

## EFFECT OF MOISTURE ON THE ENERGY CONSUMPTION OF BUILDINGS

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**ABSTRACT** - Analysis of heat and mass transfer through structure is of great importance to rationalize energy consumption in buildings.

This paper presents a study of transport of moisture in the porous structure that is usually neglected for computing building energy. It shows that the transfer of moisture through building materials, such as concrete, plaster, clay and brick depends on the complex morphological characteristics of the pores in these materials.

Heat and moisture migration is modeled using a continuous approach. This last is based on a description of the system as a fictitious continuum by using effective coefficients.

Sorption isotherm is applied in the model.

The non linear partial differential equations of the mathematical model calculate material moisture saturation and temperature as a function of position and time.

The procedure adopted for their solution consists basically of discretizing the spatial variable according to the control volume method.

Results show that:

- heat losses increase with an increase in moisture;
- moisture has become an important parameter to predict the thermal properties;
- Distribution of moisture depends on several parameters, such as permeability, voids and cracks present in building material (concrete, brick) and also upon the climatic conditions and humidity present in the atmosphere.

**Key words**

Energy – building – moisture transport – heat transfer – concrete – brick – clay – plaster.