

**TESTING THE FUNCTIONALITY OF THE ELECTRICAL SYSTEM
IN AN ELECTRIC MOTOR-DRIVEN TRACTOR**

Ir. Azamataufiq Budiprasojo, S.T., M.T.

Nuril Hidayat Jati Syaifullah

*Automotive Engineering Study Program, Department of Engineering, State
Polytechnic of Jember*

ABSTRACT

This study aims to evaluate and analyze the functionality of the electrical system in an electric motor-driven tractor converted from a diesel engine, in order to ensure power distribution stability, operational reliability, and system safety during operation. The electrical system consists of a 72-Volt Lithium-Ion battery, a BLDC controller, a 5000-Watt Brushless Direct Current (BLDC) motor, and supporting components such as an MCB, contactor, and throttle sensor. The research method employed was an experimental quantitative approach through operational duration variations of 5 minutes, 10 minutes, and 15 minutes. The measured parameters included controller input voltage, operating current, battery temperature, controller temperature, motor temperature, and battery capacity changes. The test results indicate that the electrical system operated stably, with voltage ranging from 79.4 to 81.4 Volts and an average value of 80.09 Volts, while the current ranged from 4.3 to 5.5 Amperes with an average of 4.81 Amperes without extreme fluctuations. The temperature of all components remained within safe operating limits, and the battery capacity gradually decreased from 98% to 91% without affecting system stability. Therefore, it can be concluded that the electrical system of the electric motor-driven tractor demonstrates good functionality, stability, and reliability under the specified testing conditions.

Keywords : *Electric tractor, electrical system, BLDC motor, functionality testing, voltage stability, system reliability.*