Nuclear Power Disaster Prevention and Risk Management

Research of Earthquake and Tsunami Hazard Evaluation

Hazard of Earthquake and Tsunami

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- ✓ Prediction of Near-Field Strong Ground Motion
- ✓ Lesson learnt from Large Earthquakes and Tsunamis
- ✓ Safety Evaluation of Nuclear Power Plants and their Surrounding Areas for Earthquakes and Tsunamis

▶ Contribution to Seismic Safety Improvement of both Nuclear Facilities and their Surrounding Areas

1. Research Outline and Objectives

We study the characteristics of the earthquake and tsunami during the 2011 Off the Tohoku Pacific Coast of Tohoku Earthquake (M9) and learn how such disastrous damages occurred. We also investigate the regional seismic characteristics, such as seismicity, locations of seismic active faults, soil and subsurface structures, historical damage patterns and so on. Incorporating lessons learnt from recent earthquakes and tsunamis with regional disaster factors, we carry out the rational hazard evaluation for the nuclear power buildings and their surrounding areas in Fukui Prefecture.

2. Research Activities

Prediction of Near-Filed Strong Ground Motion

Seismic waves generated at the source propagate through various paths and finally reach the ground surface after amplified in local shallow layered structures. To predict the strong ground motion from future earthquakes, we must study various kinds of factors, such as regional seismicity, locations of earthquake sources, seismic active faults, surface and subsurface structures, historical damage patterns, and so on. In particular, considering the low seismicity in and around Fukui Prefecture, it is significant to collect the data from small and/or moderate earthquakes and induce seismic parameters in common with large earthquakes. As a successful example of modeling moderate earthquake, we show results of source models and simulation results of strong ground motion for the 2001 Hyogo-Hokubu Earthquake (M5.4) in Figs. 1 and 2.

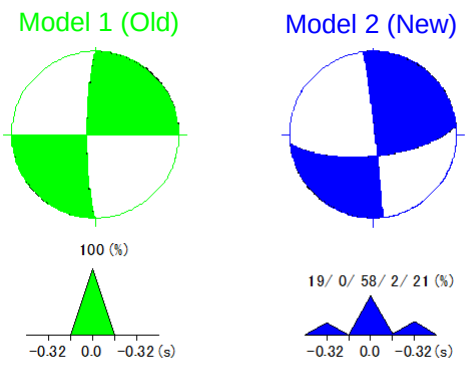

Fig.1 Source Models (Upper: Focal Mechanism, Lower: Source Time Function)

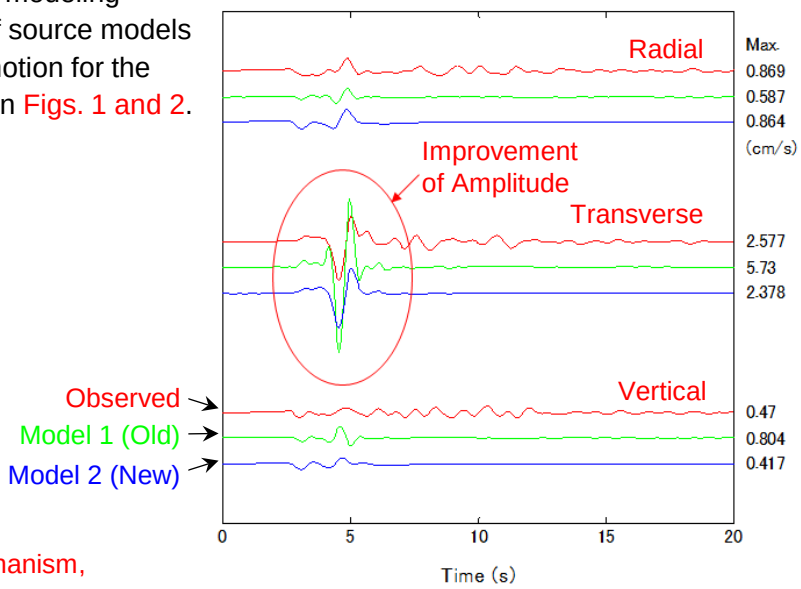

Fig.2: Simulation Results of Strong Ground Motion

3. Appeal of Research, Future Outlook

High Accuracy Prediction of Near-Field Strong Ground Motion

Incorporation of Lesson learnt from Large Earthquakes and Tsunamis with Investigated Regional Seismic Characteristics

Safety Improvement of Nuclear Facilities and the Surroundings

Message for Candidate Students

Let's tackle together the study on earthquake and tsunami to enhance the seismic safety of both nuclear power buildings and their surrounding areas, sharing the feeling of "no more tragedy we experienced in Fukushima on March 11, 2011 " from the bottom of the heart.