Outline of “Reports about the study regarding current seismic safety and reinforcement of reactor buildings at Fukushima Daiichi Nuclear Power Station (3)”

August 26, 2011
Tokyo Electric Power Company

[Orientation]
This paper is the report of the study we have implemented regarding current seismic safety and reinforcement of reactor buildings at Fukushima Daiichi Nuclear Power Station, based on the “Collection of report pursuant to the Provisions of Article 67, paragraph 1 of the Act on Regulation of Nuclear Source Materials, Nuclear Fuel Materials and Reactors” (April 13, 2011). We have completed the evaluation for Unit 1, Unit 3 and Unit 4 and summarized the results into a report (1) for Unit 1 and Unit 4, and a report (2) for Unit 3. We submitted the report (1) on May 28, 2011 and the report (2) on July 13, 2011 to Nuclear and Industrial Safety Agency, Ministry of Economy, Trade and Industry. As we completed the evaluation of Unit 2, Unit 5 and Unit 6 this time, we summarized the results into this report and submitted it to the Agency today (August 26, 2011).

[Outline of evaluation]
○ Reactor building of Unit 2

- As for the reactor building of Unit 2, any damage was not observed from the outside view despite opening of blowout panels of east side wall. Since it is prohibited to enter the building due to high radiation, conditions inside the building are unknown. However, it is assumed at this moment that there is no damage. Considering this situation, from the viewpoint of seismic safety of the building, the analysis results of back-check of seismic safety (Fukushima Daiichi Nuclear Power Station, Interim report revision 2 (April 19, 2010) on the evaluation results of seismic safety by revision of “Regulatory Guide for Aseismic Design of Nuclear Power Reactor Facilities”) was applied, and the seismic safety was evaluated by the analysis results.
- Time transient response analysis using design basis earthquake ground motion (Ss) was used for the back-check of seismic safety. As a result, shear strain occurred in anti-earthquake walls was estimated at maximum 0.17×10^{-3} (Ss-1, E-W direction, 5th floor) that was far below the standard value 4×10^{-3}. Thus it was evaluated that the building had enough safety.
- In addition, considering a possibility to reduce rigidity of the shell walls

affected by temporary high-temperature phenomenon of the Primary Containment Vessel and occurrence of strange sound on March 15 around the Suppression Chamber located in the basement floor, a parameter study was conducted for confirmation. It was confirmed that these factors did not affect the analysis results significantly though there were a difference to some extent.

○ Reactor buildings of Unit 5 and Unit 6

- The reactors of Unit 5 and Unit 6 stay in cold shutdown. Any damage was not observed from the outside view. Detailed inspection inside the buildings has not been conducted yet. However, no structural damage has been informed. Considering this situation, from the viewpoint of seismic safety of the building, as is the case in Unit 2 the analysis results of back-check of seismic safety was applied, and the seismic safety was evaluated by the analysis results.
- Time transient response analysis using design basis earthquake ground motion (Ss) was used for the back-check of seismic safety. As a result, shear strain occurred in anti-earthquake walls of Unit 5 was estimated at maximum 0.19×10^{-3} (Ss-1, E-W direction, 5th floor) and shear strain occurred in anti-earthquake walls of Unit 6 was estimated at maximum 0.33×10^{-3} (Ss-1, N-S direction, 2nd floor). Those values were far below the standard value 4×10^{-3}. Thus it was evaluated that the building had enough safety.

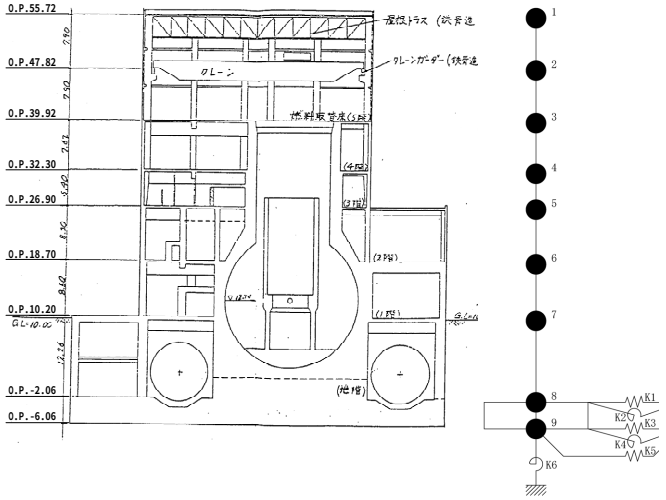

Fig.1 Earthquake response analysis model (Case of Unit 2)

