

Project no. 335-020

Comfort and load balancing with energy-efficient cooling with thermoactive structures

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This project produces a model of a thermoactive floor structure based on a recently developed sandwich casting technique. This model is measured in order to document whether a satisfactory indoor climate can be achieved with an air conditioning system which makes it possible to save up to 75 % of electricity consumption for cooling.

Results:

This new technology utilises the temperature fluctuations of the daytime so that the chilly night air is accumulated in the concrete floors of buildings in order to cool the premises during the warm hours of the day. This considerably reduces electricity consumption for mechanical ventilation and cooling.

Laboratory tests and theoretical calculations show that cooling using thermoactive structures is sufficient to maintain the required comfort level while the building is in use. In buildings with glass façades, this structure can ideally be used for basic tempering and with convectors for supplementary heat. This saves 75 % of the electricity consumption for mechanical ventilation and cooling without jeopardising comfort.

If executed correctly, this system can lead to electricity consumption savings of 85 % without the construction work needing to be more expensive, and the potential for use is enormous.