Effect of Surface Roughness on the Fatigue Life of Laser Additive Manufactured Ti6Al4V Alloy

Adrián Bača[1], Radomila Konečná[1], Gianni Nicoletto[2], Ludvík Kunz[3]
[1]University of Žilina, Faculty of Mechanical Engineering, Department of Material Engineering, Univerzitná 8215/1, 010 26 Žilina, Slovakia. E-mail: adrian.baca@fstroj.uniza.sk, radomila.konecna@fstroj.uniza.sk
[2]University of Parma, Department of Industrial Engineering, Parco Area della Scienze 181/A, 43124 Parma, Italy. E-mail: gianni.nicoletto@unipr.it
[3]Institute of Physics of Materials, Academy of Sciences of the Czech Republic, Žižkova 22, 616 62 Brno, Czech Republic, E-mail: kunz@ipm.cz

Direct Metal Laser Sintering enables production of fully dense metal parts with comparable or higher tensile properties as compared to the conventionally produced parts. However, for a more widespread use of this additive manufacturing technique, material data should be obtained and evaluated with respect to the influencing manufacturing factors. In the case of Ti6Al4V alloy, the fatigue performance can be highly susceptible to the process related issues, such as build direction, porosity and surface condition. This study was undertaken to examine the fatigue life of Ti6Al4V specimens manufactured by Direct Metal Laser Sintering (DMLS) technique and to investigate the influence of the surface state on the fatigue life. A high degree of anisotropy in the fatigue performance associated with the specimen build orientation was determined.

Keywords: Ti6Al4V, Direct Metal Laser Sintering, additive manufacturing, fatigue life, surface roughness

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