
THE INFLUENCE OF THE GEOMETRY AND MATERIAL OF THE FUEL ROD ARRAY WWER-1000 SPACER GRID MESH

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Abstract

The conditions for the nuclear fuel elements interaction with the spacer grid are one of the key factors determining the thermo-mechanical behavior of the fuel rod array during operation. When in service, due to creeping and the radiation increase of the constructional materials, the change of the elastic tension in the pairs “fuel-element jacket — spacer grid mesh” takes place, resulting in changing the conditions of their interaction and subsequently in the stress-strain behavior of the fuel rod array. By using the software package AnsysMechanical v 17.0 we have analyzed the influence of the following factors on the initial contact forces and save time of these forces: the magnitude of the initial tension, the bulge length and the material of the mesh. It is proved that the increase of the initial tension brings about the time increment of the elastic interaction, the use of the alloy with the lower speed of the radiation-induced creep causes the essential increase of the elastic interaction duration, and the bulge length change has a significant impact on the time of the elastic interaction in the pair “fuel-element jacket — spacer grid mesh”.

Keywords

Spacer grid, fuel-element jacket, contact force, fuel rod array, radiation increase, radiation-induced creep, initial tension, bulge

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