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A numerical approach on the design of a sustainable turning insert

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Abstract

To decrease the energy footprint of a machined product, a novel turning insert design is reported in this article. Two geometrical models of the turning inserts, i.e., a commercially available design of insert; and proposed design of insert, were used to numerically simulate the turning operation. FEM-based coupled temperature displacement simulations were carried out for orthogonal turning operations for A2024-T351. Reasonable associations of numerical results with experimentation were found. Numerical simulation results showed the efficacy of the new design of the insert in quantitative reduction of energy inefficient byproduct of machining named as "Burr". Additionally, an improved tool life was also predicted. © Pakistan Academy of Sciences.

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