ABSTRAK

Nama	:	Robby Wikra Wiguna
NPM	:	062230200219
Jurusan	:	Teknik Mesin
Program Studi	:	D – III Teknik Mesin
Judul Laporan	:	Rancang Bangun Mesin Gergaji Pita Portabel sebagai Alat Bantu Potong Benda Kerja (Proses Pembuatan)

(2025: xv + 87 Halaman, 61 Gambar, 18 Tabel, + 31 Lampiran)

Laporan akhir ini membahas rancang bangun mesin gergaji pita portabel sebagai alat bantu pemotongan material logam, khususnya baja karbon ST 37. Tujuan utama perancangan adalah menghasilkan mesin yang efisien, presisi, dan fleksibel, sehingga dapat digunakan pada lingkungan kerja dengan keterbatasan ruang dan mobilitas tinggi. Proses pengembangan meliputi analisis kebutuhan teknis, perancangan mekanik, pemilihan bahan dan komponen, fabrikasi, hingga perakitan sistem transmisi dan penggerak. Mesin menggunakan motor listrik 0,5 HP (2.840 RPM) yang diturunkan kecepatannya melalui speed reducer rasio 1:60, menghasilkan kecepatan mata gergaji ± 47,33 RPM atau kecepatan potong 25 m/menit sesuai standar pemotongan baja karbon. Sistem penjepit menggunakan ragum dan mekanisme gas spring 200 N untuk memberikan tekanan konstan, memastikan pemotongan stabil dan akurat. Hasil pengujian menunjukkan mesin mampu memotong baja ST 37 dengan ketebalan hingga 10 mm secara konsisten, dengan hasil potongan rapi dan dimensi presisi. Rangka mesin terbuat dari baja hollow untuk mengurangi bobot tanpa mengorbankan kekuatan struktur. Perhitungan teknis meliputi penentuan diameter pulley, kecepatan sudut, torsi, daya rencana, serta massa total komponen untuk menjamin kinerja optimal dan keamanan penggunaan. Kesimpulan dari penelitian ini adalah bahwa mesin gergaji pita portabel yang dirancang telah memenuhi spesifikasi teknis dan kebutuhan fungsional, serta dapat menjadi solusi efektif untuk bengkel dan industri kecil yang membutuhkan alat potong logam dengan mobilitas tinggi.

Kata Kunci: gergaji pita portabel, perancangan mekanik, speed reducer, pemotongan baja karbon, pengujian performa.

ABSTRACT
Design and Construction of a Portable Band Saw Machine as a Tool for Cutting Workpieces
(Making Process)

(2025: xv + 87 pp. + 61 Figures + 18 Tables + 31 Attachments)

Robby Wikra Wiguna
NPM. 062230200219
DIPLOMA – III MECHANICAL ENGINEERING STUDY PROGRAM
MECHANICAL ENGINEERING DEPARTMENT
STATE POLYTECHNIC OF SRIWIJAYA

This final project report presents the design and construction of a portable band saw machine as an auxiliary tool for cutting metal workpieces, particularly low-carbon steel ST 37. The main objective is to produce a machine that is efficient, precise, and flexible, suitable for work environments with limited space and requiring high mobility. The development process includes technical requirements analysis, mechanical design, material and component selection, fabrication, and assembly of the transmission and drive systems. The machine is powered by a 0.5 HP electric motor (2,840 RPM), with speed reduced through a 1:60 ratio speed reducer, resulting in a blade rotation speed of approximately 47.33 RPM or a cutting speed of 25 m/min, in accordance with the recommended standard for cutting low-carbon steel. The clamping system employs a vice combined with 200 N gas springs to provide constant downward pressure, ensuring stable and accurate cuts. Performance testing showed that the machine can consistently cut ST 37 steel with a thickness of up to 10 mm, producing clean cuts with precise dimensions. The frame is constructed from hollow steel to reduce weight without compromising structural strength. Technical calculations include pulley diameter determination, angular speed, torque, planned power, and total component mass to ensure optimal performance and operational safety. The conclusion is that the designed portable band saw meets the specified technical and functional requirements and can serve as an effective solution for small workshops and industries that require a mobile metal-cutting tool.

Keywords: portable band saw, mechanical design, speed reducer, low – carbon steel cutting, performance testing.