

ABSTRAK

Dwiky Darmawan, 105821101317. 2025. Simulasi Metode *Counter Poise* Untuk Memperbaiki Nilai Pentanahan Pada Tower Jalur Sungguminasa - Bollangi, Skripsi, dibimbing oleh **Abdul Hafid** dan **Zahir Zainuddin**. Penelitian ini membahas penerapan simulasi metode *counterpoise* untuk meningkatkan kualitas sistem pentanahan pada tower jalur transmisi Sungguminasa–Bollangi 150 kV, khususnya pada Tower 134 yang mengalami permasalahan nilai tahanan pentanahan melebihi standar. Gangguan petir pada jalur transmisi dapat menyebabkan gangguan besar pada sistem kelistrikan, salah satunya *back flashover* akibat tingginya resistansi pentanahan. Metode penelitian dilakukan melalui pengumpulan data teknis PLN, observasi lapangan, serta pengukuran langsung menggunakan Earth Tester pada Tower 132–140. Selanjutnya dilakukan simulasi teknis metode *counterpoise* untuk menurunkan nilai tahanan pentanahan. Data dianalisis menggunakan pendekatan kuantitatif berdasarkan hasil pengukuran aktual dan perhitungan resistansi dengan variasi jumlah dan panjang elektroda. Hasil penelitian menunjukkan bahwa nilai tahanan pentanahan awal pada beberapa tower masih dalam batas standar, namun Tower 140 memiliki nilai resistansi 3,22 Ω . Setelah dilakukan perbaikan dengan metode *counterpoise* melalui penambahan empat batang elektroda paralel, nilai resistansi dapat diturunkan hingga kisaran 0,7–0,8 Ω pada tanah sawah, 1,6–1,8 Ω pada tanah liat, dan 2,5–2,6 Ω pada tanah berpasir. Penurunan ini setara dengan 40–80% dari nilai awal. Hasil ini membuktikan bahwa metode *counterpoise* efektif dalam meningkatkan kualitas sistem pentanahan, mengurangi risiko *back flashover*, serta meningkatkan keandalan sistem transmisi listrik.

Kata kunci: sistem pentanahan, *counterpoise*, tower transmisi, resistansi tanah, *back flashover*.

ABSTRACT

Dwiky Darmawan, 105821101317. 2025. *Simulation of Counter Poise Method to Improve Grounding Values on Towers on the Sungguminasa - Bollangi Line, Thesis, supervised by Abdul Hafid and Zahir Zainuddin.* This research examines the application of the counterpoise method simulation to improve the grounding system of the 150 kV Sungguminasa–Bollangi transmission line towers, particularly Tower 134, which recorded grounding resistance values exceeding the standard. Lightning strikes on transmission lines often cause major disturbances in power systems, one of which is back flashover due to high grounding resistance. The study was conducted through technical data collection from PLN, field observations, and direct measurements using an Earth Tester on Towers 132–140. Subsequently, counterpoise method simulations were performed to reduce grounding resistance values. Data analysis employed a quantitative approach based on actual measurement results and theoretical resistance calculations with variations in electrode number and length. The results indicate that while most towers met the standard limits, Tower 140 exhibited a resistance value of 3.22 Ω . After improvement using the counterpoise method with the installation of four parallel electrodes, the resistance was reduced to approximately 0.7–0.8 Ω in paddy soil, 1.6–1.8 Ω in clay soil, and 2.5–2.6 Ω in sandy soil. This reduction corresponds to 40–80% of the initial value. The findings demonstrate that the counterpoise method is effective in enhancing grounding performance, mitigating the risk of back flashover, and improving the reliability of power transmission systems.

Keywords: grounding system, counterpoise method, transmission tower, soil resistance, back flashover.