

Abstract

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Numerical and Field Study of the Effect of Air Velocity and Evaporation Rate on Indoor Air Quality In Enclosed Swimming Pools

The aim of this work is to investigate the effect of air velocity and swimming pool evaporation rate on the indoor air quality inside enclosed swimming pools using CFD modeling, in combination with field study on existing facility. Also in order to determine the mass flow rate of water evaporation for dimensioning the ventilation system in indoor swimming pools. The steady state two-dimensional and three-dimensional CFD simulations were carried out based on water evaporation rate and air conditioning supply air velocity. CFD enable the detailed information of air flow, temperature, and humidity distributions in the hall due to different evaporation rates and different air conditioning supply air velocity. The simulation results showed that the supply air velocity and temperature have great effect on the rate of evaporation, optimizing these two parameters could enhance the indoor air quality inside enclosed swimming pools. On the other hand increasing the supply air velocity resulted in a reduction in relative humidity within enclosed swimming pools.