

ANALISIS PENGARUH REKONFIGURASI SISTEM DAN PERUBAHAN BEBAN PADA PANEL Y TERHADAP ARUS HUBUNG SINGKAT PADA EXISTING PT. X

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ABSTRAK

Perubahan konfigurasi sistem kelistrikan akibat perubahan beban dan rekonfigurasi jaringan dapat memengaruhi distribusi aliran daya, besarnya arus hubung singkat, serta koordinasi sistem proteksi. Perubahan tersebut berpotensi menggeser karakteristik kerja *Overcurrent Relay* (OCR) sehingga memengaruhi selektivitas dan keandalan sistem proteksi. Penelitian ini bertujuan menganalisis pengaruh perubahan beban dan rekonfigurasi sistem terhadap perubahan nilai arus hubung singkat, mengevaluasi dampaknya terhadap kelayakan rating *circuit breaker* dan *busbar*, serta menganalisis pengaruhnya terhadap koordinasi proteksi OCR pada sistem distribusi listrik *Gasoline Storage Hub* (GSH) PT. X. Penelitian dilakukan melalui pemodelan sistem menggunakan perangkat lunak ETAP berdasarkan *single line diagram* kondisi eksisting dan pasca rekonfigurasi. Simulasi meliputi analisis aliran daya, analisis arus hubung singkat berdasarkan IEC 60909, serta evaluasi koordinasi proteksi menggunakan fitur *Star Auto Protection*, *Sequence of Operation*, dan *Time Current Characteristic* (TCC) pada kondisi operasi normal, abnormal, dan *blackout*. Hasil simulasi menunjukkan bahwa perubahan beban dan rekonfigurasi sistem menyebabkan perubahan distribusi daya serta perubahan nilai arus hubung singkat pada beberapa titik sistem, yang selanjutnya memengaruhi karakteristik operasi relay, nilai *Coordination Time Interval* (CTI), serta koordinasi proteksi. Evaluasi menunjukkan bahwa sebagian zona proteksi tetap memenuhi prinsip selektivitas, sedangkan beberapa zona mengalami *misscoordination* akibat pergeseran karakteristik kurva TCC setelah rekonfigurasi sistem.

Kata Kunci: Arus Hubung Singkat, ETAP, Koordinasi Proteksi, *Overcurrent Relay*, Rekonfigurasi Sistem.

**ANALYSIS OF THE EFFECTS OF LOAD CHANGES AND
SYSTEM RECONFIGURATION ON SHORT-CIRCUIT
CURRENT AND PROTECTION COORDINATION IN THE
GASOLINE STORAGE HUB ELECTRICAL SYSTEM OF PT. X**

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ABSTRACT

Changes in electrical power system configuration due to load changes and network reconfiguration can affect power flow distribution, short-circuit current levels, and protection system coordination. These changes may alter the operating characteristics of Overcurrent Relays (OCR), thereby affecting the selectivity and reliability of the protection system. This study aims to analyze the impact of load reduction and system reconfiguration on short-circuit current levels, evaluate their effects on the interrupting capability of circuit breakers and busbars, and assess the coordination of overcurrent protection in the electrical distribution system of the Gasoline Storage Hub (GSH), PT. X. The study was conducted by developing electrical system models in ETAP based on the existing and post-reconfiguration single-line diagrams. The simulations included load flow analysis, short-circuit analysis in accordance with IEC 60909, and protection coordination analysis using the Star Auto Protection, Sequence of Operation, and Time-Current Characteristic (TCC) features under normal, abnormal, and blackout operating conditions. The simulation results indicate that load reduction and system reconfiguration modify power flow distribution and short-circuit current levels at several buses, which subsequently affect relay operating characteristics, Coordination Time Interval (CTI) values, and protection coordination performance. The evaluation shows that while several protection zones remain properly coordinated, others experience miscoordination due to shifts in the TCC curves following system reconfiguration.

Keywords: ETAP, Short-Circuit Current, Protection Coordination, Overcurrent Relay, System Reconfiguration.