Abstract Details

Title: Integration of Steam Cycle to Enhance the Efficiency of Power Plants

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Abstract: The continuous and simultaneous increases in energy price and energy consumption have motivated researchers for further operation improvement. The steam power stations as a part of power plant require a sophisticated study and development. This work is aiming to improve the steam power stations systems to be more efficient The main idea of this study is combining the reheat and regenerative cycles of steam to have a new cycle (reheat-regenerative cycle). The combination of such cycles has been conducted in three different ways. The data for analysis the proposed combined cycles was taken from Garri Thermal Power Station. The produced shaft work from the turbine is calculated using Willian's Line Equation Consequently, the efficiency has been calculated for each pattern of combined cycles and compared to choose the best one. From three combined cycles, it is found that the highest efficiency could be obtained when combining the normal reheat cycle with the normal regenerative cycles. It is found to be more than 90% compared to 80% and 85% of reheat and regenerative respectively. Moreover, the effect of changing the steam flow rate has positively effected on the cycle efficiency. Further work should be carried out on the economic study of the systems. Also the effect of fuel switching could be studied for the suggested combination on steam cycles.

Keywords: Steam Cycles, Efficiency of Power Plants, Regenerative Cycles, Reheat Cycle (Reheat-Regenerative Cycle).