

**ANALISIS PERBANDINGAN KINERJA TURBIN FRANCIS  
SAAT COMMISSIONING TERHADAP DATA DESAIN  
DI PLTA KERINCI MERANGIN HIDRO**

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**ABSTRAK**

PLTA Kerinci Merangin Hidro merupakan pembangkit listrik tenaga air yang menggunakan turbin Francis sebagai komponen utama dalam proses konversi energi air menjadi energi listrik. Pada tahap *commissioning*, dilakukan pengujian untuk memastikan bahwa kinerja turbin telah sesuai dengan spesifikasi dan data desain yang telah direncanakan. Penelitian ini bertujuan untuk menganalisis perbandingan kinerja turbin Francis saat *commissioning* terhadap data desain dengan meninjau parameter utama, yaitu debit air, head efektif, daya keluaran, dan efisiensi turbin. Metode penelitian yang digunakan adalah metode analisis kuantitatif dengan membandingkan data hasil pengujian *commissioning* dengan data desain turbin. Data diperoleh dari hasil pengukuran langsung di *power house* serta dokumen teknis pembangkit. Hasil analisis menunjukkan adanya perbedaan antara kinerja aktual dan data desain, yang disebabkan oleh faktor kondisi aliran air, kehilangan energi hidraulik, serta pengaruh mekanis dan operasional saat pengujian berlangsung. Meskipun demikian, kinerja turbin secara umum masih berada dalam batas toleransi yang diizinkan dan memenuhi standar operasi pembangkit. Hasil penelitian ini diharapkan dapat menjadi bahan evaluasi kinerja turbin Francis serta sebagai referensi dalam peningkatan efisiensi dan keandalan operasi PLTA, khususnya pada tahap awal pengoperasian pembangkit.

**Kata kunci:** *Commissioning*, Efisiensi, Kinerja Turbin, PLTA, Turbin Francis.

***DURING COMMISSIONING AGAINST DESIGN DATA  
AT KERINCI MERANGIN HYDROPOWER PLANT***

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***ABSTRACT***

*PLTA Kerinci Merangin Hidro is a hydroelectric power plant that utilizes a Francis turbine as the main component in converting water energy into electrical energy. During the commissioning stage, performance testing is conducted to ensure that the turbine operates in accordance with the specified design data. This study aims to analyze the performance comparison of the Francis turbine during the commissioning process with respect to the design data by evaluating key parameters, including water discharge, effective head, output power, and turbine efficiency. The research method employed is quantitative analysis by comparing the data obtained from the commissioning test results with the turbine design data. The data were collected through direct measurements at the powerhouse and from technical documentation of the power plant. The analysis results indicate differences between the actual performance and the design data, which are influenced by water flow conditions, hydraulic energy losses, as well as mechanical and operational factors during the testing process. Nevertheless, the overall turbine performance remains within the allowable tolerance limits and complies with the operational standards of the power plant. The results of this study are expected to serve as an evaluation reference for the performance of the Francis turbine and to contribute to efforts to improve efficiency and operational reliability of hydroelectric power plants, particularly during the initial operation phase.*

***Keywords:*** *Commissioning, Efficiency, Turbine Performance, Hydroelectric Power Plant, Francis Turbine.*