

Moving forward with decommissioning

Initiatives at the Fukushima Research Infrastructural Creation Center

The Nuclear Plant Decommissioning Safety Research Establishment was established on April 1, 2013 in the Japan Atomic Energy Agency (JAEA) to conduct research and development towards the decommissioning of Fukushima Daiichi Nuclear Power Station (hereinafter, 1F). The establishment was partly reorganized and renamed as "Fukushima Research Infrastructural Creation Center" in fiscal year 2015 in order to enhance research and development capabilities and accelerate the construction of facilities.

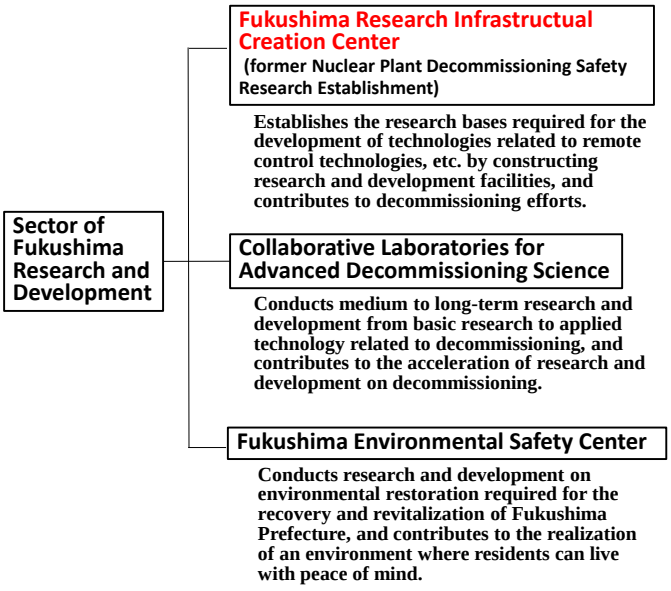


Fig. 1 Research organization and roles

The main projects of the Center are to construct facilities for 1) development and demonstration of remote-controlled equipment and devices required for decommissioning work, and 2) analysis and research of radioactive materials. As to the former project, the "Remote Control Equipment and Device Development Facility (Mock-up Test Facility)", which is called the "Naraha Remote Technology Development Center," is under construction in Naraha Town. The facility is due to begin partial operations during the fiscal year 2015. For the latter project, preparations are underway for the construction of the "Radioactive Material Analysis and Research Facility" in Okuma Town adjacent to 1F for conducting analysis and research of radioactive materials. This facility is called the "Okuma Analysis and Research Center," and is scheduled to begin full operations in fiscal year 2017.

In the following, the present status of the construction of these facilities and some of recent research highlights are introduced.

Overview of the Naraha Remote Technology Development Center

The Naraha Remote Technology Development Center consists of the Research management building that is equipped with state-of-the-art virtual reality systems used to train operators and workers, and the Demonstration test building where demonstration tests for decommissioning technology and remote-controlled equipment are conducted. The photo at the top of this report shows the current state of construction of these facilities. The Research management building will begin operations in summer of 2015, and will be fully open to use in fiscal year 2016.

Fig. 2 Image of the completed Naraha Remote Technology Development Center, and construction in progress

With the collective expertise of researchers and engineers from a wide range of fields related to remote control technology, the facility will allow smooth and efficient research and development

work, and is also expected to serve as a base for the development of remote control technology which transmits information. For this purpose, discussions are underway for collaboration in research and technology development which includes mutual use of facilities, with domestic and overseas organizations in order to increase the number of users of the facility.

As a part of these efforts, a memorandum of understanding was concluded with Nagaoka University of Technology on April 30, 2015 concerning research collaboration in remote control technology. Nagaoka University of Technology is the only university in Japan studying the system safety of disaster response robots, focusing on their safety standards and safety certification. JAEA is aiming at efficient promotion of remote control technology towards the decommissioning of 1F in collaboration with Nagaoka University of Technology, and cooperates in the research on evaluation of performance and underlying technology concerning remote-controlled equipment for disaster. As a domestic university, the Nagaoka University of Technology is the first one with which JAEA cooperates in this field. This collaboration is expected to lead to the development of standard test methods for assessing the performance of remote-controlled equipment for disaster and the development of elemental technology of remote-controlled equipment used for disaster response. It is also expected that excellent human resources are developed through the mutual utilization of facilities and exchange of researchers and engineers.

