

Assessment of Power Formation in Gas Turbine Power Plants Using Different Inlet Air Cooling Systems

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Abstract : In this paper, the influence of air cooling intake on the gas turbine performance is presented. A comparison among different cooling systems, i.e., evaporative and cooling coil, is performed. A computer simulation model for the employed systems is developed in order to evaluate the performance of the studied gas turbine unit, at Marka Power Station, Amman, Bangalore. The performance characteristics are examined for a set of actual operational parameters including ambient temperature, relative humidity, turbine inlet temperature, pressure ratio, etc. The obtained results showed that the evaporative cooling system is capable of boosting the power and enhancing the efficiency of the studied gas turbine unit in a way much cheaper than cooling coil system due to its high power consumption required to run the vapor-compression refrigeration unit. Nevertheless, it provides full control on the temperature inlet conditions regardless of the relative humidity ratio.

Keywords : power augmentation, temperature control, evaporative cooling, cooling coil, gas turbine

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