

عنوان مقاله:

The Effects of Tool Edge and Cutting Conditions on the Vibration Frequency of the Tool in Turning

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خلاصه مقاله:

The present work is an empirical study on the effects of cutting and tool edge conditions on the vibration frequency of the tool in turning operation. During these tests two forms of cutting tools were used which produced: Orthogonal cutting conditions (knife edge tools) and Oblique cutting conditions (vee shaped tools) with varying tool angles. Machining test cuts were conducted using sharp and worn tools, the effects of cutting conditions (depth of cut and spindle speed) and tool overhang studied. A set of experiments was performed on a CNC lathe machine (Okuma LH35-N) without coolant. Flank wear was measured by surface texture instrument (Form TalysurfTM series). Vibration frequency was measured using a Kjaer 4331 accelerometers. The workpiece material was mild steel and the cutting tool was made of high speed steel (HSS). The experimental results show that for sharp cutting tools the majority of the changes in output level occurred below 10 kHz; the most noticeable peaks occurring in the 3.5 kHz range, whereas worn cutting tools produced an increase in signal amplitude which was detectable below 5 kHz. A general increase in signal intensity occurs from 0 to 3 kHz, with small-localized peaks occurring at 1 kHz.

کلمات کلیدی:

Vibration frequency, Tool wear, Turning, Cutting conditions

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