A.N.T. International Academy
ONLINE EDUCATION

Delayed Hidride Cracking

COURSE DESCRIPTION

This course gives an overview of Delayed Hydride Cracking (DHC) in zirconium alloys and will provide engineers and technical managers at utilities, reactor vendors and regulators who would like to get a deeper knowledge of DHC in Zr alloys.

Some fuel cladding and structural components made from zirconium alloys have failed by DHC in nuclear reactors and chemical plants. This course will tackle the circumstances of the failures so that plant designers and operators can avoid such failures over the whole lifetime of their components, including post-operation storage, for example, dry storage of spent nuclear fuel. The approach is to avoid exceeding at least one limiting condition. The effect on DHC of other variables will also be discussed.

The content is described more in the *Appendix*.

COURSE MATERIAL

The course material was developed by A.N.T. International and consists of modified/edited earlier recorded A.N.T. International Seminar.

AUTHORS/LECTURERS

The authors/lecturers of the reports and lectures, World Class Experts in their fields, are as follows:

Kit Coleman.

Read more about the Experts

COURSE DURATION

- Total time: approx. 1 week for full time studies
- Lectures: 6 h

The listed time for the lectures is the actual running time. More time may be needed to digest the information provided in this course.

CERTIFICATE

You will automatically receive an email with your certificate that you can print or share on social media. If you need a printed certificate, please don't hesitate to contact us and we can send it to you via regular mail. You reach us at *support@antinternational.com*.

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Appendix: Course outline and topics covered

- » Introduction to Delayed Hydride Cracking (DHC)
- » Component failure by DHC
- » Hydrogen in zirconium alloys:
  (a) Solubility limits and (b) Diffusivity
- » Hydride properties:
  (a) Crystallography and (b) Mechanical properties
- » Basic mechanism of DHC
- » Implications of mechanism for behaviour of a crack
- » Experimental methods
- » Phenomenology and dependencies on:
  (a) Time, Stress and stress intensity factor,
  (b) Temperature history and distribution, (c) Microstructure, and Strength
- » Models of crack growth by DHC
- » Implications for structural integrity:
  (a) During operation - Leak-before-break and
  (b) During storage of spent nuclear fuel

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