

ABSTRACT

This study will discuss one type of micro machining, namely micro turning. In micro turning, there is a chronic phenomenon that can reduce the precision of the workpiece. The ploughing phenomenon causes damage to the surface of the workpiece. Ploughing is prone to occur in micro turning. Because the feeding of micro-sized material causes some of the workpiece to be plowed into the surface. Workpieces that are plowed into the surface tend to degrade the surface quality. The ploughing occurs due to high-pressure contact between the workpiece and the cutting edge. Such contact is unavoidable in a micro turning cutting process. It is necessary to have a cutting method that can reduce the contact between the cutting edge and the workpiece. Ultrasonic Vibration Assisted Turning (UVAT) has an intermittent cutting mechanism that can reduce this contact. This study will discuss the Longitudinal Vibration Assisted Turning (LVAT) type of UVAT. LVAT manipulates the movement of the cutting edge, the vibration generated by LVAT produces movement towards the depth of cut. This study examines the effect of LVAT application on surface roughness which is indicated by ploughing phenomenon. To see the effect, LVAT machining parameters will be tested by compiling a dataset using the full factorial method. The parameters valued are spindle speed, feed rate and frequency. The result of the experiment shows that the change of feed rate machining parameter in LVAT application has a positive impact on the feed rate of 0.48 mm/rev. LVAT frequency insertion can suppress the negative impact of ploughing.

Keywords: *Micro turning, surface roughness, ploughing, UVAT.*