ABSTRAK

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(2026: xiii + 75 Halaman, 24 Gambar, 11 Tabel + 7 Lampiran)

Sistem pendingin (cooling system) merupakan salah satu sistem penting pada mesin yang berfungsi menjaga temperatur kerja agar tetap berada pada kondisi optimal. Dalam proses pembelajaran, mahasiswa sering kali hanya memperoleh pemahaman teoritis sehingga diperlukan media pembelajaran yang mampu memperlihatkan prinsip kerja sistem pendingin secara nyata. Tujuan dari tugas akhir ini adalah merancang dan membangun *Cooling system trainer* sebagai media pembelajaran sistem pendingin yang dapat digunakan pada kegiatan praktikum. Metode yang digunakan dalam perancangan meliputi studi literatur, observasi, dan bimbingan. Tahap perancangan diawali dengan identifikasi kebutuhan alat, pembuatan desain, pemilihan material, perhitungan komponen, serta proses pembuatan dan perakitan alat. *Cooling system trainer* yang dirancang terdiri atas beberapa komponen utama, yaitu radiator, *water pump*, *water jacket*, *Thermostat*, reservoir tank, *cooling fan*, *flow meter*, water *Heater*, panel kontrol, dan sensor temperatur. Sistem bekerja dengan mensirkulasikan fluida pendingin melalui rangkaian komponen sehingga proses perpindahan panas dapat diamati secara langsung. Hasil perancangan menunjukkan bahwa alat yang dibuat mampu merepresentasikan prinsip kerja dasar sistem pendingin cair (liquid cooling system) secara sederhana, aman, dan mudah digunakan sebagai media pembelajaran. Selain itu, alat ini dapat membantu mahasiswa memahami fungsi setiap komponen, alur sirkulasi fluida, serta proses perpindahan panas yang terjadi pada sistem pendingin. Dengan adanya *Cooling system trainer* ini diharapkan proses pembelajaran menjadi lebih interaktif, efektif, dan mampu meningkatkan kompetensi mahasiswa dalam memahami sistem pendingin secara teoritis maupun praktis.

Kata Kunci: *Cooling system trainer*, Sistem Pendingin, Media Pembelajaran, Perancangan Alat, Perpindahan Panas.

ABSTRACT

Desain and the Clouman Epf Cooling System Trainer Selecting Medium for Autonomous (Cooling System)

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A cooling system is an essential system in machinery that maintains the operating temperature within an optimal range to ensure efficient and reliable performance. However, the learning process often emphasizes theoretical concepts, limiting students' opportunities to directly observe cooling system components and understand their operating principles. Therefore, a practical learning medium is needed to improve students' comprehension through direct observation and experimentation. This final project aims to design and construct a Cooling System Trainer as an instructional medium for learning liquid cooling systems. The development process involved literature studies, field observations, consultations with supervisors, design preparation, material selection, component specification calculations, fabrication, assembly, and functional testing. The trainer consists of a radiator, water pump, water jacket, thermostat, reservoir tank, cooling fan, flow meter, water heater, control panel, and temperature sensor. The system operates by circulating coolant through a closed-loop circuit, enabling users to observe coolant flow, monitor temperature changes, and understand the heat transfer process. Functional testing confirmed that all components operated properly, the coolant circulated effectively, and the measuring instruments accurately displayed system conditions during operation. The results indicate that the Cooling System Trainer successfully represents the fundamental working principles of a liquid cooling system in a simple, safe, and practical manner. The trainer enables students to identify component functions, understand coolant circulation, and observe heat transfer directly. Therefore, the developed trainer is expected to enhance learning effectiveness, improve students' practical skills, strengthen their understanding of cooling system concepts, and support laboratory activities by providing a hands-on learning experience under controlled operating conditions.

Keywords : Cooling system trainer, Cooling System, Learning Media, Equipment Design, Heat Transfer.