21CR Project 611-40076

Simulating the Performance of Natural and Hybrid Ventilation Systems in U.S. Office Buildings

Updated 4 March 2005

Objectives:

To investigate the potential energy and indoor environmental performance of natural and hybrid ventilation alternatives in low- to mid-rise U.S. commercial buildings in a range of U.S. climates. Performance aspects to be investigated include ventilation and space conditioning (primarily cooling) energy savings, ventilation rates, air distribution, thermal comfort, humidity control, and operating economics.

What information/items will result from this project:

Comparative performance on mechanical, pure natural, and hybrid ventilation systems in U.S. office buildings in terms of ventilation rates, energy consumption and indoor air quality. Also, preliminary recommendations on when and how to apply natural and hybrid ventilation approaches in different U.S. climates and how to improve their performance through the incorporation of fans, heat recover and filtration.

How are the results likely to be applied:

The results will potentially be applied by HVAC system designers to apply modern natural/hybrid ventilation concepts and technologies and by HVAC equipment manufacturers to develop and manufacture new products targeting the natural/hybrid ventilation market. Preliminary recommendations on natural and hybrid ventilation system control strategies and will be related to the requirements of ASHRAE Standard 62. Results will be of value to manufacturers of HVAC system controls, humidity control equipment, and energy recovery ventilation systems.

Research Subcontractor:

National Institute of Standards and Technology (NIST), Gaithersburg, MD (Principal Investigators: Steven J. Emmerich, Ph.D., and Andrew K. Persilly, Ph.D.)

Status:

The project was concluded and the final report approved for release. The final report is available for free downloading from the ARTI website

Responsible 21CR Subcommittee: System Integration & Indoor Environmental Quality