ABSTRAK

Saputra Galung. 2019. Pengaruh Depth of Cut dan Cutting Speed Terhadap Keausan Pahat Carbide dan Biaya Konsumsi Listrik Pada Mesin CNC Router 3 Axis. Skripsi, Program Teknik Mesin. Fakultas Teknik Universitas Muhammadiyah Metro. Pembimbing (I) Asroni.,M.T. Pembimbing (II) Eko Nugroho., M.Eng.

Perkembangan ilmu pengetahuan dalam bidang iptek dan industri untuk mempermudah pekerjaan dan mempercepat produksi secara masal. Penggunaan mesin CNC berguna untuk pembuatan kerajinan dari kayu jati dengan mempercepat waktu produksi dan meperkecil biaya produksi. Tujuan dari penelitian ini untuk mengetahui pengaruh depth of cut dan cutting speed terhadap keausan pahat jenis carbide pada mesin cnc router 3 axis dan pengaruh terhadap kosumsi listrik. Pada penelitian ini bahan yang digunakan adalah kayu Jati. Metode pengukuran keausan dengan pengukuran luas penampang dan pengurangan berat menggunakan alat uji timbangan digital dan autocad serta alat pengambilan gambar menggunakan digital microscope menggunakan pahat jenis carbide, angle 30 ^{o}, Panjang pahat 31 mm., the length of cutting edge 10 mm. the top of the knife point 0,1 mm variasi depth of cut 2, 2,5, dan 3 mm serta variasi cutting Speed : 500, 600, dan 700 mm/menit. Dari penelitian yang telah dilakukan didapat hasil sebagai berikut pada variasi depth of cut 3 mm mengakibatkan keausan paling rendah yaitu sebesar 3,1254 mm2 dan kehilangan berat 0,003 gr, sedangkan keausan paling tinggi terjadi pada variasi depth of cut 2 mm yang mengakibatkan keausan sebesar 11,7884 mm^2 dan 0,019 gr. Cutting speed paling optimal yaitu 700 mm/menit yang nilainya 3,1254 mm^2 dan kehilangan berat 0,003 gr, sedangkan keausan tertinggi terjadi pada Cutting Speed 500 mm/menit yang nilainya 11,7884 mm^2 dan 0,019 gr. Nilai konsumsi listrik paling rendah dari variasi yang gunakan yaitu 616,25 rupiah dengan variasi depth of cut 3 mm dan cutting speed 700 mm/min serta memerlukan waktu permesinan 1,1 jam. Pengaruh depth of cut dan cutting speed terahadap keausan pahat dan biaya konsumsi listrik adalah semakin besar nilai depth of cut dan cutting speed semakin cepat waktu machining dan berakibat semakin rendah nilai keausannya serta biaya konsumsi listrik nya semakin rendah.

Kata kunci : Depth of Cut dan Cutting speed, Pahat Jenis Carbide , Mesin CNC Router 3 Axis, Keausan pahat, Konsumsi Listrik.

ABSTRACT

Saputra Galung. 2019. Effect of Depth of Cut and Cutting Speed on Carbide Chisel Wear and Electricity Consumption Costs on 3 Axis CNC Router Machines. Thesis, Mechanical Engineering Program. Engineering Faculty, Muhammadiyah University of Metro. Advisor (I) Asroni., M.T. Advisor (II) Eko Nugroho., M.Eng.

The development of science in the field of science and technology and industry to facilitate work and accelerate mass production. The use of CNC machines is useful for making teak crafts by speeding up production time and reducing production costs. The purpose of this study was to determine the effect of depth of cut and cutting speed on the wear of carbide tool chisels on 3 axis cnc router machines and the effect on electrical consumption. In this study the material used is teak wood. The method of measuring wear by measuring cross-sectional area and weight reduction using digital and autocad weighing test equipment and image capture tools using a digital microscope using a carbide tool, angle 30 o, tool length 31 mm., The length of cutting edge is 10 mm. the top of the knife point 0,1 mm variation in depth of cut 2, 2.5 and 3 mm and variations in cutting Speed: 500, 600 and 700 mm / min. From the research that has been done, the following results are obtained in the variation of depth of cut 3 mm resulting in the lowest wear of 3.1254 mm2 and weight loss of 0.003 gr, while the highest wear occurs in the variation of depth of cut 2 mm which results in wear of 11, 7884 mm2 and 0.019 gr. The most optimal cutting speed is 700 mm / minute with a value of 3.1254 mm2 and a weight loss of 0.003 g, while the highest wear occurs at a Cutting Speed of 500 mm / min with values of 11.7884 mm2 and 0.019 gr. The lowest electricity consumption value of the variations used is 616.25 rupiah with a depth of cut variation of 3 mm and a cutting speed of 700 mm / min and requires a machining time of 1.1 hours. The effect of depth of cut and cutting speed on tool wear and electricity consumption costs is the greater the value of depth of cut and cutting speed, the faster the machining time and the lower the wear value and the lower the cost of electricity consumption.

Keywords: Depth of Cut and Cutting speed, Carbide Chisel, 3 Axis CNC Router Machine, Chisel Wear, Electric Consumption.