



*The Materials Ageing Institute
and RosenErgoAtom
offer*

Materials Degradation Course For Engineers in the Nuclear Industry





The Materials Ageing Institute (MAI) and RosenErgoAtom offers a Materials Degradation Course for Engineers in the Nuclear Industry

Course Scope

Degradation of reactor components is a significant challenge for the long-term operability and economic viability of the existing fleet of light water reactors (LWR). The objective of this course is to start from the fundamentals and provide an integrated and up-to-date picture of materials management in the current LWR fleet, with a special emphasis on PWR and VVER. Field experience and degradation management approaches will be described and linked to our current understanding of degradation mechanisms of carbon and low alloy steels, stainless steels, nickel-based alloys, concrete and polymers under LWR service conditions.

Selected Topics to Be Covered By Industry Experts

- Design and operation of LWR plants
- LWR environment (water, temperature, radiation, stress)
- Materials used in various components and why, fabrication, welding
- History of corrosion and mechanical degradation in operating plants
- Fundamentals of metallurgy, plant chemistry, corrosion, mechanical damage, irradiation effects and nondestructive testing
- Reactor pressure vessel integrity issues, NDE, degradation, analysis and mitigation
- Reactor pressure vessel internals integrity issues, NDE, degradation, analysis and mitigation
- Steam generator integrity issues, NDE, Degradation analysis and mitigations, repairs and replacements
- Piping and nozzles degradation issues and flow assisted corrosion
- Degradation issues of other systems and components, service water, concrete and polymer materials (cables, seals,...). Electrical equipments (turbines, transformer, electronic devices,...) are not in the scope of the course.

Target Audience: The course is suitable to the engineers and researchers who are new to the plant materials degradation issues, and to the managers who do not have a background in nuclear power plant materials. The course will also be suitable to anyone who wants to refresh the knowledge related to materials aging managements.

The course will be conducted in English. English to Russian translation will be provided

Duration : November 29th to December 3rd, 2021 with one day break on December 1st



Registration

Please click the following link to register

[Registration MDC](#)

Note: If you encounter problems during the registration, please contact: Chaveli.Bitsindou@edf.fr

Fees

Russian participants/Residents in Russia/MAI Members	Free
All Others	200€



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PROGRAM

MAI-REA LWR MATERIALS DEGRADATION COURSE

FOR ENGINEERS IN THE NUCLEAR INDUSTRY

NOVEMBRE 29TH – DECEMBER 3RD (DIGITAL EVENT, MOSCOW TIME)

For each lecture, time for Questions/Answers will be dedicated at the end.

During lectures, Chat will be available for Questions.

At virtual coffee break, rooms with instructors will be dedicated for discussions & networking.

Translations into russian will be provided.

DAY – 1 MONDAY, 29TH NOVEMBER

TIME	TOPIC	PRESENTER
9:00	Welcome & Introduction MAI overview	Valery Bezzubstev (REA) Hing-Ip Wong (EDF)
9:10	Reactor designs and associated materials Overview of reactor operation and experience	Francois Cattant (EDF)
11:00	Fundamentals of Metallurgy	Patrick Todeschini (EDF)
11:45	Virtual Coffee break with instructors	
12:00	Break	
13:00	Fundamentals of irradiation damage: Metallic Materials	Christophe Domain (EDF)
13:45	Fundamentals of thermal fatigue and environmental fatigue	Jean-Christophe Leroux (EDF)
14:30	Erosion-corrosion of pipelines and equipment NPP power unit: analysis, forecasting, management	Grigogy Tomarov (REA)
15:15	The effect of deformation martensite on the properties of equipment and pipelines of NPP from austenitic steel”	Alexey Korneev (REA)
16:00	Virtual Coffee break with instructors	
16:30	Adjourn	

DAY – 2 TUESDAY, 30TH NOVEMBER

TIME	TOPIC	PRESENTER
9:00	Fundamentals of Flow Accelerated Corrosion	Dr. Morita (CRIEPI)
9:45	Fundamentals of Stress Corrosion Cracking	Dr. Peng (CGN)
10:30	Fundamentals of Wear	Thomas Pasutto (EDF)
11:15	Fundamentals of NDE	Andreas Schumm (EDF)
12:00	Virtual Coffee break with instructors	
12:15	Break	
13:30	PWR Internals Aging Management Program Development	Remy Bonzom (EDF)
14:30	VVER core Internal Aging Management	Alexander Sorokin (REA)
15:30	Virtual Coffee break with instructors	
16:00	Adjourn	

DAY – 3 WEDNESDAY, DECEMBER 1ST

Day off

DAY – 4 THURSDAY, 2ND DECEMBER

TIME	TOPIC	PRESENTER
9:00	Fundamentals of fracture mechanics RPV integrity	Arina Marchenko (EDF)
10:00	1) Dmitry Erak - VVER RPV integrity assessment (VVER RPV material aging effects). 2) Anna Chernobaeva - Monitoring of RPV materials under operation due to Surveillance Specimens Programs. VVER experience. 3) B. Margolin - Application of advanced methods of fracture mechanics for VVER RPV integrity assessment in modern Russian Codes	Dmitry Erak & Anna Chernobaeva & B. Margolin (REA)
12:00	Virtual Coffee break with instructors	
12:15	Break	
13:15	Steam generator degradation, inspection, and integrity assessment	Adele Astorg (EDF)
14:00	Methods of data visualization with the option of multi-element transducer in the state-of-the-art ultrasonic control systems	Dmitry Tikhonov (REA)
14 :45	Frequency of control of NPP equipment and pipelines	Dmitry Kuzmin (REA)
15:30	Fundamentals of water chemistry	Bruna Martin-Cabanas (EDF)
16:15	Virtual Coffee break with instructors	
16:30	<i>Adjourn</i>	

DAY – 5 FRIDAY, 3RD DECEMBER

TIME	TOPIC	PRESENTER
9:00	PWR Pressure Boundary Materials Degradation	Dr. Peng (CGN)
9:45	Lessons learned for addressing materials-related degradation in new builds	Miguel Yescas (FRA)
10:30	Polymer aging assessment	Sarah Chatenet (EDF)
11:15	Inspection, Assessment and Repair of Concrete Structures	Jean Luc Adia (EDF)
12:00	Virtual Coffee break with instructors	
12:15	Break	
13:30	Overview of BWR Materials Degradation and Aging Issues, Aging approach	Wynter Storm McGruder (EPRI)
14:45	Impact of materials aging to long term operation	Christophe VARE (EDF)
15:45	Conclusions	
16:00	End of course	