

Resilience of nuclear power plants subjected to seismic hazards

*Tatsuya Itoi¹

1. The University of Tokyo

When seismic safety of nuclear power plants is discussed, so called "systemic approach" should be introduced, where the nuclear power plants and related systems are viewed as the complex socio-technical system. There, many types of stakeholders are involved and interacted with each other. Physical systems and human/organizational systems also interact.

The risk of a complex socio-technical system under the threat of natural hazards can be estimated by analyzing the resilience of a system as well as hazards at the site of the system.

By reviewing existing definitions of resilience, resilience can be discussed from the viewpoints of 1) characteristics of a complex socio-technical system, 2) characteristics of natural hazards and 3) risk management of natural hazards. Resilience can be conceptualized as “an ability of a system to manage uncertainties and adapt to a changing situation in a timely manner to continuously achieve its objectives during its lifetime.” The attributes required to define the resilient system can be categorized into those of action and those of recognition. As actions, the resilient system (1) absorbs changes, (2) responds to changes and (3) restructures itself. To carry out the actions, the system needs to have attributes related to recognition that are (4) to monitor change or disturbance, (5) to learn from experiences and (6) to anticipate potential changes, needs, demands and constraints.