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# Modelling of Non-Uniform Deformation of Metals with Dislocation Cell Structure

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The hardening behaviour of metals physically originates from a complex microstructure evolution. To describe non-uniform deformation of metals a model of the dislocation cell structure is proposed in this contribution. The material containing cells is modelled to behave like a composite consisting of a periodic array of two types of elements: hard cell walls and soft cell interiors. To ensure compatibility of plastic deformation across the interface between the hard and soft phases, polarised layers of geometrically necessary dislocations are introduced at the interface. The internal stresses created in the material by the geometrically necessary dislocations are taken into account. The model is capable of describing the material behaviour for monotonic deformation and for deformation with a strain path change. The model predicts the strain path change effect, its dependency on the amount of prestrain and on the amplitude of the strain path change.

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