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INSERTION RELIABILITY STUDIES FOR THE RBC-TYPE CONTROL RODS IN ASTRID

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This paper reports on preliminary studies performed regarding the insertion reliability of the RBC-type Control Rods designed for the ASTRID Sodium-cooled Fast Reactor. At this stage, the primary aim of the analysis is to evaluate the mechanical behaviour of RBC Control Rods under Emergency Shutdown conditions, for which reactor core structures are subjected to significant misalignments (including earthquake-imposed displacements). Using a Finite Element Model based on the Cast3M solver and developed specifically for these studies, computations are performed that allow assessing contact reactions (and the associated friction forces and contact pressures), deformations and stresses (mostly due to bending-induced deformations) which are considered for design. Based on these preliminary results, some optimisation of the Control Rod design is proposed that ensures some stable behaviour all along the rod drop, with substantial design margins.

Country/Int. Organization

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