

ANALISIS PERBEDAAN MODE ANTARA *EXTRACTION* DAN *FULL CONDENSING* TERHADAP EFISIENSI TURBIN UAP KAPASITAS 22 MW

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Abstrak

Turbin uap merupakan salah satu komponen penting dalam menunjang suatu pembangkit listrik. Operasi *steam turbine generator* (STG) di PT. XYZ dilakukan secara kontinyu sejak tahun 1992. Masing-masing STG di PT. XYZ memiliki kapasitas 22 MW berdasarkan desain awal di *manual book* dan terbagi menjadi dua mode. Selama 28 tahun beroperasi, diperkirakan performa STG mengalami penurunan akibat beberapa factor seperti peningkatan vibrasi, peningkatan *pressure drop* tiap *stage*, peningkatan laju aliran *steam* masuk pada beban normal, serta peningkatan *temperature exhaust*. Oleh karena itu perlu dilakukan Analisa terhadap efisiensi STG apakah efisiensi dan performanya masih dalam kondisi yang andal atau tidak. Berdasarkan hasil Analisa dari kelima STG yang ada dengan mengambil sampel pada tanggal 13 Januari 2020 dan menggunakan metode perhitungan siklus Rankine didapat bahwa mode *full condensing* berada pada STG 51-G-101 A/B/E dengan efisiensi masing-masing 80,18%, 66,25%, dan 76,75%. Mode *extraction* berada pada STG 51-G-101 C/D dengan nilai efisiensi 74,85% dan 74,66%. Perhitungan actual ini mengalami penurunan dibandingkan dengan perhitungan desain sebesar 85% namun performa STG masih dalam keadaan baik namun harus tetap dipantau.

Kata kunci: *efisiensi, turbin uap, extraction, full condensing*

ANALYSIS OF MODE DIFFERENCES BETWEEN EXTRACTION AND FULL CONDENSING AGAINST EFFICIENCY OF 22 MW CAPACITY STEAM TURBINE

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Abstract

The steam turbine is one of the important components in supporting a power plant. Steam turbine generator (STG) operations at PT. XYZ have been carried out continuously since 1992. Each STG at PT. XYZ has a capacity of 22 MW based on the initial design in the manual book and is divided into two modes. During its 28 years of operation, it is estimated that STG's performance has decreased due to several factors such as increased vibration, increased pressure drop for each stage, increased steam inflow rate at normal load, and increased exhaust temperature. Therefore it is necessary to analyze the efficiency of STG whether the efficiency and performance are still in a reliable condition or not. Based on the results of the analysis of the five existing STGs by taking samples on January 13, 2020 and using the Rankine cycle calculation method, it was found that the full condensing mode was at STG 51-G-101 A / B / E with an efficiency of 80.18% each, 66.25%, and 76.75%. The extraction mode is at STG 51-G-101 C / D with efficiency values of 74.85% and 74.66%. This actual calculation has decreased compared to the design calculation by 85%, but STG's performance is still in good condition but must be monitored.

Keywords: *efficiency, steam turbine, extraction, full condensing*