

ABSTRAK

ANDRIAN SUMUAL

Identifikasi Kerusakan Dan Penanganan LVMDP MD 160 100 KVA Di PT PLN (Persero)

ULP Tondano

. Dibimbing oleh Ir. Tony Koerniawan, S.T, M.T.

Penelitian ini berjudul “*Evaluasi kerusakan Dan Penanganan Gardu MD 160 dan Strategi Pencegahannya di PT PLN (Persero) Unit Layanan Pelanggan Tondano.*” Tujuan utama penelitian ini adalah untuk mengidentifikasi jenis dan penyebab kerusakan yang terjadi pada panel distribusi tegangan rendah (Low Voltage Main Distribution Panel/LVMDP) di Gardu MD 160, karena ada indikasi anomali hangus pada busbar dan beban tidak seimbang serta merumuskan strategi pencegahan yang efektif guna meningkatkan keandalan sistem distribusi listrik di lingkungan PT PLN (Persero) ULP Tondano. Metode penelitian yang digunakan meliputi studi literatur, observasi lapangan, wawancara teknis dengan pihak PLN, serta pengukuran langsung terhadap parameter kelistrikan seperti arus, tegangan, suhu, dan kondisi isolasi komponen panel. Data yang diperoleh dianalisis secara kualitatif untuk mengidentifikasi faktor penyebab kerusakan dan secara kuantitatif untuk menilai tingkat keandalan sistem berdasarkan standar PUIL dan SPLN. Hasil penelitian menunjukkan bahwa kerusakan pada panel LVMDP umumnya disebabkan oleh faktor utama, yaitu: faktor teknis seperti ketidakseimbangan beban dan gangguan arus lebih, faktor lingkungan seperti kelembapan tinggi dan akumulasi debu pada ruang panel, gangguan binatang dalam panel LVMDP serta faktor manusia seperti kurangnya perawatan rutin dan kesalahan operasional. Kondisi tersebut berpotensi menurunkan keandalan suplai listrik dan meningkatkan risiko gangguan sistem distribusi. Di lakukan penanganan, beban sangat tidak seimbang dengan nilai *unbalance* mencapai 17,6% (siang) dan 21,7% (malam). Setelah pemerataan, nilai ini turun drastis menjadi 2,7% (siang) dan 3,7% (malam), masuk dalam kategori seimbang. Implementasi strategi ini diharapkan dapat mengurangi potensi kerusakan panel LVMDP, meningkatkan efisiensi operasional, serta memperpanjang umur peralatan distribusi listrik di wilayah kerja PT PLN (Persero) ULP Tondano.

Kata Kunci: Panel LVMDP, Gardu MD 160, Kerusakan Panel, Sistem Distribusi Listrik, Strategi Pencegahan

ABSTRACT

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Identification of Damage and Handling of LVMDP MD 160-100 KVA Substations at PT PLN (Persero) ULP Tondano

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This research is entitled "Evaluation of Damage and Handling of MD 160 Substation and Its Prevention Strategy at PT PLN (Persero) Tondano Customer Service Unit." The main objective of this study is to identify the types and causes of damage occurring in the Low Voltage Main Distribution Panel (LVMDP) at MD 160 Substation, due to indications of busbar burning anomalies and load imbalance, and to formulate effective preventive strategies to improve the reliability of the electrical distribution system within PT PLN (Persero) Tondano Customer Service Unit. The research methods used include literature review, field observation, technical interviews with PLN personnel, and direct measurement of electrical parameters such as current, voltage, temperature, and the insulation condition of panel components. The collected data were analyzed qualitatively to identify the factors causing the damage and quantitatively to assess the system reliability level based on PUIL and SPLN standards. The results show that damage to the LVMDP panel is generally caused by several main factors: technical factors such as load imbalance and overcurrent disturbances; environmental factors such as high humidity and dust accumulation inside the panel room; animal interference within the LVMDP panel; and human factors such as lack of routine maintenance and operational errors. These conditions have the potential to reduce the reliability of power supply and increase the risk of distribution system disturbances. Before corrective action was taken, the load was highly unbalanced, with an unbalance value reaching 17.6% (daytime) and 21.7% (nighttime). After load redistribution, these values decreased significantly to 2.7% (daytime) and 3.7% (nighttime), which fall into the balanced category. The implementation of this strategy is expected to reduce potential LVMDP panel damage, improve operational efficiency, and extend the service life of electrical distribution equipment in the working area of PT PLN (Persero) Tondano Customer Service Unit

Keywords: LVMDP Panel, MD 160 Substation, Panel Damage, Electrical Distribution System, Prevention Strategy