

INCEFA-SCALE Project – Overview of the Modelling Plans

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Abstract:

INCEFA-SCALE is a five-year project supported by the European Commission HORIZON2020 programme. It kicked off in September 2020 and is the successor to the INCEFA-PLUS programme. The objective is to continue work, advancing the ability to predict lifetimes of Nuclear Plant components when subjected to Environmental Assisted Fatigue (EAF) loading. The main issue addressed by INCEFA-SCALE is the transferability of laboratory-scale tests to real nuclear components.

The project strategy will be (1) the development of comprehensive mechanistic understanding developed through detailed examination of test specimens and data mining, and (2) testing focussed on particular aspects of component-scale cyclic loading. From these data, one of the main objectives is to derive an EAF assessment procedure that can be used by assessors for the extrapolation of laboratory test data to real component geometries and conditions, for lifetime calculations.

This paper will give an overview of the INCEFA-SCALE modelling plans and some illustrations on the 5 main topics that have been identified: (1) numerical analyses to support test design and interpretation, (2) data mining, (3) review of the codified methods, (4) fatigue damage modelling and noncodified approaches to better address for fatigue damage mechanisms, and (5) industrial application.

Keywords: environmentally assisted fatigue, pressurized water reactor, stainless steel, finite element analyses, data mining



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