

## RINGKASAN

### **EVALUASI TINGKAT KEANDALAN SISTEM JARINGAN DISTRIBUSI 20 kV DI PT. PLN PERSERO UP2D JAWA TENGAH & DIY KANTOR PERWAKILAN SEMARANG MENGGUNAKAN METODE FMEA (*FAILURE MODE EFFECT ANALYSIS*)**

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Energi listrik di Indonesia disuplai oleh satu perusahaan listrik milik negara yaitu PT.PLN Persero yang memiliki misi untuk menjalankan bisnis kelistrikan dengan berorientasi pada pelanggan. Untuk mencapai misi tersebut maka perusahaan harus meningkatkan kinerja bagian pendistribusian. Dalam mengevaluasi keandalan jaringan distribusi ini ditetapkan suatu indeks keandalan yang digunakan sebagai pembanding, yaitu SAIFI (*System Average Interruption Frequency Indeks*) dan SAIDI (*System Average Interruption Duration Index*).

Penelitian ini bertujuan untuk mengevaluasi sistem keandalan jaringan distribusi 20kV di Penyulang KPK-03 dan KPK-14 GI Krpyak menggunakan metode FMEA. Data Sekunder penelitian berasal dari PT.PLN Persero UP2D (Unit Pelaksana Pengatur Distribusi) Jawa Tengah&DIY Kantor Perwakilan Semarang yang selanjutnya akan dikelola menggunakan software excel dan juga Etap 12.6.0.

Hasil penelitian menunjukkan berdasarkan perhitungan manual menggunakan FMEA KPK-03 GI Krpyak nilai SAIFI sebesar 0.9637499 fault/customer.yr dan SAIDI 3.0644993 hour/customer.yr. KPK-14 GI Krpyak nilai SAIFI sebesar 1.254418 fault/customer.yr, dan SAIDI 3.9481803 hour/customer.yr. Hasil simulasi pada KPK-03 GI Krpyak nilai SAIFI sebesar 1.1560 fault/customer.yr dan SAIDI 3.0376 hour/customer.yr. KPK-14 GI Krpyak hasil simulasi nilai SAIFI sebesar 1.2030 fault/customer.yr, SAIDI 3.5871 hour/customer.yr. Analisis perbaikan dilakukan pada KPK-014 dikarenakan penyulang ini lebih tidak handal. Perbaikan dilakukan dengan mengganti komponen proteksi LBS (*Load Break Switch*) pada jalur pembebanan TD-5 yang disambungkan pada bus TD-4 dengan komponen proteksi recloser. Hasil dari perbaikan menunjukkan bahwa SAIFI pada KPK-14 GI Krpyak mengalami peningkatan keandalan sebesar 11,85%. Dari semula 1.2030 fault/customer.yr menjadi 1.0755 fault/customer.yr.

Kata Kunci : Keandalan, FMEA, SAIFI, SAIDI, CAIDI.

## **SUMMARY**

### **EVALUATION OF THE 20 kV NETWORK SYSTEM RELIABILITY IN PT. PLN PERSERO UP2D CENTRAL JAVA&DIY SEMARANG REPRESENTATIVE OFFICE USING FMEA (FAILURE MODE EFFECT ANALYSIS)**

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*Electrical energy in Indonesia is supplied by a state-owned electricity company, namely PT. PLN Persero which has a mission to run an electricity business with a customer-oriented orientation. To achieve this mission, the company must improve the performance of the distribution department. In evaluating the reliability of this distribution network, a reliability index is used as a comparison, namely SAIFI (System Average Interruption Frequency Index) and SAIDI (System Average Interruption Duration Index).*

*This study aims to evaluate the reliability system of the 20kV distribution network at the KPK-03 and KPK-14 Feeder GI Krapyak using the FMEA method. Secondary data of the research comes from PT. PLN Persero UP2D (Distribution Regulatory Implementing Unit) Central Java & DIY Semarang Representative Office which will then be managed using excel software and also Etap 12.6.0.*

*The results showed that based on manual calculations using FMEA KPK-03 GI Krapyak the SAIFI value was 0.9637499 fault/customer.yr and SAIDI 3.0644993 hour/customer.yr. The SAIFI value of KPK-14 GI Krapyak is 1.254418 fault/customer.yr, and SAIDI is 3.9481803 hour/customer.yr. The simulation results at KPK-03 GI Krapyak have SAIFI values of 1.1560 fault/customer.yr and SAIDI 3.0376 hour/customer.yr. KPK-14 GI Krapyak simulation results SAIFI value of 1.2030 fault/customer.yr, SAIDI 3.5871 hour/customer.yr. Repair analysis was carried out on KPK-014 because this feeder was more unreliable. Repairs are carried out by replacing the LBS (Load Break Switch) protection component on the TD-5 loading line which is connected to the TD-4 bus with a recloser protection component. The results of the improvement show that SAIFI at KPK-14 GI Krapyak has increased reliability by 11.85%. From the original 1.2030 fault/customer.yr to 1.0755 fault/customer.yr.*

**Keywords :** Reliability, FMEA, SAIFI, SAIDI, CAIDI