

ABSTRAK

PENGARUH JUMLAH GIGI MATA PISAU TERHADAP EFISIENSI MESIN GERGAJI MEJA DITINJAU DARI KONSUMSI ENERGI DAN PENURUNAN PUTARAN MOTOR

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(2026: xv + 60 Halaman + 8 Gambar + 10 Tabel + 4 Lampiran)

Penelitian ini dilatarbelakangi oleh permasalahan yang ditemukan pada proses pemotongan kayu di Depot Pertukangan Kayu Iwan, dimana sering terjadi penurunan putaran motor (drop RPM) bahkan motor listrik berhenti beroperasi akibat beban pemotongan yang berlebihan. Penelitian ini bertujuan untuk mengetahui pengaruh jumlah gigi mata pisau terhadap konsumsi energi listrik dan penurunan putaran motor pada mesin gergaji meja. Metode penelitian yang digunakan adalah metode eksperimen dengan variasi jumlah gigi mata pisau 26T, 36T, dan 48T. Parameter yang diamati meliputi konsumsi energi listrik dan penurunan putaran motor (Δ RPM). Data hasil pengujian dianalisis menggunakan regresi linear sederhana dengan bantuan SPSS. Hasil penelitian menunjukkan bahwa jumlah gigi mata pisau berpengaruh terhadap konsumsi energi listrik dan penurunan putaran motor. Rata-rata konsumsi energi listrik yang diperoleh sebesar 0,00862 kWh pada mata pisau 26T, 0,00769 kWh pada mata pisau 36T, dan 0,00568 kWh pada mata pisau 48T. Sedangkan rata-rata penurunan putaran motor sebesar 498 rpm, 343 rpm, dan 272 rpm. Hasil analisis regresi menunjukkan nilai koefisien determinasi (R^2) sebesar 0,949 untuk konsumsi energi listrik dan 0,852 untuk penurunan putaran motor. Mata pisau 48T menghasilkan performa terbaik karena memiliki konsumsi energi listrik paling rendah dan penurunan putaran motor paling kecil.

Kata Kunci: Efisiensi mesin, gergaji meja, jumlah gigi mata pisau, konsumsi energi listrik, penurunan putaran motor.

ABSTRACT

THE EFFECT OF SAW BLADE TOOTH NUMBER ON THE EFFICIENCY OF A TABLE SAW MACHINE IN TERMS OF ENERGY CONSUMPTION AND MOTOR SPEED REDUCTION

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This study was motivated by problems encountered during the wood-cutting process at Depot Pertukangan Kayu Iwan, where motor speed reduction (RPM drop) frequently occurred and, in some cases, caused the electric motor to stop operating due to excessive cutting loads. The purpose of this study was to determine the effect of the number of saw blade teeth on electrical energy consumption and motor speed reduction in a table saw machine. The research employed an experimental method using three variations of saw blade tooth numbers: 26T, 36T, and 48T. The observed parameters were electrical energy consumption and motor speed reduction (Δ RPM). The collected data were analyzed using simple linear regression with the assistance of SPSS software. The results showed that the number of saw blade teeth affected both electrical energy consumption and motor speed reduction. The average electrical energy consumption was 0.00862 kWh for the 26T blade, 0.00769 kWh for the 36T blade, and 0.00568 kWh for the 48T blade. Meanwhile, the average motor speed reductions were 498 rpm, 343 rpm, and 272 rpm, respectively. Regression analysis yielded coefficients of determination (R^2) of 0.949 for electrical energy consumption and 0.852 for motor speed reduction. The 48T saw blade demonstrated the best performance, producing the lowest energy consumption and the smallest motor speed reduction.

Keyword: *Electrical energy consumption, machine efficiency, motor speed reduction, saw blade tooth number, table saw.*