



MODELLING OF DEFORMATION FIELD, TEXTURE AND STRAIN HARDENING IN ECAP USING A GENERAL FLOW LINE FUNCTION

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Engineering Lecture Theatre E7

As an extension of a recently published flow function, a new analytic function is proposed to describe the material flow during the equal channel angular extrusion process for arbitrary angles of the two channels. The asymmetry of the flow lines is also taken into account. The parameters of the function can be obtained from finite element simulations or experimental flow lines. From the flow function, the strain field along the streamlines is derived. It is shown that the strain rate that a material element experiences varies significantly during the test. The strain field is injected into a polycrystalline plasticity model and the texture development is predicted. Several experimental observations are well explained by the model, particularly the rotated positions of the main texture components. Hardening is also modelled with a dislocation based hardening model and compared to stress strain curves obtained in torsion testing with variable strain rate simulating the strain rate evolution in ECAE testing.

Visitors are most welcome: Please note the parking arrangements. There is a designated Visitors Car Park (N1) clearly ground-marked by white paint and tickets, at a cost of \$3/day, are available from a dispensing machine. ('Blue' permit designated areas are for Monash members only.). It is also possible to park at other designated Visitors Car Parks (E1, S1 and S2) on the Clayton Campus, but tickets are \$1.4/hour.

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