

Constitutive Modelling of Anisotropic Behaviour of Advanced High Strength Steels

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ABSTRACT

Accurate description of anisotropic behaviour of sheet metals is critical for predicting anisotropic springback behaviour. Various yield functions have been proposed to represent anisotropic yielding. However, anisotropy in elastic and hardening behaviour has been less explored. In this work, an elastoplastic constitutive model was developed to predict anisotropic springback behaviour of advanced high strength steels. Anisotropy was considered in four steps: first, orthotropic elastic stiffness matrix was used to account for anisotropic linear elastic behaviour. Second, anisotropy in nonlinear unloading behaviour was considered by extending the Quasi-Plastic-Elastic model. Third, an anisotropic yield function, Yld2000-2d, was used. Lastly, the anisotropic hardening behaviour was represented by modifying the Armstrong-Frederick type combined isotropic-kinematic hardening model. The developed model was validated for the prediction of anisotropic springback behaviour of advanced high strength steels.