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Spatially Resolved Tool Wear Prediction in Finish Milling

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Abstract

Tool wear is a cost driver in the metal cutting industry. The development of tool wear is mostly unknown during process planning of a finish milling operation. This study investigates a tool wear prediction method based on a dexel-based engagement simulation and cutting experiments. With this modelling approach, progression of tool wear is spatially resolved along the cutting edge of the tool. This paper contributes to the perspective of transparent process planning in milling. In particular, the ability to plan tool changes and to distribute wear uniformly along the cutting edge helps to improve surface quality and reduce tool cost.

Keywords: Engagement Simulation; Tool Wear Model; Finish Milling; Predictive Model; Ball End Mill