Rancang Bangun Prototipe Skuter Listrik Roda Dua Sebagai Media Pembelajaran Jurusan Teknik Politeknik Negeri Jember

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ABSTRAK

Penelitian ini bertujuan untuk merancang dan membuat prototipe skuter listrik roda dua dan menjadi media pembelajaran bagi mahasiswa jurusan teknik politeknik negeri jember. Prototipe menggunakan motor DC 24 V, baterai 24 V 12 Ah, dan sistem transmisi rantai dengan sproket 12T dan 36T yang memiliki rasio transmisi 3:1. Pengujian dilakukan dengan mengukur arus, tegangan, daya listrik, temperatur motor, jarak tempuh, dan waktu pengoperasian. Hasil pengujian menunjukkan bahwa pada beban 54 kg, arus jalan sebesar 25,6 A dan daya sebesar 609,2 W, sedangkan pada beban 76 kg, arus jalan meningkat menjadi 37,8 A dan daya mencapai 895,8 W. Rata-rata arus start sebesar 65,74 A dan rata-rata arus jalan sebesar 30,72 A, dengan temperatur akhir tertinggi mencapai 79,5°C. Hasil penelitian menunjukkan bahwa prototipe dapat digunakan sebagai media pembelajaran di Politeknik Negeri Jember untuk mempelajari prinsip kerja motor DC, sistem transmisi mekanik, karakteristik baterai, serta pengaruh variasi beban terhadap kinerja skuter listrik. Dengan demikian, prototipe ini berpotensi mendukung pembelajaran praktik dan pemahaman mahasiswa mengenai teknologi kendaraan listrik.

Kata kunci: skuter listrik, media pembelajaran, motor DC, transmisi mekanik, variasi beban.

Design and Development of a Two-Wheeled Electric Scooter Prototype as a Learning Medium for the Engineering Department of Politeknik Negeri Jember

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ABSTRACT

This study aims to design and develop a two-wheeled electric scooter prototype to serve as a learning medium for students in the Engineering Department of Jember State Polytechnic. The prototype uses a 24 V DC motor, a 24 V 12 Ah battery, and a chain transmission system with 12-tooth and 36-tooth sprockets, providing a transmission ratio of 3:1. Testing was conducted by measuring current, voltage, electrical power, motor temperature, travel distance, and operating time. The results showed that at a rider load of 54 kg, the running current was 25.6 A and the electrical power was 609.2 W. At a load of 76 kg, the running current increased to 37.8 A and the power reached 895.8 W. The average starting current was 65.74 A, while the average running current was 30.72 A, with the highest final motor temperature reaching 79.5°C. The results indicate that the prototype can be used as a learning medium at Jember State Polytechnic to study DC motor operation, mechanical transmission systems, battery characteristics, and the effects of load variations on electric scooter performance. Therefore, this prototype has the potential to support practical learning activities and enhance students' understanding of electric vehicle technology.

Keywords: *electric scooter, learning medium, DC motor, mechanical transmission, load variation.*