# Modelling of Iron Fines Formation in Cold Rolling Processes Using Material Point Method

**Category: Computer modeling of surfaces and surface interactions**

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Surface cleanliness of a cold rolled sheet metal is important for product performance and aesthetic reasons. Iron fines, which are produced as a result of the roll asperities ploughing through the strip surface in the roll bite, degrade strip cleanliness. Predicting iron fines formation is critical to tailor strip cleanliness to a desired specification. In this work, we study the formation of iron fines by modelling the wear behavior of a single roll asperity sliding over the strip surface using a Generalized Interpolation Material Point Method. The roll asperity is modelled as a rigid ellipsoidal indenter and the strip as a smooth-soft substrate. The influence of several parameters such as the geometry of the roll asperity, adhesion, the length of the scratch, strip material behavior and interfacial shear strength of the roll-strip contact interface on iron fines formation are investigated numerically and discussed.