



## CIB NEWS ARTICLE

International Council for Research and Innovation  
in Building and Construction

Providing a global network for international exchange and cooperation in research and innovation in building and construction, in support of an improved building process and of improved performance of the built environment.

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### Full Member Profile



## Institute for Research in Construction National Research Council of Canada Celebrates its 60<sup>th</sup> Anniversary

Canada's National Research Council (NRC) established its Division of Building Research in 1947. The objective was to provide a research service to the construction industry and technical support to Canada's national housing agency in its efforts to facilitate the development of affordable and safe housing for a growing population in the post-war years. Another key role for the new division was to coordinate the ongoing development and advancement of the National Building Code of Canada, first published in 1941. This combination of research and regulatory support within one organization proved pivotal in bringing building science to bear on the challenges of building in a large country challenged by a diverse climate and geology and an industry consisting mostly of small- and medium-sized firms.

The Division was renamed the NRC Institute for Research in Construction (NRC-IRC) in 1986. Today NRC-IRC is at the forefront of construction research in Canada, addressing the design, construction and operation of buildings and infrastructure. As well, it

continues its national coordinating role in the advancement of the country's regulatory system.

### Research

NRC-IRC research emphasizes innovation and collaboration with industry through consortium projects and client-driven research focused on issues with high economic impact. As in other countries, sustainability, energy efficiency, and health and wellness are key drivers. The research is organized into four programs:

**Building Envelope and Structure:** the development of technologies for the design, construction and operation of durable, energy-efficient and cost-effective building envelope systems. The research has three components:

*Heat and Moisture Performance of Envelopes:* the study of materials and systems, design approaches, installation methods, interior and exterior

environments, and their effects on envelope performance and durability.

*Performance of Roof Systems and Insulation:* technologies, test procedures and innovative approaches to improve the structural, wind and thermal performance of roofing systems and the performance of insulation.

*Concrete Materials and Structural Technologies:* research to enhance the performance and sustainability of concrete, including new studies at the nanoscale.



*Dynamic wall testing facility for studying the effect of wind-driven rain on full-scale wall sections.*

**Indoor Environment:** the development of technologies, tools and guides for the design and operation of cost-effective, energy-efficient indoor environments that optimize the comfort, satisfaction and health of building occupants. There are three sub-programs:



*One of the chambers in the new NRC-IRC flanking research facility.*

*Lighting:* energy efficiency, lighting quality, controls, daylighting, and the effects of lighting on occupants.  
*Ventilation and Indoor Air Quality:* ventilation systems, thermal conditions, air movement patterns and contaminant concentrations in buildings.  
*Acoustics:* sound resistance of wall and floor assemblies in residential construction and acoustical performance of workplaces and other spaces.

**Fire Research:** focused on the fire safety design of buildings and transportation systems, and a reduction of the risks and costs associated with fire. Supporting the construction industry's move to performance-based fire safety design, the program addresses two main fields:



*Full-scale experiment on the fire resistance of gypsum board.*

*Active Fire Protection and Materials Properties:* fire detection, fire suppression and smoke management, and the properties of materials as they relate to the fire performance of systems and assemblies.

*Fire Resistance and Risk Management:* the fire resistance of structural elements, characterization of

real fires and the various parameters considered in assessing fire risks and human behaviour in fire emergencies.

**Urban Infrastructure:** the development of models, technologies and tools for the performance prediction, design, rehabilitation, evaluation, and management of infrastructure systems. The research focuses on two elements:

*Buried Utilities:* the performance of transmission and distribution water mains, and small- and large-diameter sewers and drainage pipes; models and technologies to evaluate the condition of buried pipes.

*Concrete Structures:* technologies and decision-support tools to predict the life cycle performance of new and rehabilitated concrete infrastructure systems (mostly bridges), and to optimize their life cycle design, construction and maintenance.



*An engineer works on an infrastructure research set-up.*

While its core research program is based in Ottawa, NRC-IRC also operates the Centre for Sustainable Infrastructure Research in western Canada along with a group in southern Ontario currently addressing construction productivity issues. As well, NRC-IRC partners with two federal agencies in the operation of the Canadian Centre for Housing Technology, for which it provides research management services.

### Support to Canada's Regulatory System

NRC-IRC support to the regulatory system across Canada consists of two activities: a coordinating role in code development and the evaluation of innovative products against the requirements of codes. These activities are organized as follows:

**Canadian Codes Centre:** the Centre works with the provinces and territories in the development of Canada's model national construction codes, with the objective of advancing the country's building

regulatory system, promoting consistency in code requirements, and encouraging interprovincial trade. Central to its work is the provision of technical and administrative support to the Canadian Commission on Building and Fire Codes (CCBFC), which has responsibility for and publishes the national model codes such as the National Building Code.

**Canadian Construction Materials Centre:** this group carries out technical evaluations of innovative materials, products and systems for buildings, facilitating their code acceptance. It also provides technical support to proponents who wish to obtain evaluations in other countries. An increasing role is to help industry evaluate alternative solutions allowed under the objective-based format of the 2005 national codes.



*An evaluation officer with some innovative building products.*

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