ANALISIS MODIFIKASI SISTEM KONTROL SMART MOTOR CENTER (MCC) UNTUK MENIMALKAN ABNORMALITY STOP PADA MOTOR DI CHEMICAL PLANT-13 PT INDAH KIAT PULP & PAPER PERAWANG

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ABSTRAK

Chemical Plant-13 PT Indah Kiat Pulp & Paper Perawang mengandalkan motor listrik yang dikendalikan melalui sistem Smart Motor Control Center (Smart MCC) untuk menjaga kelangsungan proses produksi. Namun, sistem ini masih sering mengalami abnormality stop yang mengganggu produksi, terutama akibat gangguan komunikasi Profibus DP/SIMOCODE serta kondisi single point of failure pada sumber power supply 24VDC yang digunakan bersama oleh Profibus Line 1 dan Line 2. Penelitian ini bertujuan mengidentifikasi penyebab utama abnormality stop, menganalisis kondisi eksisting sistem kontrol Smart MCC, merancang modifikasi sistem kontrol, serta mengevaluasi efektivitas modifikasi tersebut. Metode penelitian berupa studi kasus yang diawali dengan observasi lapangan dan pengumpulan data historis trip motor melalui wawancara dengan teknisi electrical dan proses, dilanjutkan dengan perancangan dan implementasi dua modifikasi utama, yaitu (1) perubahan komunikasi motor-motor kritis dari SIMOCODE/Profibus menjadi hardwire, dan (2) pemisahan sumber power supply 24VDC untuk Optical Link Module (OLM) Profibus Line 1 dan Line 2. Hasil evaluasi menunjukkan modifikasi yang dilakukan berhasil menurunkan frekuensi abnormality stop akibat gangguan komunikasi Profibus, menghilangkan dampak silang antar line ketika salah satu sumber 24VDC bermasalah, mempersingkat waktu pemulihan (recovery time) dari 1–24 jam menjadi 0–4 jam, serta meningkatkan penilaian kualitatif keandalan sistem dari skala 4 menjadi 5. Dengan demikian, modifikasi sistem kontrol Smart MCC yang dirancang terbukti efektif meningkatkan keandalan operasional motor listrik di Chemical Plant-13.

Kata kunci: Smart Motor Control Center, abnormality stop, Profibus, hardwire, power supply 24VDC

Analysis Modification of the Smart Motor Control Center (MCC) System to Minimize Abnormal Motor Stoppages at Chemical Plant-13 PT Indah Kiat Pulp & Paper Perawang

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ABSTRACT

Chemical Plant-13 of PT Indah Kiat Pulp & Paper Perawang relies on electric motors controlled through a Smart Motor Control Center (Smart MCC) system to maintain continuous production. However, the system frequently experiences abnormality stops that disrupt production, mainly caused by Profibus DP/SIMOCODE communication disturbances and a single point of failure in the 24VDC power supply shared by Profibus Line 1 and Line 2. This study aims to identify the main causes of abnormality stops, analyze the existing condition of the Smart MCC control system, design a control system modification, and evaluate the effectiveness of the modification.The research method is a case study beginning with field observation and collection of historical motor trip data through interviews with electrical and process technicians, followed by the design and implementation of two main modifications: (1) changing the communication of critical motors from SIMOCODE/Profibus to hardwire, and (2) separating the 24VDC power supply for the Optical Link Module (OLM) of Profibus Line 1 and Line 2. The evaluation results show that the modification successfully reduced the frequency of abnormality stops caused by Profibus communication disturbances, eliminated cross-line impact when one 24VDC source failed, shortened the recovery time from 1–24 hours to 0–4 hours, and improved the qualitative reliability rating from a scale of 4 to 5. Thus, the designed Smart MCC control system modification is proven effective in improving the operational reliability of electric motors at Chemical Plant-13.

Keywords: Smart Motor Control Center, abnormality stop, Profibus, hardwire, 24VDC power supply