EFFECTS OF MATERIAL MOISTURE ADSORPTION AND DESORPTION ON BUILDING COOLING LOADS

P. FAIREY
Program Director
Florida Solar Energy Center
Cape Canaveral, FL

D. KOSAR
Gas Research Institute
Chicago, IL

ABSTRACT

Moisture adsorption and desorption (MAD) by internal building materials and furnishings can be significant in buildings. For many building cooling strategies, MAD may have overriding effects on building cooling loads. For example, natural ventilation of buildings in hot, humid climates has been shown to induce higher latent loads and higher room relative humidities during periods following the ventilation.

Even the most sophisticated public domain building energy analysis programs cannot accurately predict these building moisture phenomena. In October 1986, a cooperative research effort between the Gas Research Institute (GRI), U.S. Department of Energy (DOE), Florida Power and Light (FPL), and the Florida Solar Energy Center (FSEC) was initiated to study moisture transport in buildings. One of the objectives of this project is the development of computer algorithms that accurately describe the behavior of moisture in building, materials and systems.

During the initial year of the project, a comprehensive search of the world literature has been completed. Moisture property data have been collected and compiled in computer friendly formats, and six major theories of combined heat and moisture transport have been identified. Each of the theories requires data that are unique to that theory.

The paper will present a synopsis of the need for building moisture transport research, a discussion of results to date, and efforts to incorporate MAD algorithms in existing public domain software.

Proceedings of the Fifth Symposium on Improving Building Systems in Hot and Humid Climates, Houston, TX, September 12-14, 1988