**E. O. Paton Electric Welding Institute**

**Department of Mathematical Modeling**

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E. O. Paton Electric Welding Institute is research institution, doing researches on welding processes. Established in 1934 Institute is experienced in research of welding process and developing of new welding technologies, such as: welding in space, underwater welding; welding application in civil industry: welded Paton Bridge; development of welding machinery for manufacturing industry.

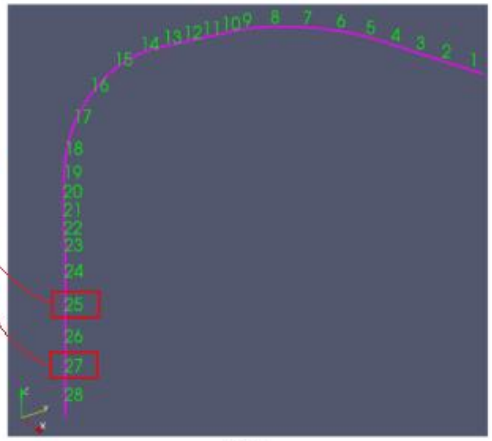
Department of Mathematical Modeling is scientific unit of institute founded at 1972. It specializes in research of welding process and stress state of welded constructions, using numerical methods. Department developed technology of structural repairs of nuclear power plant components with welding, defining resource of welded nuclear power plants components, and developed welding software.

Nowadays department doing research of defects in a pipelines, developing pipeline repair technology with welding, doing research on nuclear reactor swelling and irradiation.

We discovered advantages of free software Code_Aster at 2020, and planning to use it on our further projects. We developed software, using available Code_Aster source code, for solving most resent industry problems. See example of Pipe Module to define limit state plastic stresses in a pipeline, subjected to erosion/corrosion wear.

Link: linkedin.com/company/strengthmodulesfea

(1)

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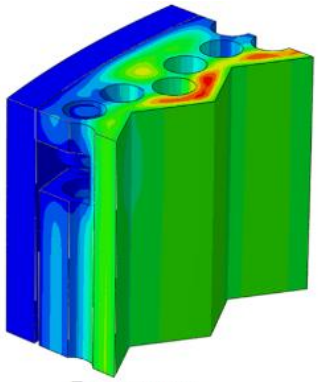
(3)

Developed module (using Code_Aster source code) for defining limit state stresses in pipe with erosion/corrosion defect. Residual strength of pipelines can be defined from these stresses.



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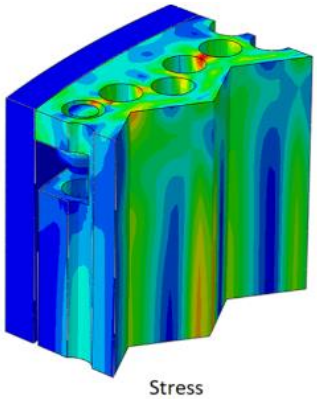
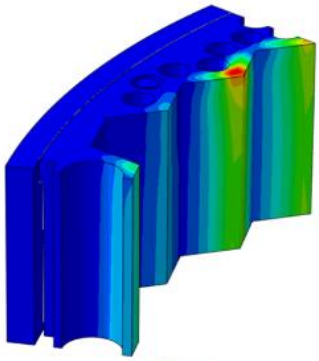
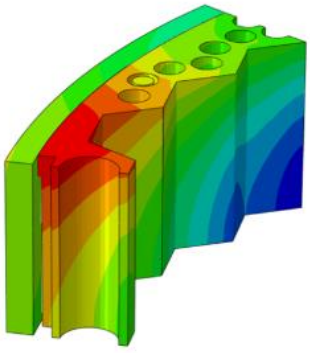


Stress



Swelling



Displacement

Irradiation swelling of reactor's baffle. Using models of irradiation swelling and irradiation creep; cumulative radiation dose, temperature, irradiation creep and stress state of baffle obtained. Based on these results, service life of reactor can be defined.