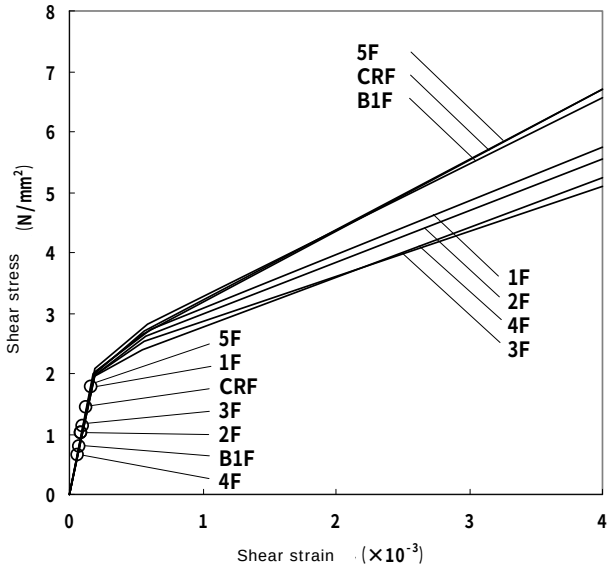

Fig.2 Maximum response value on shear skeleton curve
(Unit 2, Ss-1, E-W direction)

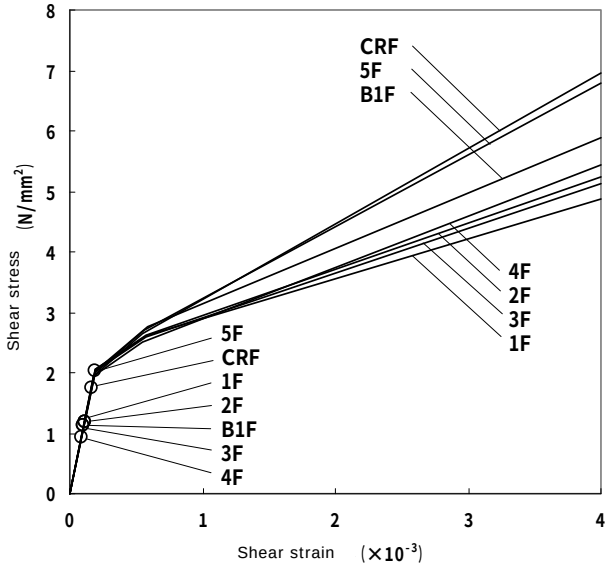

Fig.3 Maximum response value on shear skeleton curve
(Unit 5, Ss-1, E-W direction)

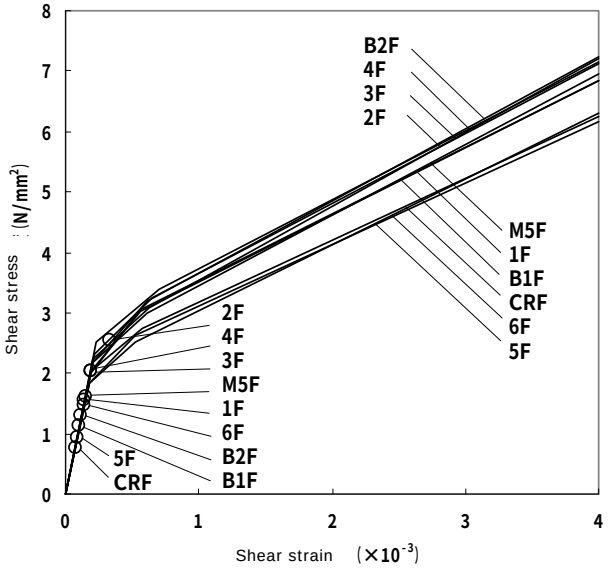

Fig.4 Maximum response value on shear skeleton curve
(Unit 6, Ss-1, N-S direction)