Abstract

The entire history of shelter engineering shows the man’s ability to find adequate building designs to maintain indoor thermal conditions to which man could be best adapted, depending on the climatic conditions and available materials. Despite that these aspects have been sometimes forgotten in the modern architecture, where the comfort conditions are substantially maintained by mechanical heating and cooling systems.

Because of several oil crises, climate change and the sudden increase of electricity consumption due to the rise in the number of air-conditioning systems in southern European countries, the need of strategies that reduce cooling thermal loads is becoming mandatory.

Thermal mass can represent a solution, offering to architects the opportunity to manage thermal energy flows of a building with a positive effect on the indoor conditions during summer and winter periods.

This work shows the possibilities of managing thermal mass in buildings and focuses in one of its particular application to reduce cooling energy and peak cooling loads: the night cooling. The activation of thermal mass through hollow core slabs is also analyzed and the thermal behavior of a massive office space with different conditions of ventilation strategies and internal loads in different locations is simulated through the IDA ICE 4.0 software.