

PENERAPAN STANDAR IEC 61499 DALAM SISTEM KONTROL TERDISTRIBUSI PABRIK TENNESSEE EASTMAN

Oleh

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INTISARI

Paradigma sistem kontrol yang semula didominasi oleh pendekatan tersentralisasi bergerak menuju distribusi kontrol. Hal ini menimbulkan kebutuhan akan standar perangkat lunak sistem kontrol yang memungkinkan bagian bagian pabrik dapat bekerja secara desentralisasi. Standar IEC 61499 hadir sebagai standar pemrograman sistem kontrol baru yang diharapkan mampu memenuhi kebutuhan itu. Selama ini, belum ada implementasi standar IEC 61499 dalam sistem kontrol untuk keseluruhan pabrik. Pada penelitian ini, ingin diketahui pengaruh implementasi arsitektur sistem terdistribusi berbasis blok blok fungsi IEC 61499 terhadap performa sistem kontrol keseluruhan pabrik. Implementasi sistem kontrol dilakukan terhadap pabrik Tennessee Eastman.

Implementasi dilakukan dengan mengadaptasi struktur regulasi kontrol keseluruhan pabrik Tennessee Eastman menjadi sistem kontrol terdistribusi berbasis IEC 61499 yang dijalankan bersama dengan model proses dari pabrik. Hasil implementasi ini dibandingkan dengan hasil implementasi sistem tersentralisasi terhadap Pabrik Tennessee Eastman

Uji performa sistem kontrol terdistribusi berbasis IEC 61499 dalam penelitian dilakukan dengan melihat *steady state error*, *mean squared error*, serta *rise time* dari pengendalian terhadap pabrik Tennessee Eastman. Hasil uji dibandingkan dengan implementasi sistem tersentralisasi dari pabrik Tennessee Eastman. Diamati bahwa implementasi sistem kontrol terdistribusi tidak memiliki pengaruh terhadap performa kontrol dan dapat menggantikan sistem tersentralisasi pada pengendalian pabrik Tennessee Eastman.

Kata kunci: *Plantwide Control, IEC 61499, Distributed System.*

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IMPLEMENTATION OF DISTRIBUTED CONTROL SYSTEM FOR TENNESSEE EASTMAN PROCESS USING IEC 61499

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ABSTRACT

Control system paradigm, while initially dominated by centralized approach, began to lean into distributed paradigm. Distributed paradigm generates necessity for a control software standard that enables parts of factory to work decentralized. IEC 61499 control programming standard came out as a new standard for a programming distributed control system. The research aim to understand the effects of implementing function-block based architecture of IEC 61499 into a plantwide control performance. System implementation was done to Tennessee Eastman Process, an testbed for new control architecture.

Implementation was done by adapting simple regulatory plantwide control of Tennessee Eastman Process into a distributed control system based on IEC 61499, run together with the process model of the process. Implementation results were compared with implementation of centralized control system into Tennessee Eastman Process

Performance test were done by comparing the *steady state error*, *mean squared error*, and *rise time* of Tennessee Eastman Process's process variable that are to be controlled. Tests results are compared with implementation of centralized system in Tennessee Eastman Process. It was observed through the test that distributed architecture doesn't effecting the control performance and could be used to replace centralized architecture in Tennessee Eastman Process's control system.

Keywords: *Plantwide Control, IEC 61499, Distributed System.*

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