

# Perancangan offshore geothermal power plant 8 x 80 mw berbasis truss spar platform dengan taut mooring system = The designing of offshore geothermal power plant 8 x 80 mw based on truss spar platform with taut mooring system

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## Abstrak

[Salah satu cara untuk mengekspansi penggunaan Energi Panas Bumi secara bersih dan meminimalisir dampak negatif terhadap lingkungan dengan memaksimalkan pemanfaatan sumber daya alam yang tersedia. Membuka kemungkinan lain dari penggunaan konstruksi Bangunan Lepas Pantai sebagai Pembangkit Listrik Tenaga Panas Bumi Terintegrasi. Dengan konstruksi berbasis pada Truss Spar Platform, Pembangkit Listrik Tenaga Panas Bumi Lepas Pantai ini berlokasi di Gunung Laut Kawio Barat, Perairan Sangihe Talaud, Sulawesi Utara, Indonesia. Platform yang memiliki Displacement sebesar 201556 DWT menggunakan 12 Mooring Lines, dengan sistem pertambatan Taut dan kalibrasi chain-polyester-chain. Chain dengan Grade 4 (K4 Studless Chain) berdiameter 5" dan Polyester High-Tech Fibre Ropes berdiameter 11". Didapatkan hasil Gravity Loads sebesar 201556 N, Resistant Loads 3715.9 N, Current Drag 321448.04, Lift Force 1125068.16 N, Steady and Dynamic Wind Loads on Structures 457520.05 N, Impulse Load (Wave Slamming Load 6.23 N.

.....Breaking Wave Loads 873.84 N; Wave Run-Up Loads 0.766 N). Analisis RAO (Response Amplitude Operator) terhadap struktur terlampir dalam bentuk grafik. Konversi Energi pada Power Plant dengan siklus Rankine, memiliki kalibrasi 2 set turbine untuk menghasilkan power sebesar 80MW, dengan efisiensi thermal sistem sebesar 60%. Dan Mooring Tension yang terjadi di setiap Mooring Lines masih memiliki nilai yang berada dibawah Allowable Tension, sehingga desain Mooring Lines aman untuk digunakan pada Platform.

.....One way to expand the use of geothermal energy which clean and minimalizing the negative impacts to the environments by the maximizing the utilization of available resources. Open up another possibility of using the Offshore Constructions for an Integrated Offshore Geothermal Power Plant. With constructions based on Truss Spar Platform, the Offshore Geothermal Power Plant 8 x 80 MW are located in Kawio Barat Seamount, Sangihe Talaud Seas, North Sulawesi, Indonesia. The platform which has the displacement is about 201556 DWT are using the 12 Mooring Lines, with Taut Mooring System and calibrations are chain-polyester-chain. The chain is Grade 4 (K4 Studless Chain) with diameter 5" and Polyester High-Tech Fibre Ropes with diameter 11". The calculation resulted are 201556 N for Gravity Loads, 3715.9 N for Resistant Loads, 321448.04 for Current Drag, 1125068.16 N for Lift Force, 457520.05 N for Steady and Dynamic Wind Loads on Structures, Impulse Load (Wave Slamming Load 6.23; Breaking Wave Loads 873.84 N; Wave Run-Up Loads 0.766 N). RAO (Response Amplitude Operator) analysis concerning to the structure are proven in graph. Energy Conversion in Power Plant with Rankine cycle, have 2 sets of turbine calibrations to produce 80MW of power, with the thermal efficiency is 60%. And Mooring Tension that occurs in each Mooring Lines are still in the under of Allowable Tension, so that the Mooring Lines Design are safe to be used on the Platform., One way to expand the use of geothermal energy which clean and minimalizing the negative impacts to the environments by the maximizing the utilization of available

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