

Title: Study of Rake Face Action On Cutting Using Palm-Kernel Oil As Lubricant

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Outlet: Journal of Emerging Trends in Engineering and Applied Sciences

Date:

Abstract: The work investigates the effect of cutting speed, feed rate, depth of cut, and rake angle on main cutting force during the cylindrical turning of mild steel, brass, and aluminium rod, using high speed steel cutting tool and palm-kernel oil as cutting fluid. The impact of lubrication on the coefficient of friction between the chip and rake face during turning operation, assuming a negligible friction between the flank and cut surface is measured. Experimental results show that aluminium at cutting speed of 4.15m/s and rake angle 9° gave a 33.3% reduction in coefficient of friction while brass and mild steel under the same cutting condition gave 7.9 and 13.8% increase in coefficient of friction respectively. Findings at cutting speed of 4.15m/s and depth of cut 1.5mm gave 9.79% reduction, 46.7 and 20.8% increase in coefficient of friction for brass, aluminium and mild steel respectively while cutting speed of 4.15m/s and feed 1.8mm/rev gave a 9.2% reduction, 30.4 and 14.5% increase in coefficient of friction for brass, aluminium and mild steel respectively. Similar trend was observed by varying the cutting conditions on the work parts through different selected values. The effect of palm-kernel oil as a metal cutting lubricant is more pronounced on aluminium than brass and mild steel.