

Corrosion-induced hydrogen embrittlement in Al-alloys

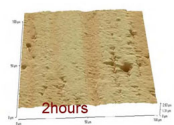
Written by Kamoutsi Eleni

Saturday, 18 December 2010 20:01 - Last Updated Wednesday, 12 January 2011 21:25

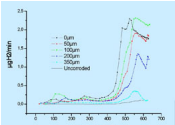
The structural integrity of aging aircraft structures can be affected by corrosion. As the time of an aircraft in service increases, there is a growing probability that corrosion will interact with other forms of damage, such as single fatigue cracks or multiple-site damage.

The present paper focuses on the observed corrosion-induced embrittlement of alloy 2024 and tries to answer the key question on whether the observed embrittlement is attributed to hydrogen uptake and trapping in the material. Hydrogen is produced during the corrosion process and is being trapped in distinct energy states, which correspond to different microstructural sites. The formation of a hydrogen-affected zone beneath the corrosion layer is supported by fractographic analysis. Removal of the corrosion layer leads to complete restoration of yield strength but only partial restoration of ductility. Additional heat treatment to release the trapped hydrogen leads only to complete restoration of ductility.

In this work, LoM has collaborated with the research team of Prof. Pantelakis of the Dept. of Mechanical and Aerospace Engineering of the University of Patras as well as with Prof. V. Bontozoglou from the Dept. of Mechanical Engineering of UTH.



Saturday, 18 December 2010 20:01 - Last Updated Wednesday, 12 January 2011 21:25

[illegible]