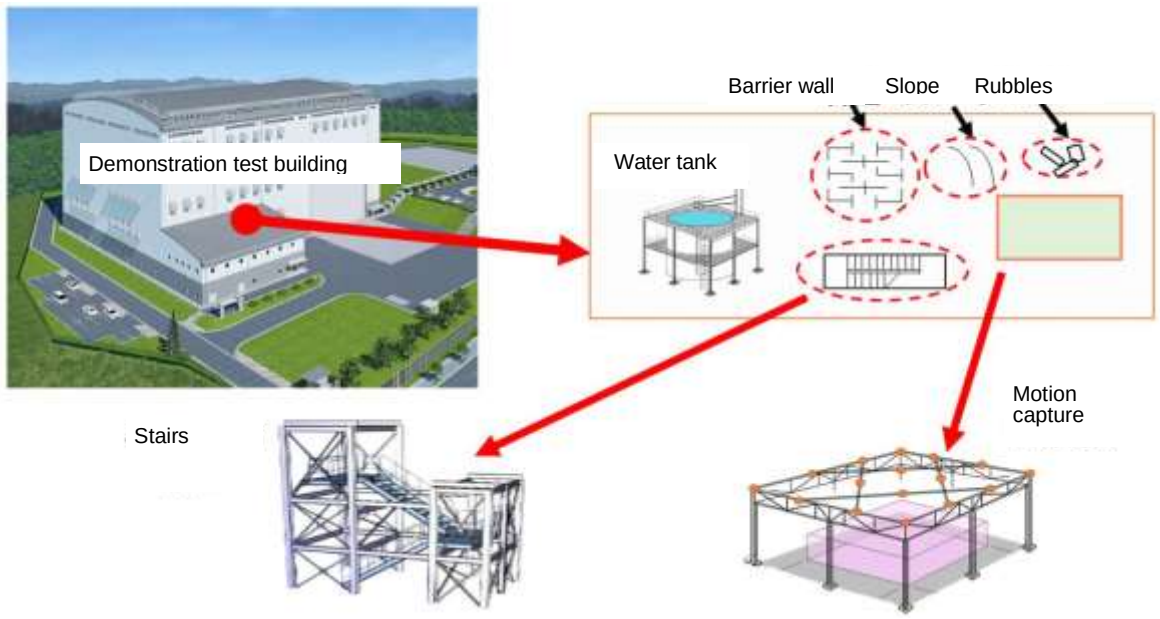
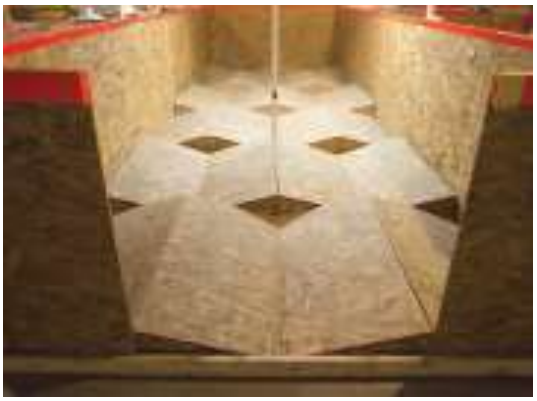


Fig. 3 Test facilities at the Naraha Remote Technology Development Center (Demonstration test building). In the Demonstration test building, working environment in 1F building is simulated at full scale. These areas will be used to test whether robots function properly, and to train operators and workers so that they master the required procedures.

(a) Stairs, landing area

(b) Various types of terrain for testing movement capabilities



(c) Various types of terrain for testing movement capabilities

(d) Various types of terrain for testing movement capabilities

The above photos show test facilities used to confirm the functions of the robots to move forward over different configurations (a)～(d).

