



# ENERGY SAVING IN A LARGE AIR CONDITIONING SYSTEM BY USING AN AUTOMATIC CHILLER CONTROL SYSTEM. CASE STUDY: A SHOPPING CENTER

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**Abstract.** The energy consumption of air conditioning system is approximately 45% of the total energy consumption in a shopping center. Therefore, chiller operation control is important for energy saving in the large central air conditioning system. In conventional control, the change in air-condition load will effect the air handling unit chilled water flow rate and then the chiller load in order to maintain room air temperatures. This conventional control has a long response time to the load change causing the wide band of air temperature fluctuation in air-conditioned area and consuming more electrical energy in chiller operation. This paper presents the use of an automatic control system working with room air temperature sensors in air-conditioned area to assist the conventional control system of chillers operation at shopping center. This automatic control system uses air temperature sensors installed in air-conditioned areas to limit chiller load target directly. This automatic control system could reduced response time causing the narrow band of local air temperature fluctuation. The root mean square of air temperatures were reduced 0.0, 0.16 and 0.43 °C of Cinema area, Shopping area, and food center area respectively. With the aid of this automatic control for continuous monitoring of all temperatures in the air conditioning areas, the air handling unit temperature control set points of Cinema area, Shopping area, and food center area were changed to the new target values which were 24.5, 25.3 and 25.3 °C respectively. After applying this automatic control, the electrical energy consumption per day was reduced by 25.8 %.

**Keywords:** Automatic control system, chiller, Temperature fluctuation, Energy saving.