

RADIATION DAMAGE AND MATERIAL LIMIT: ILLUSTRATION OF A WAY TO CODIFY RULES WITH RCC-MRx CODE

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RCC-MRx, developed especially for Sodium Fast Reactors (SFR), Research Reactors (RR) and Fusion Reactors (FR-ITER) can also be used for components of other types of nuclear facilities. It has been considered for instance in the frame of a CEN-Workshop (CEN-WS 64 - Design and Construction Code for mechanical equipments of innovative nuclear installations) in order to develop, on its basis, the European code for the design and fabrication of mechanical equipments for ESNI (European Sustainable Nuclear Industrial Initiative) innovative nuclear installations.

The specific features of this current state of art nuclear design and construction code for mechanical components are:

- creeping damage is covered by the design rules responding to the needs of fast breeders and high temperature
- irradiated material is covered by the design rules responding to the needs of research reactors developed for the JHR project
- enlarged material selection range compared to material usually considered by others nuclear design and construction codes such as aluminum alloys, zirconium alloys, 9Cr ,
- manufacturing techniques such as neutron beam welding,....

Once introduced the application domain, main purpose and overall structure of the set of rules, the presentation focuses on the irradiated material design rules including:

- the background of these rules, linked with the changes in material behavior
- their content, in term of damages impacted,
- and the challenges to be met for their developments to other applications.

The conclusion highlights the potential benefits of these rules for the design and construction of components for the spallation and accelerator facilities.

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