Fig. 4 Examples of facilities for standard test methods pertaining to the assessment of the performance of remote-controlled equipment for responding disaster

Overview of the Okuma Analysis and Research Center

The Okuma Analysis and Research Center will conduct, 1) analysis and evaluation of the properties of radioactive wastes required for treating and disposing of the radioactive wastes generated by 1F decommissioning, 2) safety evaluation of radioactive wastes, 3) test for disposing method of radioactive wastes, and 4) development of technology for evaluating safety of waste disposal. Low-level radioactive materials such as rubbles and secondary wastes produced by water treatment will be analyzed in the facilities constructed at the first stage (Administration Building and Research Building No. 1), while high-level radioactive materials such as fuel debris will be analyzed

in the facility constructed at the second stage (Building No. 2). The Administration Building constructed at the first stage is aimed to start operation in fiscal year 2017, and the second stage facility, in fiscal year 2020.

So far, the investigation of species and amount of radioactive materials to be analyzed and the survey of the construction site have been conducted. Now, the detailed designing of the facilities and equipment just started.

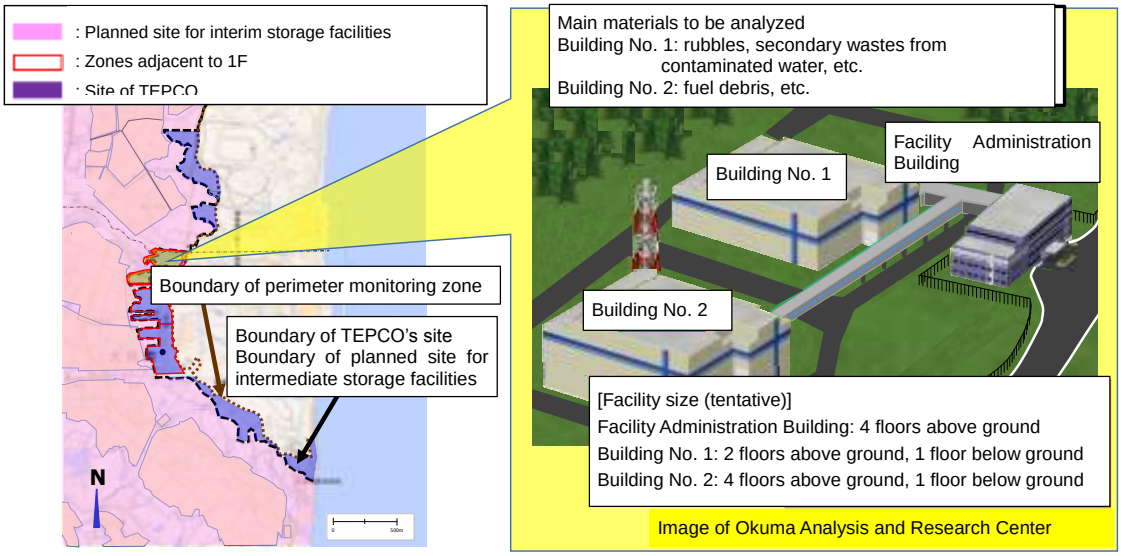


Fig. 5 The construction site of the Okuma Analysis and Research Center (left) and the image of the facility (right)

In the Fukushima Research Infrastructural Creation Center, management and utilization of the facilities is discussed in the "Committee on Management and Utilization of the Facility" composed of external experts. Under this committee, sub-committees have been established for each facility. These are "Expert Committee on Mock-up Test Facility" for Naraha Remote Technology Development Center, and "Expert Committee on Analysis and Research Facility" for Okuma Analysis and Research Center. Under the "Expert Committee on Mock-up Test Facility," three branch investigative sub-committees ("Sub-committee on Robot Simulator Development," "Sub-committee on Standard Test Method for Nuclear Disaster Response Robot" and "Sub-committee on International Collaboration") operate, and under the "Expert Committee on Analysis and Research Facility," "Sub-committee on Analytical Technology" operates. The abovementioned memorandum of understanding concluded with Nagaoka University of Technology is the realization of one of the

results obtained through discussion in the “Sub-committee on Standard Test Method for Nuclear Disaster Response Robot.”

TOPICS Fukushima No. 68
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