MEACTOS

Mitigating EAC Through Optimization of Surface Condition

OBJECTIVES

The goal of the MEACTOS project is to improve the safety and reliability of Generation II and III nuclear power plants (NPPs) by improving the resistance of critical locations, including welds, to environmentally-assisted cracking (EAC) through the application of optimised surface machining and improved surface treatments. This project will quantify the effect of various surface machining and treatment techniques on the EAC behavior of specific structural materials in the primary circuit of NPPs.

The gained knowledge will be summarised in practical guidelines, which can be used for incorporation into key nuclear design and manufacturing codes. Furthermore, a tailored roadmap for harmonisation of guidelines and codes will be produced. In these ways, MEACTOS will improve safe and reliable economic nuclear energy production in Europe.

MEACTOS will contribute to tackling the obsolescence of the machining practices used in the nuclear field with direct application to the construction of the new plants. Finland, France, United Kingdom, Slovakia, Bulgaria, Belarus, Poland and also Russia are building or planning to build new plants to start its first operation in in the coming years

DESCRIPTION OF WORK

The project will contain two phases: 1) qualitative screening phase, and 2) a verification phase to demonstrate quantitatively improved EAC initiation performance. The link between surface machining/treatment parameters and EAC initiation performance is the characterisation of the material surface and near-surface regions in terms of properties (hardness), residual stress and microstructure.

Finally, both the screening and verification phase will produce technically-relevant information on mitigation of EAC initiation. This information will be incorporated into guidelines for modern surface machining and treatment techniques

MAIN DELIVERABLES OR RESULTS

Advanced machining as well as surface modification techniques proactively manages material degradation through the manipulation and control of residual stresses and microstructure in the material. This approach highlights the highest risk locations and provides guidance on available mitigation technologies to facilitate the procurement and fabrication of components with significantly reduced risk of long-term degradation.

The anticipated results of this project, will lead to a proactive approach for dealing with materials degradation, greater reliability for the existing plants as they age, and reliability for plants that will be built.

DURATION

1/09 2017 – 31/ 08 2021
4 years

PARTNERS

CIEMAT / VTT, Univ. of Sheffield (NAMRC) / Univ. of Manchester (UNIMAN) / CVR / SCK•CEN / AREVA GmbH / PSI / STUBA / EDF / ZAG / RATEN / JRC / ENSA / Idetra / AMEC

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