

Impact Strength Analysis of CANFLEX Fuel During 100% Reactor Inlet Header Brake Accident

Moon-Sung Cho and Ho Chun Suk
Korea Atomic Energy Research Institute
P.O. Box 105, Yusong, Daejeon, Korea 305-600

Abstract

A structural analysis was performed to simulate the impact of the fuel bundle string on the inlet shield plug during a 100% Reactor Inlet Header (R.I.H) brake accident in a CANDU-6 Reactor. Any significant damage to either the fuel or the fuel channel due to the collision could result in coolant flow blockage, and thus pose additional safety related concerns beyond those addressed for the initial loss-of-coolant accident. A three-dimensional finite-element (FE) model for simulating the collision was developed using the structural analysis computer code ABAQUS. The FE model was validated with the test results that have been obtained during the normal refueling impact test performed at KAERI in 1996. The analysis results agree well with the test results. With use of the FE model, dynamic behavior of the fuel bundle string impacted on the shield plug was investigated and its effects on the fuel bundles and pressure tube were evaluated. The overall integrity of the fuel bundles as well as the possibility of bundle sticking or coolant flow blockage in the pressure tube was assessed.