

ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh variasi cairan pendingin terhadap tingkat keausan pahat *High Speed Steel* (HSS) serta perubahan struktur mikro setelah proses pembubutan baja ST 42. Metode yang digunakan adalah eksperimen dengan menggunakan mesin bubut konvensional. Variasi cairan pendingin yang digunakan meliputi: coolant 30% air 70%, coolant 50% air 50%, air 100% dan tanpa cairan pendingin. Parameter pemotongan yang diterapkan meliputi putaran spindel 382 rpm, kecepatan potong 30 m/menit, kecepatan pemakanan 0.03 mm/menit dan kedalaman potong 1 mm. Keausan pahat diukur menggunakan jangka sorong, sedangkan analisis struktur mikro dilakukan menggunakan mikroskop optik. Hasil penelitian menunjukkan bahwa penggunaan coolant 50% air 50% memberikan tingkat keausan pahat terendah yaitu 0,2 mm, sedangkan tanpa pendingin menghasilkan keausan tertinggi 0,73mm. Analisis struktur mikro menunjukkan bahwa variasi coolant yang seimbang lebih efektif dalam menjaga stabilitas struktur mikro pahat dibandingkan tanpa pendingin. Penggunaan cairan pendingin terbukti mampu mengurangi keausan pahat dan menjaga kualitas pemotongan pada proses pembubutan.

Kata Kunci : Keausan pahat, cairan pendingin, pembubutan, baja ST 42, struktur mikro

ABSTRACT

This study aims to determine the effect to coolant variation on the wear level of High Speed Steel (HSS) cutting tools and the microstructural changes after the turning process of ST 42 steel. An experimental method was employed using a conventional lathe. The coolant variations used include: 30% coolant with 70% water, 50% coolant with 50% water, 100% water and dry cutting (no coolant). The cutting parameters were set at a spindle speed of 382 rpm, cutting speed of 30 m/min, feed rate of 0.03 mm/min and depth of cut 1 mm. Tool wear was measured using a caliper and microstructural analysis was conducted using an optical microscope. The result showed that the 50% coolant with 50% water mixture yielded the lowest tool wear (0.2 mm), while the absence of coolant resulted in the highest wear (0.73 mm). Microstructural analysis also indicated that balance coolant mixture was more effective in maintenance the tool's microstructure. The use of coolant effectively reduced tool wear and preserved machining quality during the turning process.

Keywords: tool wear, coolant, turning, ST 42 steel, microstructure