

ABSTRAK

Penelitian ini bertujuan untuk mengkaji pengaruh variasi beban dan jarak tempuh terhadap kinerja *electric trolley* berdasarkan parameter daya mekanik keluaran (P_o), konsumsi daya listrik (P_i), dan efisiensi. Pengujian dilakukan pada dua jenis lintasan yaitu, mendatar (0°) dan menanjak dengan kemiringan tetap 15° , dengan variasi beban sebesar 100 kg, 150 kg, dan 200 kg serta jarak tempuh sejauh 30 m, 50 m, dan 70 m. Data diperoleh melalui pengukuran tegangan, arus, waktu, dan kecepatan menggunakan voltmeter, ammeter, *stopwatch*, dan alat ukur jarak. Perhitungan P_o dilakukan berdasarkan gaya dorong dan kecepatan, sedangkan P_i dihitung dari hasil pengukuran arus dan tegangan. Efisiensi dihitung dari rasio P_o terhadap P_i . Hasil penelitian menunjukkan bahwa daya mekanik (P_o) dan konsumsi daya listrik (P_i) meningkat seiring bertambahnya massa dan jarak tempuh, baik pada lintasan mendatar maupun menanjak. Efisiensi juga cenderung meningkat terhadap beban dan jarak, namun lebih stabil pada lintasan mendatar. Nilai P_o tertinggi tercatat sebesar 179,53 Watt (200 kg, 70 m, lintasan menanjak), nilai P_i terbaik adalah 62 Watt (100 kg, 70 m, lintasan mendatar), dan efisiensi tertinggi sebesar 81% dicapai pada beban 200 kg dan jarak 70 m di lintasan menanjak. Penelitian ini menunjukkan bahwa kombinasi beban besar dan lintasan panjang secara signifikan meningkatkan performa konversi energi pada sistem *electric trolley*.

Kata kunci: *Electric trolley*, beban, jarak tempuh, daya mekanik, konsumsi daya listrik, efisiensi.

ABSTRACT

This study aims to examine the effect of variations in load and distance traveled on the performance of electric trolleys based on the parameters of mechanical output power (P_o), electrical power consumption (P_i), and efficiency. Tests were conducted on two types of tracks, namely horizontal (0°) and uphill with a fixed slope of 15° , using variations in total mass of 100 kg, 150 kg, and 200 kg and distance traveled of 30 m, 50 m, and 70 m. Data were obtained by measuring voltage, current, time, and speed using a voltmeter, ammeter, stopwatch, and distance measuring instrument. The calculation of P_o is based on the thrust and speed, while P_i is obtained from the results of current and voltage measurements. Efficiency is calculated from the ratio of P_o to P_i . The results showed that mechanical power (P_o) and electrical power consumption (P_i) increased with increasing mass and distance traveled, both on horizontal and uphill tracks. Efficiency also tends to increase with load and distance, but is more stable on horizontal tracks. The highest P_o value was recorded at 179.53 Watt (200 kg, 70 m, uphill track), the best P_i value was 62 Watt (100 kg, 70 m, flat track), and the highest efficiency of 81% was achieved at a load of 200 kg and a distance of 70 m on an uphill track. These findings indicate that the combination of large loads and long tracks significantly improves the energy conversion performance of the electric trolley system.

Keywords: Electric trolley, load, travel distance, mechanical power, electrical consumption, efficiency.