



Energy audit and evaluation of indoor environment condition inside Assiut International Airport terminal building, Egypt

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Abstract:

Large space buildings, such as airport terminal buildings, consume high energy due to the cooling demand; especially in hot arid climates; to achieve passenger thermal comfort. Evaluation of thermal environment and energy analysis inside airports is an important issue, in terms of reducing energy and controlling indoor environments. This work aims to analyze electrical energy consumption and the indoor environment of the terminal building at Assiut International Airport, Egypt as a case study. Indoor environmental conditions, and energy consumption with HVAC systems, were monitored inside five multiple functional zones within the terminal building (Departure hall, Public area, Duty-free hall, Gate, and Arrival hall) during summer (August 2017). The indoor environmental parameters monitored include: temperature, relative humidity, and illuminance. The results indicate the HVAC system consumed the largest portion (70%) of the overall building electricity demand, and the Energy Use Intensity (EUI) of ATZ terminal building is 300 kWh/m²/year. Also, indoor temperatures were found to be within the acceptable range of comfort, with a high energy consumption of 6,000,000 kWh for the year 2017. A significant reduction of monthly energy consumption was achieved based on increasing HVAC set temperature from 25 °C to 27 °C; a reduction equal to 24.5% of total energy consumption during the hot months. The results of this study help search for sustainable solutions for reducing energy consumption and improving passenger thermal comfort inside the terminal building (phase 2)

Keywords:

Indoor environment Terminal building Thermal comfort Electrical energy consumption Thermal image Illuminance

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