

## Investigation of the Effects of Smart Ultrasound Wave on Surface Roughness during Turning Operation of Mild Steel

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Turning is one of the most widely accepted metal cutting processes in manufacturing industry. Due to global competitiveness, there is an increasing demand for product quality. Surface roughness represents the dimensional accuracy of the finished product and is one of the most important quality requirements of the finished product. Surface roughness is generally detrimental to the efficient performance of machined parts, especially where relative motion between parts is concerned. In this paper, a new novel technique has been proposed and adopted with an aim to reduce surface roughness of the machined surface. External ultrasonic sound waves were applied during the turning process of mild steel and its effect on surface quality was studied. Detailed experimentations were carried out under different ultrasonic frequencies to determine the effective frequency range which optimizes surface roughness to the best degree possible. The experimental results showed significant improvements in surface roughness in machined products. In addition to these, the effect of orientation of the application of the ultrasonic sound waves and the amplitude of the waves were studied in detail.

**Keywords:** Ultrasound, Surface Roughness, Vibration, Orientation, Amplitude

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