

# UJI KONSEP FAULT TOLERANT PADA DISTRIBUTED CONTROL SYSTEM (DCS) BERBASIS PLC STUDI KASUS DI PT. SEMEN INDARUNG PADANG

## Abstraks

*Pengontrol proses sistem di industri awalnya secara konvensional (menggunakan relay/kontaktor), gerbang logik (logik 525), dengan berkembangnya teknologi otomasi pengontrolan sistem, sehingga dibuat peralatan control yang lebih efektif dan keandalan yang lebih baik yaitu PLC (Programmable Logic Control). Sesuai dengan namanya, PLC mengontrol proses sesuai dengan diskripsi melalui program, jika ada perubahan diskripsi kerja proses maka rangkaian masukan dan keluaran tidak ada perubahan. Model pengontrolan secara Distributed Control System (DCS) adalah pengembangan dari peralatan PLC dimana DCS merupakan sistem kontrol yang pengoperasiannya dapat dilakukan pada pusat pengontrol (sentralisasi) dan unit-unit pengontrol (desentralisasi). DCS lebih efektif mengoperasikannya dibanding dengan sistem sentralisasi atau desentralisasi. Model pengontrolan DCS belum merupakan suatu sistem kontrol proses yang baik karena jika terjadi error akibat dari failure pada sistem proses, maka mengakibatkan sistem proses berhenti. Berhentinya proses pengontrolan system selama waktu perbaikan dan pergantian komponen memerlukan waktu dan kerugian biaya yang cukup besar. Oleh karena itu diperlukan konsep fault tolerant, yaitu suatu metoda untuk mengurangi berhentinya proses sistem akibat terjadinya fault pada komponen kontrol.*

*Pada penelitian ini membahas perancangan suatu model engineering, menerapkan dan menguji konsep fault tolerant pada DCS berbasis PLC untuk pengontrolan sistem transportasi bahan baku semen di PT.Semen Padang. Merubah DCS menjadi DCS fault tolerant dengan menambahkan dan meningkatkan kemampuan perangkat keras dan perangkat lunak yang digunakan pada sistem proses, sehingga dapat mendeteksi dan menggantikan kerja peralatan utama secara otomatis bila terjadi failure.*

*Menguji aplikasi konsep fault tolerant pada DCS di PT. Semen Indarung Padang terhadap kontinuitas proses yang dapat mengurangi berhentinya proses kerja sistem akibat adanya fault komponen kontrol. Uji konsep fault tolerant juga meningkatkan keandalan system DCS. Keandalan sistem DCS tanpa fault tolerant  $1.421 \times 10^{-23}$  dan setelah menggunakan konsep fault tolerant keandalan system  $1.454 \times 10^{-19}$  dengan kenaikan 10232,23%.*

**Kata kunci : Fault Tolerant, DCS, PLC, Semen dan Keandalan**

# TESTING THE CONCEPT OF FAULT TOLERANT DISTRIBUTED IN CONTROL SYSTEM (DCS) PLC BASED CASE STUDY IN PT.SEMEN INDARUNG PADANG

## ABSTRACT

Systems in industrial process controllers initially conventionally (using a relay / contactor), the gate logic (logic 525), with the development of automation control system technology, which made control equipment more effective and better reliability of the PLC (Programmable Logic Control). As the name implies, the PLC controls the process in accordance with the description by the program, if there are changes in job descriptions of the process input and output circuit there is no change. Distributed model of control in Control System (DCS) is the development of equipment which the DCS PLC control system is an operation can be performed on the central controller (centralized) and control units (decentralized). DCS is more effective to operate than centralized or decentralized systems. DCS control model has not been a good process control system because if an error occurs due to failure in the system process, then the resulting system stops the process. Cessation of the process control system during the period of repairs and component replacement requires time and substantial cost disadvantage. Therefore we need the concept of fault tolerant, which is a method to reduce the stopping of the process due to the fault system in the control component.

This research discusses a model of engineering design, implement and test the concept of fault tolerant on PLC-based DCS control system to transport raw materials of cement in PT.Semen Indarung Padang. Changing DCS DCS become fault tolerant by adding and improving the ability of hardware and software used in the system process, so it can detect and replace the work of major equipment automatically when the failure occurred.

Testing the concept of fault tolerant applications on DCS in PT.Semen Indarung Padang against continuity processes that can reduce the stopping of the work process due to the fault component system controls. Test the concept of fault tolerant systems also increase the reliability of DCS. System reliability without fault tolerant DCS  $1421 \times 10^{-23}$  and after using the concept of fault tolerant system reliability  $1.454 \times 10^{-19}$  with 10232.23% increase.

**Key Word: Fault Tolerant, DCS, PLC Cement and reliability**