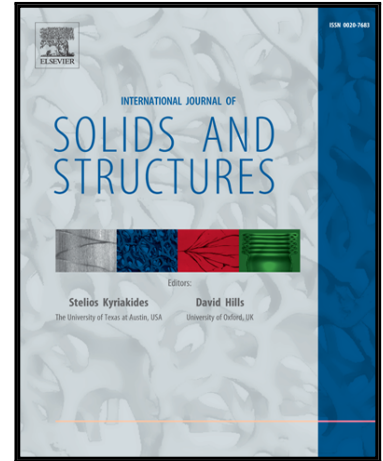


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Experiments and Constitutive Modeling of Deformation Behavior of a Magnesium Sheet during Two-Step Loading

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Abstract

Two-step tension tests, namely pre-tension in transverse direction followed by re-tension along different directions, were performed on an AZ31 magnesium alloy sheet. Compared with monotonic tension, early yielding phenomenon (strain path changes induced softening) was observed in the second loading of two-step tension. Moreover, the degree of softening increases with increasing loading angle from transverse direction to rolling direction. To model the deformation behavior, especially the early yielding phenomenon of AZ31 magnesium alloy sheet in two-step tension, more fluctuating components were introduced in the HAH model. The early yielding phenomenon of AZ31 magnesium alloy sheet in two-step tension was qualitatively well described by the extended HAH model.

Keywords: Strain path change; Deformation behavior; Constitutive modeling; Magnesium alloy; Anisotropic hardening

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