Modeling and Optimization of Chiller System

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Chiller system(Chiller&Cooling Tower) is an essential utility to be used in a variety of processes in LCD(Liquid Crystal Display) production industry. Since the demands for chiller system fluctuate largely from moment to moment, it is common to supply chilled water with a number of small-capacity chiller systems rather than few large-capacity ones. In order to meet the varying demands, operation conditions of chiller systems change at every second and hence the efficiency of chiller systems is low. To find optimal operating strategy of such chiller system network, first, a hybrid modeling technique of ideal model and empirical model is developed to predict efficiency and power consumption of each chiller system in the network. Then, a constrained optimization procedure is applied to search optimal operating conditions. The proposed method was applied to actual off-line data of LCD production industry and about 1~5% of annual power consumption was saved by optimization.