

ABSTRACT

Turning Process is a process using Lathe Machine to removes material. There is a technology called 2D UVAT (Ultrasonic Vibration Assisted Turning), 2D UVAT is known to reduce cutting temperature that occurs in machining process. On 2D UVAT process, there's an important part Tool Holder. For testing one Tool Holder, spent much cost dan much time, therefore there is one alternate process for testing Tool Holder using CAE software where this research is using ABAQUS CAE as its software. The purposes of this research is to know the best Tool Holder design from three different Tool Holder designs, Tool Holder selection based on the lowest cutting temperature average using Finite Element Method (FEM) and a good process for Tool Holder testing. Based of simulation result with 350 RPM Cutting Speed, 105 mm/min Feed Rate, 1 mm Depth of Cut, Vibration Frequencies 18000 Hz, 4 μm X Amplitude, 6 μm Y Amplitude as its paramters, shows that the best Tool Holder based on cutting temperature is 4 Hinge Tool Holder with average temperature 32.9586 °C. It was found that the simulation spent time much longer than experiment, where simulation spent 195 hours and experiment spent 188 hours, and cost for simulation is cheaper than experiment, where experiment cost spent about Rp 602,743,392.88 and simulation cost spent about Rp 372,263,366.30

Keywords: *Ultrasonic Vibration Assisted Turning, Finite Element Method, Cutting Temperature*