Estimating power consumption for flat surface machining employing various milling techniques

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The work presents a comparative analysis of power consumption during face milling and peripheral milling of structural steel using a milling cutter made of high-speed steel. Amounts of power consumed in two types of milling were determined empirically for identical treatment conditions, with the work contributions of each tooth being accounted for separately. It meant that we could use actual peripheral force values and as a result, derive actual power consumption values. We present power consumption as a function of milling width and feed per tooth. We determine the connection between power consumption and transient surface area. We establish that power consumption grows steadily with increasing transient surface area, independent of machining technique, and that we can vary the area specified by varying cutting mode parameters or allowance removal patterns. After fitting, the data obtained could be described by a common equation, and the coefficient of correlation with the approximation function amounted to 0.95. This means that transient surface reference area can be used as a criterion for predicting power consumption during milling.

Keywords: *power consumption, energy conservation, power consumption per unit, milling, metal cutting, machining.*

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