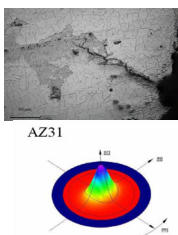


Magnesium is the lightest structural engineering metal, and therefore, particularly attractive for structural applications where weight saving is of major importance.

During the EU research project **AEROMAG** we studied the deformation as well as tensile and fatigue fracture behavior of wrought Mg alloys AZ31 and AZ61.

The mechanical behavior of a hot rolled magnesium alloy AZ31 has been evaluated experimentally under both monotonic and cyclic loading. Both longitudinal (L) and long transverse (LT) directions were evaluated. The tensile behavior of the L and LT directions differs in the offset 0.2% yield strength. A distinct hardening response is obvious in both directions. Twinning formation is more pronounced in the longitudinal direction while the fracture mode is intergranular and equiaxed facets are present in the fracture surfaces of the specimens. The S-N curves exhibit a smooth transition from the low to high cycle fatigue regime. A transgranular crack initiation mode is observed in all tested specimens while the propagation of the cracks is characterized as intergranular. This seems to be attributed to the existence of strain incompatibility points due to the lack of satisfying the von Mises criterion. Finally, fatigue crack growth shows a high sensitivity on the increase of stress intensity factor range; it represents a disadvantage for damage tolerance structural applications.



LoM has collaborated in this research with the research team of Prof. Pantelakis at the Dept. of Mechanical and Aerospace Eng., of the Univ. of Patras.

More info can be found in the publication;

A.Chamos, S. Pantelakis, E. Kamoutsi and G.N. Haidemenopoulos, Tensile and Fatigue Behavior of Wrought Magnesium Alloys AZ31 and AZ61, Fatigue and Fracture of Engineering Materials and Structure 31(9),pp.812-821, 2008.

In the attached file, results from this research are presented.

