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By John Burrows

This article presents highlights from the NRC-IRC housing activities report prepared for the 2010 annual conference of the Canadian Home Builders' Association.

Building Envelope and Structure

Window/Wall Interface Details for Managing Rainwater and Air Leakage: The evaluation of the condensation risk at the window frame with various installation details subjected to low temperatures and air leakage across the interface has been completed. Several articles, including one in *Home Builder*, along with two major reports, have been published. Further information is available at:
http://www.nrc-cnrc.gc.ca/eng/ibp/irc/ci/volume-11-n2-1.html

Heat, Air and Moisture Movement in Wall Assemblies: The NRC-IRC wall research house is the site of studies of innovative wall assemblies. In the winter of 2009, one project investigated the potential for wintertime moisture accumulation when XPS foam was added as external insulation over an insulated wood-frame assembly. A second project investigated the performance of a wood-frame wall with and without the designated polyethylene vapour barrier. Information is available at:
http://www.nrc-cnrc.gc.ca/eng/projects/irc/innovative-systems.html

The Indoor Environment

Indoor Air Initiative: In 2009, NRC-IRC commissioned its new full-scale laboratory for research on air quality and ventilation. Initial experimental work is examining air supply, air distribution and air movement within residential buildings in support of an indoor air quality field study in the homes of approximately 100 families with asthmatic children. The objective is to improve understanding of the impact of ventilation and air distribution on indoor air quality.

Hybrid Heating and Ventilation Systems: Researchers are currently running experiments investigating the effectiveness of ventilation when diffusers are placed in non-traditional locations (i.e., not under windows). The results will quantify the difference in performance in terms of ventilation effectiveness, predicted occupant comfort and energy use. Reports and published papers are available at:
www.nrc-cnrc.gc.ca/eng/ibp/irc/publications/index.html

Indoor Air Quality Technologies and Solutions

This project is evaluating ways of removing air contaminants and improving indoor air quality. Portable air cleaners (PAC), commercial air duct cleaning (DC) and heat/energy recovery ventilators (H/ERV) are scheduled for study. More information is available at: http://www.nrc-cnrc.gc.ca/eng/projects/irc/innovative-systems.html

Mould Research
This research project is addressing three issues: mould-detection techniques, the potential for mould growth on building materials and components, and remediation methods. New laboratory facilities for the study of mould growth on building materials were commissioned in 2009; in 2010, the first experiments will begin.

Developing and Demonstrating Zero-Peak Houses
NRC-IRC has begun a project that will explore the potential to reduce household electricity use dramatically, perhaps to zero, through more efficient house design and appliances, shifting demand to off-peak times with advanced controls, changes in occupant behaviour, and local power generation and storage. For details, see: http://www.nrc-cnrc.gc.ca/eng/projects/irc/zero-peak.html

Guidelines for Effective Solar Shading Devices
Researchers have completed the development of guidelines for the effective use of exterior, between-pane and interior, highly reflective shading devices for residential windows. These will be available soon. Published articles can be downloaded from:
http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/nrcc51405.pdf
http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/nrcc51256.pdf

Fire Safety

Performance of Protected Ceiling/Floor Assemblies in Basement Fire Scenarios
The objective of this new project is to study the fire performance of engineered ceiling/floor systems protected by measures such as gypsum board, sprinklers or other protection systems. The results will help to better understand how innovative construction products and systems affect the fire safety of occupants in single-family houses.

Smoke Movement Studies in a Dwelling with a Secondary Suite
NRC-IRC recently completed smoke movement studies in a residential building with a secondary suite located in the basement. The results formed the basis of changes to Part 9 of the National Building Code. The full report is available on the NRC-IRC website:
http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/rr/rr297.pdf

Development of the National Construction Codes

The final public review of proposed changes for the 2005-2010 code cycle was completed. Major changes include: provisions to provide additional protection from the ingress of radon into buildings; a new harmonized window standard for windows, doors, and skylights; a three-level risk-based approach for design for lateral loads; and additional fire protection requirements for construction of buildings and houses in close proximity to one another or close to the property line.

Following consultations with the provinces and territories, a decision was made to establish energy efficiency as a new objective in the National Construction Codes.

Construction Materials Evaluation

A survey of Canadian building officials and manufacturers yielded insights on the services offered by the NRC Canadian Construction Materials Centre (NRC-CCMC). Suggested new fields for evaluations include energy efficiency, water conservation, and sustainability. NRC-CCMC is analyzing the survey findings to determine changes needed to better meet client expectations.

Canadian Centre for Housing Technology

In 2009, the Canadian Centre for Housing Technology (CCHT) carried out a number of experiments including the following: evaluation of an advanced integrated mechanical system (combined space-heating, hot water heating and heat recovery ventilation); study of a Stirling hybrid forced-air system; evaluation of a novel design of residential water heater; study of an air source heat pump. Projects for 2010 will address the following: ultra-high efficiency solar cells; water recirculation loop; gas fireplace operation in an open-concept R-2000 home; solar thermal heating. More information on CCHT is available at:
http://www.ccht-cctr.gc.ca

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