Influence of casting defects on the fatigue behaviour of an AlSi7Mg0,6-T6 aerospace alloy

I. Serrano-Muñoz, C. Verdu, J. Y. Buffière

(Université de Lyon, INSA-Lyon, MATEIS CNRS UMR 5510, 69621 Villeurbanne, France)

In aluminium cast alloys, fatigue crack initiation occurs on pores resulting from the material processing. Surface or sub-surface pores appear to be the most critical defects. Several specimens of alloy AlSi7Mg0,6 have been investigated by laboratory computed tomography. The 3D images are first used to extract the 3D stereological parameters of the pores and their distributions. In a second step, "realistic" 3D finite element models of the porosity are generated, allowing to calculate the local stress distribution and levels around the pores. Correlation between the image analysis results, the FE calculations, the observed fatigues lives and the damage mechanisms should help in sorting out which pore parameters have the largest influence on the fatigue resistance of this class of material.