

ABSTRAK

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Judul Laporan Akhir : Rekondisi Mesin Pemotong Plat Manual Metalex FS-F5216 Dengan Modifikasi Laser *Line* Sebagai Alat Bantu Penentuan Garis Pemotongan di Bengkel Produksi Teknik Mesin

(2026 : xv + 79 Halaman, 67 Gambar, 9 Tabel + 7 Lampiran)

Laporan akhir ini membahas proses rekondisi dan modifikasi pada Mesin Pemotong Plat Manual Metalex FS-F5216 di Bengkel Produksi Teknik Mesin Politeknik Negeri Sriwijaya. Penurunan performa mesin yang disebabkan oleh faktor usia pakai dan keausan komponen mekanik, Selain itu, metode penentuan garis potong yang masih bersifat manual konvensional dan kurang presisi sering kali menjadi kendala utama dalam efisiensi proses pemotongan plat. Tujuan dari kegiatan ini adalah mengembalikan fungsi optimal elemen mekanis mesin sekaligus meningkatkan akurasi pemotongan melalui integrasi sistem komponen laser *line*. Metode pelaksanaan yang digunakan meliputi tahapan observasi awal, perencanaan teknis, perancangan sistem tambahan, serta proses pengerjaan rekondisi dan modifikasi. Proses rekondisi dilakukan secara menyeluruh, mencakup pengasahan mata pisau (*shearing blade*) menggunakan mesin *surface grinding* untuk mengembalikan ketajamannya, perbaikan pegas pelontar agar mekanisme penekanan kembali stabil, serta pembuatan ulang (*re-manufacturing*) komponen *workpiece pushing plate* yang hilang sesuai spesifikasi asli. Sementara itu, modifikasi utama yang diterapkan adalah penambahan tiga unit laser *line* yang diintegrasikan pada rangkaudukan khusus di atas area pemotongan. Sistem laser ini diproyeksikan untuk membentuk garis lurus yang akurat sebagai panduan visual langsung bagi operator sebelum proses penekanan pedal potong dilakukan. Hasil pengujian menunjukkan bahwa Mesin Pemotong Plat Manual Metalex FS-F5216 berhasil dikembalikan ke performa fungsi optimalnya setelah dilakukan rekondisi. Modifikasi sistem laser *line* mampu memproyeksikan garis lurus yang sejajar dengan garis potong aktual secara konsisten. Inovasi ini terbukti secara signifikan membantu operator dalam proses *alignment* material, mempercepat waktu persiapan kerja, meminimalkan risiko kesalahan manusia (*human error*), serta berpotensi besar meningkatkan presisi hasil potongan plat secara berkelanjutan.

Kata Kunci: Rekondisi, Modifikasi, Mesin Pemotong Plat Manual, Metalex FS-F5216, Laser *Line*.

ABSTRACT

Reconditioning of the Metalex FS-F5216 Manual Plate Cutting Machine with Laser Line Modification as a Cutting Line Determination Aid in the Mechanical Engineering Production Workshop

(2026: xv + 79 pp. + 67 Figures + 9 Tables + 7 Attachments)

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**DIPLOMA–III MECHANICAL ENGINEERING STUDY PROGRAM
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This final report discusses the reconditioning and modification process of the Metalex FS-F5216 Manual Plate Cutting Machine at the Mechanical Engineering Production Workshop of Sriwijaya State Polytechnic. The decline in machine performance caused by age and wear of mechanical components, in addition, the conventional manual and imprecise method of determining the cutting line is often the main obstacle in the efficiency of the plate cutting process. The purpose of this activity is to restore the optimal function of the machine's mechanical elements while increasing cutting accuracy through the integration of the laser line component system. The implementation method used includes the stages of initial observation, technical planning, additional system design, and the reconditioning and modification work process. The reconditioning process is carried out thoroughly, including sharpening the shearing blade using a surface grinding machine to restore its sharpness, repairing the ejection spring so that the pressing mechanism is stable again, and re-manufacturing the missing pushing plate workpiece component according to the original specifications. Meanwhile, the main modification implemented is the addition of three laser line units integrated into a special mounting frame above the cutting area. This laser system is projected to form an accurate straight line as a direct visual guide for the operator before the cutting pedal is pressed. Test results show that the Metalex FS-F5216 Manual Plate Cutting Machine has been successfully restored to its optimal functional performance after being reconditioned. The modified laser line system is able to project a straight line that is parallel to the actual cutting line consistently. This innovation has been proven to significantly assist operators in the material alignment process, speed up work preparation time, minimize the risk of human error, and has the potential to significantly improve the precision of plate cutting results on an ongoing basis.

Keywords : *Reconditioning, Modification, Manual Plate Cutting Machine, Metalex FS-F5216, Laser Line.*