Session XIII-B: Windows

Thursday, December 9, 2004
10:30 p.m. to 12:00 p.m.
Grand Ballroom – Palm

Session Chair:

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10:30 p.m. to 10:40 p.m. Introduction
Alex McGowan

10:40 p.m. to 11:00 a.m. *"Decision-Making Framework for Selection and Design of a Shading Device Based on Daylighting Performance"*
Svetlana Olbina

11:00 a.m. to 11:20 a.m. *"Measured Cooling Load, Energy, and Peak Demand Savings from High-Performance Glass in a California Production House"*
Bruce Wilcox

11:20 p.m. to 11:40 p.m. *"Relative Heating Performance of High and Low SHGC Glazing in Production Homes"*
James Larsen

Decision-Making Framework for Selection and Design of a Shading Device Based on Daylighting Performance

Svetlana Olbina – *University of Florida*

Yvan Beliveau – *Virginia Polytechnic Institute and State University*

Application of existing shading devices is limited to protection from overheating and glare and providing privacy. A lack of guidance for appropriate selection and design of the shading device in the windows leads to unsatisfactory performance of the shading device.

The paper explains research that looks to improve performance of a shading device by developing a decision-making framework for selection and design of the shading device systems based on daylighting performance. Goals are to determine daylighting performance required for the shading device and variables that influence shading device daylighting performance and to develop and validate decision-making framework for selection/design of the shading device based on its daylighting performance. A decision-making framework can help designers of the buildings, together with the clients, to select the most appropriate shading device based on daylighting performance and shading device manufacturers to do appropriate design of the new shading device system with improved daylighting performance.

Measured Cooling Load, Energy, and Peak Demand Savings from High-Performance Glass in a California Production House

Bruce A. Wilcox

James Larsen – *Cardinal Glass Industries*

In the spring of 2000, two identical new homes were purchased from a local production builder in a bedroom community near Sacramento, California. Both homes came equipped with clear double glass. After a series of careful measurements to ensure the houses were really identical, all the glass in one home was replaced with high-performance, low solar gain, low-emmissivity (LSLE) glass. During July of 2001, the air-conditioning system in the house with LSLE was downsized by one ton (from 12.3 kW to 8.8 kW, or a 3.5 kW reduction) to demonstrate the real cooling load savings from the glass. The two unoccupied homes were kept comfortable and monitored with extensive hourly data for over a year to document the energy and peak demand savings from the high-efficiency glass. The house with LSLE glazing and reduced air-conditioning capacity met the cooling load and saved 25% of the cooling kWh and over one-third of the air-conditioning system peak demand (1.8 kW less) compared to the house with clear double glazing.

Relative Heating Performance of High and Low SHGC Glazing in Production Homes

Bruce A. Wilcox

James Larsen – *Cardinal Glass Industries*

Experiments comparing the performance of alternative glazing systems in identical new homes in California and Texas have suggested that low solar heat gain, low emmissivity (LSLE) glazing saved heating energy compared to glazing systems with higher U-factors and higher solar heat gain coefficients. However, simulations of these houses using site-measured data predict the LSLE glazing will use more heating energy, which suggested that current simulation models and/or their assumptions do not correctly predict the relative performance of these glazing systems. A third experiment in Fort Wayne, Indiana, which includes four identical houses with replaceable glazing, is now underway to explore this issue with greater technical rigor in a severe heating climate.