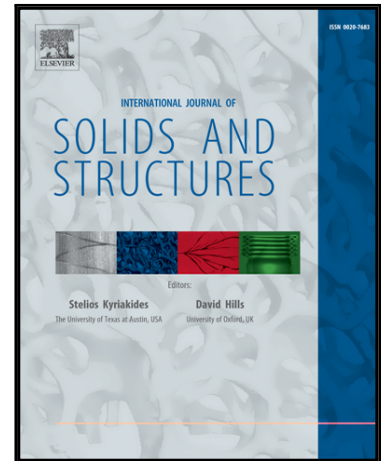


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Computational assessment of the microstructure-dependent plasticity of lamellar gray cast iron - Part IV: Assessment of the yield surface after plastic loading

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Computational assessment of the  
microstructure-dependent plasticity of lamellar gray  
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plastic loading

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**Abstract**

In this paper the yield surface of a recently presented microstructure-based volume element of the gray cast iron material GJL-250 is assessed after different plastic loading histories. The evolution of the yield surface is investigated for different volumetric, deviatoric and uniaxial loadings. The micromechanical material properties of the metallic matrix and the graphite inclusions are validated by means experimental stress-strain hysteresis loops. The metallic matrix is modeled as elastic-plastic with a non-linear kinematic hardening law. The graphite inclusions are described by means of a volumetric strain state dependent Young's modulus. The results show that the shape of the yield surface does not change significantly in comparison to the initial yield surface after pure deviatoric loadings. After volumetric loadings, the dependence of the material on the Lode angle is significantly reduced. Uniaxial

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