

ABSTRAK

Nama : Muhammad Dafa Affandi
NPM : 062330200257
Jurusan : Teknik Mesin
Program Studi : Diploma Tiga Teknik Mesin
Judul Laporan Akhir : Rancang Bangun *Break System Trainer* Sebagai Media Pembelajaran Sistem Pengereman Kendaraan Roda Empat di Bengkel Alat Berat Teknik Mesin Politeknik Negeri Sriwijaya (Proses Pengujian)

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Brake System Trainer hadir sebagai media pembelajaran interaktif guna mempermudah mahasiswa dalam memahami mekanisme pengereman kendaraan roda empat secara rinci. Pengembangan alat peraga ini dilatar belakangi oleh keterbatasan proses pembelajaran berbasis kendaraan utuh, di mana sebagian besar komponen pengereman berada di area tertutup bodi kendaraan sehingga sulit diamati secara langsung. Penelitian ini dirancang untuk mencapai beberapa sasaran utama, yaitu menganalisis proses pengujian alat simulasi sistem pengereman, mengukur durasi waktu henti poros setelah mekanisme pengereman diaktifkan, serta mengevaluasi efektivitas kinerja sistem yang diterapkan. Metodologi yang digunakan mencakup serangkaian tahapan terstruktur, dimulai dari studi literatur, kegiatan observasi, perancangan konsep, pembuatan komponen, proses perakitan, hingga pengujian kinerja alat secara menyeluruh. Secara teknis, *Brake System Trainer* mengintegrasikan komponen rem cakram dan rem tromol dari kendaraan Isuzu Panther yang dihubungkan dengan motor listrik berkapasitas 2 HP sebagai penggerak utama poros. Sistem ini juga dilengkapi dengan unit pedal rem, master rem, indikator *pressure gauge* untuk memantau tekanan hidraulis, serta struktur rangka penopang yang dirancang kokoh dan stabil. Data hasil pengujian membuktikan bahwa media ini mampu mengoperasikan sekaligus mensimulasikan dinamika pengereman mobil secara optimal. Seluruh elemen instrumen bekerja dengan baik sesuai perencanaan awal, sehingga mekanisme kerja, aliran tekanan, dan gesekan komponen dapat dipelajari secara visual tanpa terhalang bodi fisik kendaraan. Berdasarkan hasil evaluasi tersebut, *Brake System Trainer* terbukti sangat efektif untuk dimanfaatkan sebagai alat bantu pembelajaran praktikum. Kehadiran media ini mampu meningkatkan pemahaman konseptual maupun praktis mahasiswa mengenai prinsip dasar, dinamika kerja, serta performa sistem pengereman kendaraan roda empat secara komprehensif.

Kata Kunci: Brake System Trainer, Sistem Pengereman, Media Pembelajaran.

ABSTRACT

**Design and Development of a Brake System Trainer as a Learning Media for
Four-Wheeled Vehicle Braking Systems at the Heavy Equipment Workshop,
Department of Mechanical Engineering, Sriwijaya State Polytechnic
(Testing Process)**

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Muhammad Dafa Affandi
062330200257

*DIPLOMA–III MECHANICAL ENGINEERING STUDY PROGRAM
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STATE POLYTECHNIC OF SRIWIJAYA*

The Brake System Trainer is an interactive learning tool designed to facilitate students in understanding the braking mechanisms of four-wheeled vehicles in detail. The development of this tool is motivated by the limitations of a fully-integrated vehicle-based learning process, where most of the braking components are located within the enclosed area of the vehicle body, making it difficult to observe directly. This research is designed to achieve several main objectives, namely analyzing the testing process of a braking system simulation tool, measuring the duration of axle downtime after the braking mechanism is activated, and evaluating the effectiveness of the implemented system's performance. The methodology used includes a series of structured stages, starting from literature studies, observation activities, concept design, component manufacturing, assembly processes, and comprehensive testing of the tool's performance. Technically, the Brake System Trainer integrates disc brake and drum brake components from an Isuzu Panther vehicle connected to a 2 HP electric motor as the main drive of the axle. This system is also equipped with a brake pedal unit, master brake, pressure gauge indicator to monitor hydraulic pressure, and a sturdy and stable supporting frame structure. Test data proves that this media is capable of operating and simulating the braking dynamics of a car optimally. All instrument elements functioned well according to the initial plan, allowing for visual study of the working mechanisms, pressure flow, and component friction without the physical vehicle's obstruction. Based on the evaluation results, the Brake System Trainer proved highly effective as a practical learning tool. This tool significantly enhanced students' conceptual and practical understanding of the basic principles, working dynamics, and performance of four-wheeled vehicle braking systems.

Keywords: Brake System Trainer, Braking System, Learning Media.