

MECHANICAL ASSESSMENT OF PIPING OPERATING AT HIGH TEMPERATURE: APPLICATION OF NUCLEAR STANDARDS AND NUMERICAL METHODS

MASTER'S THESIS IN THE FRAMEWORK OF RESEARCH ACTIVITIES FOR ITER FUSION REACTOR

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The work can be done either in Milano Bovisa or in Polo territoriale di Lecco.

The Master's thesis takes place in collaboration with NIER Engineering S.p.a. (www.niering.it)

DESCRIPTION: The unconventional operative conditions characterizing peculiar piping circuits in the field of nuclear fusion design, e.g. metallic alloys circulating at high temperatures, make very challenging their structural assessments. In particular, the concepts of local/global resiliency of a piping system, necessary to address the thermal stress assessment by using linear elastic analyses, will be largely investigated to get insights on reliable and optimize piping design. An actual portion of a piping system taken from the nuclear application of ITER fusion reactor will be used as case study of nuclear standards application, as well as of numerical investigations aimed at supporting the piping assessment at high temperature.

Proposal content:

- State of the art about elastic follow-up phenomenon for stainless steel
- ITER reactor project: description
- Piping system belonging to WCLL-TBS ancillary system: description
- Approach of RCC-MRx standards for verifications on elastic follow-up
- Numerical approach for the elastic follow-up simulation
- Comparison between the two approaches and conclusions