

General Friction Model Extended by the Effect of Strain Hardening - DTU Orbit (08/11/2017)

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An extension to the general friction model proposed by Wanheim and Bay [1] to include the effect of strain hardening is proposed. The friction model relates the friction stress to the fraction of real contact area by a friction factor under steady state sliding. The original model for the real contact area as function of the normalized contact pressure is based on slip-line analysis and hence on the assumption of rigid-ideally plastic material behavior. In the present work, a general finite element model is established to, firstly, reproduce the original model under the assumption of rigid-ideally plastic material, and secondly, to extend the solution by the influence of material strain hardening. This corresponds to adding a new variable and, therefore, a new axis to the general friction model. The resulting model is presented in a combined function suitable for e.g. finite element modeling of friction in metal forming, where the material generally strain hardens. The extension of the model to cover strain hardening materials is validated by comparison to previously published experimental data.

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