

# **Fatigue resistance improvement of laser powder bed fusion AlSi10Mg by post-processing**

**Juan Guillermo Santos Macías, Chola Elangeswaran, Brecht Van Hooreweder, Jean-Yves Buffière, Brigitte Bacroix, David Tingaud, Grzegorz Pyka, Lv Zhao, Aude Simar**

## **Abstract:**

Additive manufacturing (AM) has a clear potential to induce a general leap in fabrication. However, it also presents specific challenges that have to be tackled to make it a success. Metal AM parts often present porosity and surface quality levels that influence fatigue resistance negatively. A way to deal with these shortcomings is to perform post-processing. Considering a surface finishing step is necessary to solve the surface roughness issue, in this work stress relieve heat treatment and hot isostatic pressing, which can be carried out before surface machining, were explored to gauge their fatigue life improvement potential on laser powder bed fusion AlSi10Mg, obtaining mitigated success. A third alternative post-treatment, friction stir processing, which can be implemented in a single step including surface finishing, proved to be very beneficial to improve fatigue resistance, mainly due to its porosity reduction effect.