Analysis and Validation of Advanced Gas-Cooled Reactor Core Seismic Response Using Non-Linear Time-Domain Methods

Speaker:
Heather Riley
Atkins

Chaired by:
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Synopsis Overleaf

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Synopsis

To ensure safe and reliable operation of the UK’s Advanced Gas-Cooled Reactors (AGRs), seismic qualification of the graphite cores is required to demonstrate safe shutdown during an infrequent seismic event. Seismic assessments of the AGR cores use a finite element modelling approach called GCORE. The GCORE methodology has undergone validation based on dynamic response tests with small arrays of intact keyed bricks and static loading tests on large arrays containing simulated cracked bricks. To extend the validation of the GCORE methodology to the dynamic response of large arrays with cracked bricks, a shaking table experiment with a multi-layer keyed array (MLA) test rig with quarter-sized components based on late-in-life core geometry has been undertaken at the University of Bristol in collaboration with EDF Energy and Atkins.

This talk outlines the GCORE modelling methodology and compares GCORE predictions against the measured dynamic responses for arrays containing intact and simulated axially cracked bricks.

This presentation will feature material produced in collaboration between Atkins, EDF Energy and the University of Bristol.

Speaker

Heather Riley

Heather is a Mechanical Engineer who joined the Atkins’ Design and Analysis group in September 2014. She obtained her MEng from the University of Durham before joining Atkins. Since joining, Heather has been supporting EDF Energy’s Graphite Reactor Core Seismic Damage Tolerance work, working on several areas of the project including: validation of the finite element graphite core computational model used for seismic analyses; development of the Hinkley Point B and Hunterston B computational model as well as performing seismic analysis to support Hinkley Point B and Hunterston B Seismic Reactor Core development of computer models and their use in seismic assessments supporting the continued safe operation of Hinkley Point B and Hunterston B power stations.