ABSTRACT

The characteristic of micro-turning is a nose radius more significant than the depth of cut. Ploughing occurs in these circumstances because the material object did not cut perfectly. Hence, chip destruction occurs. Ploughing buildup causes an increase in surface roughness, thereby negatively impacting machining quality. Implementing intermittent cutting in 1D-UVAT provides an alternative solution to reduce ploughing in micro-turning. Intermittent cutting reduces tool contact with the workpiece. Thus, the roughness is smoother. This study focuses on the effect of machining parameters on 1D-UVAT, especially TVAT, on micro-turning ($h_s < h < h_{min}$). TVAT response to micro-turning identification by the influence of feed rate, spindle speed, and frequency parameters. The experiment was carried out by the design of experiment (DOE) using the full factorial method. The investigation output is the average surface roughness (Ra) as an indicator for determining precision cutting. The tendency of TVAT to produce intermittent cuts results in reduced surface profile heights. TVAT capability is supported by selecting a low spindle speed to produce stable cutting. In addition, determining the feed rate is also important because the feed rate is the most influential parameter for the appearance of ploughing on surface roughness. This study shows the ability of TVAT to reduce ploughing on surface roughness even though it is not significant or relatively the same.

Key word: Micro turning,* MUCT, *Tangential Vibration Assisted Turning, Ploughing, Average of Surface Roughness