

## **EFFECT OF COOLING TOWER ON PERFORMANCE OF DG POWER PLANT**

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### **Abstract**

Since the DG power plant efficiency analysis considers the quantity of useful electrical energy, it does not consider the performance of the auxiliary systems of the plant. Engine may be efficient but the efficiency may go down due to either the auxiliary heat load removal system is not able to remove the heat load or not as per design. Therefore, study and analysis of the factors which leads to lower performance of the Diesel Generator (DG) plant has been done. In this paper, the efficiency of the Heavy duty furnace oil operated DG power plant is analyzed in order to find out the various factors affecting the engine de-rating. Those are ambient temperature, cooling water temperature, altitude and charge air temperature. Programmable Logical Controller (PLC) receives the input values of those factors and de-rates the engine to the maximum permissible output of the engine. From plant data, Cooling water temperature at inlet to charge air cooler and ambient temperature found as the major contributor for engine de-rating as compared to charge air temperature. Study shows that the temperature of Low Temperature (LT) water depends on Cooling tower outlet water temperature. High LT water temperature results in increase in engine de-rating, which reduces the maximum allowed engine power output by PLC. It is concluded, after the detailed study of cooling water system of cooling tower and engine de-rating system, that the cooling tower is not capable for removal of heat load as per the design. Hence the cooling tower was redesigned and modifications were implemented in fan air system & Fills area. Cooling tower (CT) performance on engine test conducted and the results are compared, Improvement of 3-4% in power output is recorded.

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**Keywords :** Engine de-rating, diesel engine, Cooling Tower.

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