

Structural analysis of the CAREM25 nuclear power plant subjected to the design basis accident

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ABSTRACT

In this paper, a numerical study about the structural response of the nuclear power plant (NPP) CAREM 25 subjected to the design basis accident (DBA) is presented. This NPP is a modern prototype with a capacity of 25MWe, which it is located at the north of the province of Buenos Aires (Argentina). Taking into account the hardware capabilities available, a full 3D methodology was adopted. A significant part of the building was modelled using solid elements, with a total number of elements greater than 2M. In order to take into account the flexibility of the soil, springs were used in the zones of contact of structure and soil. The springs and the model were calibrated against a greater model used to study the soil structure interaction of the NPP [1].

The structure was subjected to the DBA and the load combinations defined in [2]. First, a linear thermal analysis was performed with the conditions defined by DBA and evaluating the time variation of the temperature of the model, each 1h until 36h. The final results of this stage were considered as initial conditions of a structural static analysis including the pressure defined by DBA. Finally, an equivalent static analysis was performed to analyze the seismic response considering de design basis spectra for the site [1].

The different loads were combined using [2] and the abnormal/extreme environmental combination was the most unfavourable for the structure, defining the design.

REFERENCES

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