EFFECT OF HIGH PRESSURE COOLANT ON FLANK WEAR, SURFACE ROUGHNESS, AND THRUST FORCE IN DRILLING AISI 4340 STEEL

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Abstract

Drilling process is intended as a process of making a round hole by using the twist drill. Chisel a hole worn causing the surface roughness becomes higher. The liquid coolant used in order to clean or carry growled, cutting force and wear down the edge of the chisel, prolong tool life and smooth out the surface of machined products. The liquid cooling works on the area of contact between furious with chisels. The use of conventional cooling liquid will not be able to overcome the pressure experienced in the process of cutting tool and workpiece cooling zone to cool the cutting tool is ideal. Therefore, the heat generated during the machining process can not be eliminated and is one of the main causes of tool life becomes shorter. By using high pressure coolant (CPBT) during the machining process, is expected to reduce the wear of cutting tool edge roughness and the load.

A study was conducted on AISI-4340 steel material using high pressure coolant (CPBT) at a pressure of 80 bar and liquid cooling without pressure (CPTT) at a pressure of 6 bar. As a response variable is the chisel edge wear, surface roughness, holes, torque, pressure force and as an independent variable is the cutting speed, feed motion, diameter, and liquid cooling. Research done by comparing the wear edge chisels, hole surface roughness, and the load from the cutting process uses high pressure coolant (CPBT) and the cutting process using a liquid...
cooling without pressure (CPTT). It also compared the results from the drill furious form using CPBT and CPTT.

The results showed that the process of using the drill press CPBT generate thrust force, torque, flank wear and chisel edge, and hole surface roughness is lower than the CPTT. Chisel edge wear rate produced by the process of auger CPBT lower than CPTT. Results growled at drill with CPBT process is intermittent, while in CPTT is continuous.

*Keywords: flank wear, surface roughness, thrust force, high pressure coolant.*