

**ANALISIS KESTABILAN TRANSIEN AKIBAT PERUBAHAN BEBAN
PADA SISTEM PEMBANGKIT PLTMG BONTANG II MENGGUNAKAN
SOFTWARE ETAP 12.6**



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**PROGRAM STUDI TEKNIK ELEKTRO
PROGRAM PASCASARJANA
UNIVERSITAS KRISTEN INDONESIA JAKARTA
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**Thesis ini ditulis untuk memenuhi sebagian persyaratan guna
memperoleh gelar Magister Teknik Elektro (M.TE)**

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Abstract

PT Bayu Bumi Gemilang as a company who owns PLTMG Bontang II intends to distribute and commercialize their electrical power to customers (Priority customer (BBRI) and PLN) hence stability and reliability of system should be performed to minimize down time when fault occur. The stability of PLTMG Bontang II system not only depend on power plant side, but also depend on load, PLN and BBRI. This document is report of transient stability study in PLTMG Bontang II. The result of this study will be used as basis of setting and configuration in PLTMG Bontang II system. However the biggest problem of this configuration is the disturbance from PLN side. When outgoing CB to PLN open (either because of short circuit or loss of load), PLTMG Bontang II forfeit voltage and frequency reference, so frequency in PLTMG Bontang II will increase dramatically. To minimize this problem 1 or 2 (if required) generators shall be removed sequentially from system. It is recommended to use frequency base and using fast controlling system as system detection. The second problem is disturbance from cable between PLTMG Bontang II and BBRI. This fault could trigger undervoltage relay in power plant. Therefore it's recommended to install new CT c/w relay protection in 11 kV side transformer then interlock to priority customer CB (incoming transformer CB; 20kV side). So the fault can be neutralized before impacted to power plant.

Abstrak

PT Bayu Bumi Gemilang sebagai perusahaan pemilik PLTMG Bontang II bermaksud untuk mendistribusikan dan mengkomersilkan tenaga listrik mereka kepada pelanggan (pelanggan Prioritas (BBRI) dan PLN) maka stabilitas dan keandalan sistem harus diperhatikan untuk meminimalkan waktu pemadaman ketika terjadi gangguan. Stabilitas sistem PLTMG Bontang II tidak hanya bergantung pada sisi pembangkit listrik, tetapi juga tergantung pada beban, PLN dan BBRI. Dokumen ini merupakan laporan studi stabilitas transien di PLTMG Bontang II. Hasil dari penelitian ini akan digunakan sebagai dasar pengaturan dan konfigurasi dalam sistem PLTMG Bontang II. Namun masalah terbesar konfigurasi ini adalah gangguan dari sisi PLN. Ketika CB keluaran untuk PLN terbuka (baik karena sirkuit pendek atau kehilangan beban), PLTMG Bontang II kehilangan referensi tegangan dan frekuensi, sehingga frekuensi di PLTMG Bontang II akan meningkat secara cepat. Untuk meminimalkan masalah ini, generator 1 atau 2 (jika diperlukan) harus dimatikan secara berurutan dari sistem. Disarankan untuk menggunakan frekuensi dasar dan menggunakan sistem kontrol cepat sebagai pendeteksian sistem. Masalah kedua adalah gangguan dari kabel antara PLTMG Bontang II dan BBRI. Kesalahan ini dapat memicu relay undervoltage di pembangkit listrik. Oleh karena itu, disarankan untuk menginstal relay proteksi CT c / w yang baru di transformator sisi 11 kV kemudian interlock ke CB pelanggan prioritas (incoming transformer CB sisi 20kV), sehingga gangguan dapat dinetralisir sebelum berdampak ke pembangkit listrik.

Daftar Ringkasan

AVR	Automatic Voltage Regulator
CB	Circuit Breaker
CT	Current Transformer
DG	Diesel Generator
EPDCS	Electrical Power Distribution Control System
ETAP	Electrical Transient Analysis Program
GEG	Gas Engine Generator
HV	High Voltage
IS	International System
LV	Low Voltage
PCS	Process Control System
PU	per Unit
VD	Voltage Drop

KODE DAN STANDARD (CODE AND STANDARTS)

The power system studies have been carried out according to the latest edition of the following listed standards:

IEC 60034-3	Rotating electrical machines: specific requirement for turbine type synchronous machines
IEC 60034-16-1	Rotating electrical machines: excitation system for synchronous machines: definitions
IEC 60034-16-2	Rotating electrical machines: excitation system for synchronous machines: models for power system studies
IEC 60909	Short circuit current calculation in three phases AC systems
IEC 60909-1	Short circuit current calculation in three phase AC systems: factors for the calculation of short circuit currents in three AC system
IEC 60865-1	Short circuit current – calculation of effects: definitions and calculation methods 1981 IEEE Committee report on “computer representation of excitation systems” and “excitation system models for power system stability studies” 1979 IEEE Committee report on “computer representation of excitation systems” and “excitation system models for power system stability studies”
IEEE 421-1	Standard definitions for excitation systems for synchronous machines
IEEE 421-5	Recommended practice for excitation system for power



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BEBAN PADA SISTEM PEMBANGKIT PLTMG BONTANG II
MENGUNAKAN SOFTWARE ETAP 12.6

Dengan ini menyatakan dengan sesungguhnya bahwa Tesis yang saya susun sebagai syarat untuk memperoleh gelar Magister dari Program Pascasarjana Universitas Kristen Indonesia (UKI) Jakarta merupakan hasil karya saya sendiri.

Adapun bagian-bagian tertentu dalam penulisan Tesis yang saya kutib dari hasil karya orang lain telah ditulis sumbernya secara jelas sesuai dengan norma, kaidah dan etika penulisan ilmiah.

Apabila kemudian hari ditemukan seluruh atau sebagian Tesis ini bukan hasil karya sendiri atau adanya plagiat dalam bagian tertentu, saya bersedia menerima sanksi pencabutan gelar akademik yang saya sandang dan sanksi-sanksi lainnya sesuai dengan peraturan perundangan yang berlaku.

Jakarta, 16 Juli 2018

MATERAI 6000

Chandra Lesmana Harefa S.Pd

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