

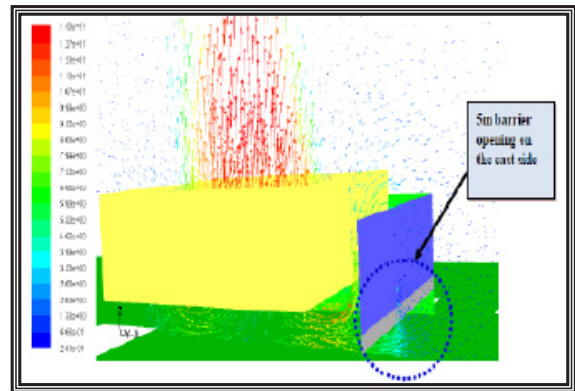


Research Assignment

Design Simulation Study of Air Cooled Condenser System at Gelugor Power Station for Performance improvement



Gelugor Station Air Cooled Condenser



Computer Model of Gelugor ACC

Project Overview

Gelugor Power Station is a combined cycle plant rated at 330 MW. Due to the deterioration in Air Cooled Condenser (ACC) performance, the plant output was restricted to about 295 MW. In this project, the main research activities start with gathering of data such as operation data, environmental data and physical layout data. Then, the study is conducted via detailed analysis using Computational Fluid Dynamics (CFD) and heat balance methods. CFD results show that the fans' flow rate can be increased by 0.57% – 5.3% by opening parts of the barrier with variable sizes. On the other hand, based on heat balance analysis, the measured pressure after the fans indicated air blockage across the condenser fins whereby the discharge capacity dropped by about 6% (~560m³/s). The project has been successfully completed within four months with the following recommendations:

1. To do offline cleaning for the condenser fins and heat transfer surfaces. This is to reduce Terminal Temperature Difference (TTD) to its design value, i.e. 8.1oC.

2. To re-commission online fins cleaning mechanism. This is to delay the heat transfer performance degradation.
3. To open the selected sound barrier.
4. To clean condenser fans in order to increase the fans' efficiency.
5. To install temperature probes for measurement of air temperature after the heat exchanger. The purpose of capturing this data is to monitor TTD as it indicates ACC performance.

Deliverables

- The deliverable of the project is the final report with the necessary recommendations.

Benefits

The station can increase its generation by approximately 10MW to 308 – 309MW. The main issue to be addressed is cleaning of all ACC condenser fins. The cleaning of ACC fins will improve the steam turbine output by approximately 3.5MW and the gas turbine output by 3.5MW.