

Fault displacement hazard analysis for risk evaluation

*Yoshikazu Suzuki¹, Makoto Takao², Koji Okumura³, Kazuo Tani⁴

1. Japan Nuclear Safety Institute, 2. Tokyo Electric Power Company Holdings, Inc. , 3. Hiroshima University, 4. Tokyo University of Marine Science and Technology

In October 2014, the Atomic Energy Society of Japan (AESJ) established an investigative expert committee to develop risk evaluation methods and measures for fault displacement on the basis of engineering approach. Following the launch of the committee, meetings were held seventeen times to discuss and examine the issue, and the committee ultimately published an investigative report in March 2017 to disseminate the research results. In this presentation, we will give an outline of the evaluation method in terms of fault displacement hazards.

Fault displacement hazards for risk evaluation should be analyzed both deterministically and probabilistically.

On a deterministic basis, a fault displacement, which is necessary for deterministic margin evaluation (hereinafter, 'the fault displacement for evaluation'), is to be determined on the basis of three kinds of approach, namely: 1) geological investigation approach, 2) numerical simulation approach, and 3) database of earthquake surface faults approach. 'The fault displacement for evaluation' should be set not only upon comprehensive consideration of 1), 2) and 3) but also taking into account uncertainties related to 1), 2) and 3).

On a probabilistic basis, hazard curves, which are necessary for Probabilistic Risk Assessment (PRA), should be determined in accordance with Probabilistic Fault Displacement Hazard Analysis (PFDHA), proposed by Youngs et al. (2003), Petersen et al. (2011), Takao et al. (2013) and so on. Furthermore, the hazard curves will be utilized as references when 'the fault displacement for evaluation' is examined. As stated above, the AESJ has established a methodology to determine the fault displacement hazards. In order to improve the reliability of the method, it is essential to accumulate technical knowledge and for the related academic fields to cooperate with one another.

Keywords: fault displacement, deterministic basis, probabilistic basis, Probabilistic Fault Displacement Hazard Analysis (PFDHA)