Session VI-B: Basements

Tuesday, December 7, 2004
1:30 p.m. to 3:00 p.m.
Grand Ballroom - Palm

Session Chair:

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1:30 p.m. to 1:40 p.m. Introduction
Bill Rose

1:40 p.m. to 2:00 p.m. *"Field Performance of Different Interior Basement Insulation Systems"*
Marc Zuluaga

2:00 p.m. to 2:20 p.m. *"Moisture Performance of Closed Crawlspaces and their Impact on Home Cooling and Heating Energy in the Southeastern U.S."*
Cyrus Dastur

2:20 p.m. to 2:40 p.m. *"Thermal and Moisture Performance of Two Unvented Crawlspace Wall Systems"*
Dan Cautley

Field Performance of Different Interior Basement Insulation Systems

Marc Zuluaga, Robb Aldrich, and Dianne Griffiths – *Steven Winter Associates*

With the support of the Department of Energy's Building America Program, the Consortium for Advanced Residential Buildings (CARB) conducted a field evaluation of different interior basement insulation strategies in response to many documented cases of moisture accumulation in these types of systems. Equipment was installed to monitor temperature and relative humidity throughout eight assemblies installed side-by-side in the basement of a Chicago area home to assess their moisture performance. This effort was undertaken to gain a greater understanding of the moisture transport mechanisms present in interior insulation systems to aid in the design and implementation of durable, safe, and effective alternatives. Findings indicate that often overlooked construction details can be critical to moisture performance. Exterior insulations systems, though preferable from a moisture standpoint, were not investigated since the extra cost and complications associated with such systems make them relatively unpopular among home builders.

Moisture Performance of Closed Crawlspaces and their Impact on Home Cooling and Heating Energy in the Southeastern U.S.

Bruce Davis and Cyrus Dastur – *Advanced Energy*

This study compared the performance of closed crawlspaces, which had sealed foundation wall vents, a sealed polyethylene film liner, and 1.0 ft3/min (0.5 L/s) of HVAC supply air for each 30 ft2 (2.8 m2) of crawlspace ground surface, to traditional vented crawlspaces with wall vents and polyethylene film covering 100% of the ground surface. The study was conducted at 12 owner-occupied, all-electric, single-family detached houses with the same floor plan located on one cul-de-sac in the southeastern United States. Using the matched pairs approach, the houses were divided into three study groups of four houses each. Comparative moisture measurements for these crawlspaces and submetered heat pump kWh use were recorded. Findings supported that for the humid conditions of the southeastern United States, properly closed crawlspaces were a robust measure that produced substantially drier crawlspaces and significantly reduced occupied space conditioning energy use on an annual basis.

Thermal and Moisture Performance of Two Unvented Crawlspace Wall Systems

Dan Cautley – *Cautley Engineering*

The thermal and moisture performance of the wall systems in two unvented residential crawlspace foundations built in Pennsylvania is characterized in this paper. Both wall systems include drainable exterior insulation and concrete block walls with interior insulation in some areas. The results indicate that nonconductive heat loss resulting from air leakage or internal air circulation can affect thermal performance and may greatly increase heat loss. Normalized seasonal heat loss estimated at measurement locations ranged from 1,634 to 5,736 Btu/ft2 (18.56 to 65.16 MJ/m2). Absolute humidity was generally higher in the crawlspaces than in outdoor air, and in one of the two homes, the block wall acted as a humidifier throughout the year. Temperature and humidity conditions that could support mold growth were present on crawlspace wall surfaces in both homes for significant time periods, although no mold was observed in either home.