

INTISARI

ANALISIS KEDIP TEGANGAN AKIBAT GANGGUAN HUBUNG SINGKAT PADA PENYULANG PLR-16 DI PT. PLN (Persero) UNIT LAYANAN PELANGGAN (ULP) PALUR

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Kedip tegangan yang sering terjadi pada penyulang PLR-16 disebabkan oleh gangguan hubung pendek. Gangguan hubung pendek umumnya terjadi karena surja petir, kontak pohon dengan jaringan sistem utilitas tenaga listrik, dan kontak dengan hewan seperti burung. Kedipan tegangan ini mengacu pada penurunan nilai tegangan rms antara 10% mencapai 90% selama jangka waktu 0,5 siklus mencapai 1 menit. Penelitian ini dilakukan dengan langkah-langkah tertentu. Pertama, data trafo daya, data jaringan distribusi tegangan menengah 20 kV, dan daya hubung singkat pada bus 150 kV dan diambil. Selanjutnya, dilakukan perhitungan untuk mencari nilai impedansi ekuivalen jaringan. Setelah itu, dilakukan kalkulasi arus gangguan hubung pendek, dan kemudian dilanjutkan dengan kalkulasi kedipan tegangan, baik itu pada gangguan fase ke *ground*, 2 fase, maupun gangguan hubung pendek 3 fase. Penelitian dilakukan dengan membagi panjang penyulang menjadi beberapa titik lokasi gangguan yaitu pada 25%, 50%, 75%, dan 100%. Hasil yang didapatkan yaitu berupa nilai arus gangguan hubung pendek fase ke *ground* di lokasi 25%, 50%, 75%, serta 100% dari panjang penyulang berturut-turut yaitu: 1587,36 $\angle(-79,85)$ A, 1094,98 $\angle(-78,62)$ A, 842,06 $\angle(-78,03)$ A, 680,34 $\angle(-77,67)$ A sedangkan nilai kedipan tegangan dan persentase kedipan tegangan ketika gangguan hubung pendek fase ke *ground* di lokasi 25%, 50%, 75%, dan 100% dari panjang penyulang berturut-turut yaitu: 8963,76 $\angle 0,03$ V dengan persentase 44,81%, 5829,35 $\angle(-0,002)$ V dengan persentase 29,14%, 2891,85 $\angle(-0,07)$ V dengan persentase 14,45%, dan 1,65 $\angle 36,38$ V dengan persentase 0,008%.

Kata kunci: Penyulang, Gangguan hubung pendek, Kedip tegangan

ABSTRACT

ANALYSIS OF VOLTAGE SAG DUE TO SHORT CIRCUIT INTERFERENCE IN PLR-16 FEEDER AT PT. PLN (PERSERO) CUSTOMER SERVICE UNIT PALUR

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The voltage flicker that often occurs in the PLR-16 feeder is caused by a short circuit fault. Short circuit faults commonly occur due to lightning surges, tree contact with the electric power utility system network, and contact with animals such as birds. This voltage flicker refers to a decrease in the rms voltage value between 10% to 90% for a period of 0.5 cycles to 1 minute. This research was conducted with certain steps. First, power transformer data, 20 kV medium voltage distribution network data, and 150 kV short circuit power on the bus are taken. Next, calculations are performed to find the equivalent impedance value of the network. After that, the short-circuit fault current is calculated, and then proceed with the voltage sag calculation, be it for phase-to-ground, 2-phase, or 3-phase short-circuit faults. The research was conducted by dividing the length of the feeders into several disturbance locations, namely at 25%, 50%, 75%, and 100%. The results obtained are in the form of phase to ground short circuit fault current values at locations of 25%, 50%, 75%, and 100% of the feeder length respectively, namely: $1587.36 \angle (-79.85) \text{ A}$, $1094.98 \angle (-78.62) \text{ A}$, $842.06 \angle (-78.03) \text{ A}$, $680.34 \angle (-77.67) \text{ A}$ while the value of voltage sag and percentage of voltage sag when phase to ground short circuit fault at location 25 %, 50%, 75%, and 100% of the length of the feeder respectively: $8963.76 \angle 0.03 \text{ V}$ with a percentage of 44.81%, $5829.35 \angle (-0.002) \text{ V}$ with a percentage of 29.14%, $2891.85 \angle (-0.07) \text{ V}$ with a percentage of 14.45%, and $1.65 \angle 36.38 \text{ V}$ with a percentage of 0.008%.

Keywords: Feeder, Short circuit fault, Voltage sag