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Prediction of cutting forces in machining of metal matrix composites

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Abstract

This paper presents a mechanics model for predicting the forces of cutting aluminum-based SiC/Al₂O₃ particle reinforced MMCs. The force generation mechanism was considered to be due to three factors: (a) the chip formation force, (b) the ploughing force, and (c) the particle fracture force. The chip formation force was obtained by using Merchant's analysis but those due to matrix ploughing deformation and particle fracture were formulated, respectively, with the aid of the slip line field theory of plasticity and the Griffith theory of fracture. A comparison of the model predictions with the authors'™ experimental results and those published in the literature showed that the theoretical model developed has captured the major material removal/deformation mechanisms in MMCs and describes very well the experimental measurements.

Keywords

Machining; Metal matrix composites; Force modeling; PCD tool

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political legitimacy, especially in the conditions of social and economic crisis, changes non-stationary silver bromide.

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