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ΔΙΑΛΕΞΗ

**Insights on the Cyclic Elastoplastic Response of As-built Ti-6Al-4V
fabricated via Selective Laser Melting (SLM)**

[Dr Kyriakos I. Kourousis](#)

Senior Lecturer, University of Limerick, Ireland

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Περίληψη

Using as-built Selective Laser Melted (SLM) Ti-6Al-4V in engineering applications requires a detailed understanding of its elastoplastic behaviour. The cyclic elastoplastic behaviour of as-built SLM Ti-6Al-4V has been investigated experimentally under symmetric and asymmetric strain controlled loading histories and compared against that of typical wrought Ti-6Al-4V. Tensile monotonic and cyclic tests on coupons manufactured at different build orientations (0°, 45°, and 90°) were performed for both SLM and mill annealed Ti-6Al-4V. The examination of the evolving tensile and compressive maximum stresses identified an interesting phenomenon, that of asymmetric cyclic softening. This phenomenon was observed only in the SLM Ti-6Al-4V, while its wrought counterpart confirmed the findings of past research reported in the literature. Mechanical anisotropy in both monotonic and cyclic tests was noticed with the diagonal (45°) coupon having the largest yield stress in both loading conditions. The microstructure characteristics of the SLM material were examined through optical and electron microscopy, revealing a unique α' martensite microstructure. This investigation offers an advancement in the knowledge of cyclic transient effects exhibited by a typical α' martensite SLM Ti-6Al-4V under symmetric and asymmetric strain controlled tests. This response may be caused by residual stresses present in the SLM coupons. These research results are among the very few reported so far in the literature. The findings can be very useful in engineering applications utilising as-built SLM materials.

Στη διάλεξη θα συμπεριληφθεί σύντομη παρουσίαση του Univ. Limerick και μιας προσφερόμενης θέσης διδακτορικού