HANDBOOKS & REPORTS

ENVIRONMENTALLY-ASSISTED DEGRADATION OF STAINLESS STEELS IN LWRS

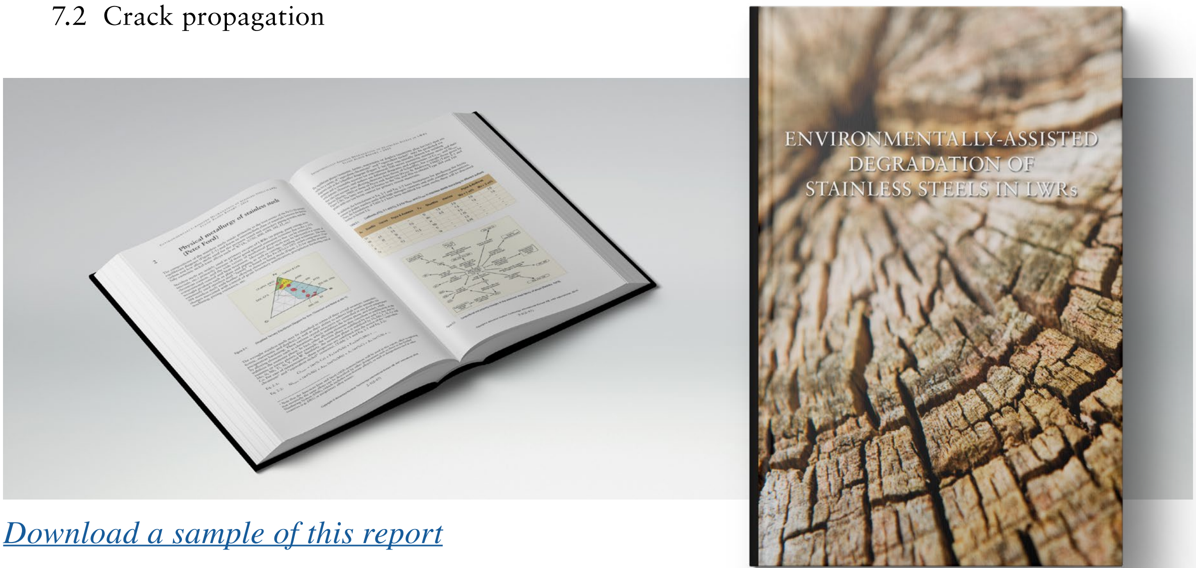
(EADS)

Objective

The objective of the EADS Report is to provide guidance for those needing an introduction to the topic as well as an up to date review and bibliography. This information is of interest to those people who are relative newcomers to this field, who may not be completely up-to-date on (a) the phenomenology and mechanisms of the various modes of degradation and (b) the effect of various interactions of material, environment and, in many cases, stress on the extent of degradation. Such information is relevant to the development and implementation of effective mitigation actions which impact on the specifications for materials procurement, mitigation methods applied in service and water chemistry.

The EADS Report covers the range from basic information to current plant experience. The EADS Report will be written and explained in such a way that those not familiar with the topic can easily follow and can find and grasp the appropriate information.

Contents:



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The Authors

Dr. Peter Ford received his doctoral degree from Cambridge University. He has been associated with the nuclear power industry for over 35 years with a focus on, first, understanding the factors controlling materials degradation and then, developing mitigation methods. He worked initially with the Central Electricity Generating Board (UK) and then for 23 years with the General Electric Corporate Research and Development Center (GE-CRD) where he was manager of the Corrosion Mitigation and Coatings Laboratory. This laboratory interacted closely with General Electric Nuclear Energy, with seminal contributions to a wide range of materials-related problems including: Choice of structural materials for current and future reactors; Fuel cladding degradation; Radioactivity build-up; Life prediction codes for environmentally-assisted cracking of materials both in and out of core; Water chemistry mitigation methods including Noble Metal Technology and finally, underwater repair and cladding techniques. Since retirement from GE, he served for 4 years as a member of the Advisory Committee for Reactor Safeguards at the US Nuclear Regulatory Commission.

Dr. Ford is active in various societies and international cooperative groups in the field of nuclear materials degradation, including consultancies with reactor vendors, utilities, universities and national labs, etc. He has authored or co-authored 90 papers and patents and is a Fellow and recipient the Willis Rodney Whitney Award from NACE International for "outstanding contributions to the science of corrosion".

Dr. Peter Scott received his B.Sc. in chemistry from the University of Sheffield in England in 1965 and then his Ph.D. in physical chemistry from the same university in 1968. He spent two years as a Post Doctoral Fellow in the Department of Applied Chemistry of the National Research Council of Canada before starting his career in the nuclear industry in the Materials Development Division at the Harwell Laboratory of the UKAEA. During 18 years at Harwell, he became a section head and a recognised expert in corrosion of metallic materials, particularly concentrating on the phenomena of corrosion fatigue and stress corrosion cracking in thermal and fast reactor systems. He entered the Framatome Group (now AREVA NP) in 1989 and was named 'Expert Principal' (or Senior Corrosion Consultant) in 1993 and AREVA International Expert in 2003. In this capacity, he represented the company on several international working groups dealing with problems of stress corrosion cracking of materials mainly in light water reactors.

During his period with Framatome/AREVA NP he also served as a member of the editorial board of the NACE Corrosion Journal. He is the author or co-author of over 100 scientific publications and in 2000 he received the F. N. Speller Award from the NACE for outstanding contributions to the practice of corrosion engineering.

Dr. Pierre Combrade received his first degree from the Ecole Nationale Supérieure des Mines de Paris,in1967 and earned his doctorate degrees with a thesis on solidification of refractory eutectic alloys for aero engine turbine blades in 1972.

He spent 22 years in Creusot-Loire (then Usinor) company where he was involved in the study of stress corrosion cracking and localised corrosion of corrosion resistant alloys as well as in the development of a laboratory devoted to the study of corrosion problems in light water reactors.

With his team, he joined FRAMATOME (now AREVA NP) in 1994 as Head of the "Corrosion and Chemistry Department" in the Technical Center in Le Creusot and, since 2003, was an AREVA "International Expert". He retired from AREVA NP in January 2007.

His main field of activity regarding light water reactors are:

- IGSCC of Ni-base alloys in caustic solutions, and in primary and secondary PWR coolants.
- Corrosion-fatigue of low alloy steels.
- Oxidation of Ni-base alloys in high temperature water.
- Formation of deposits in high temperature water.
- Electrochemistry in high temperature water.

He is the author of over 50 technical papers and several reviews as well as book chapters on stress corrosion cracking and crevice corrosion. He is co-author of a book of metallurgy published in 1997 and re-edited in 2002.

He has also been involved in teaching activities in the Ecole des Mines de Paris and in the Ecole des Mines de Saint Etienne, as well as directing several thesis students working on SCC, oxidation in HT water and fretting-corrosion problems.

Contact

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