The energy efficiency of new buildings in Canada will be significantly better in the future thanks to the soon-to-be-released National Energy Code of Canada for Buildings 2011 (NECB).

Once adopted by the authorities having jurisdiction, the NECB will yield significant savings in energy costs of typical buildings, resulting in long-term benefits for both Canada’s economy and the environment. For the first time, the new code places Canada on a comparable footing with most countries that lead the world in energy-efficient building construction.

In releasing the NECB, which is 25% more energy efficient than the current Model National Energy Code of Canada for Buildings 1997, the Canadian Commission on Building and Fire Codes (CCBFC) fulfills the energy code performance target expressed by federal, provincial, and territorial government leaders. The technical requirements of the NECB also accommodate the many new technologies and construction practices that have emerged in Canada over the past 15 years.

The new code contains close to 245 technical changes to address a host of issues such as: the building envelope; lighting; heating, ventilation and air-conditioning; service water heating; electrical power systems and motors; and building energy performance compliance.

The NECB is an objective-based code; it also offers compliance flexibility, meaning that engineers, architects and designers can follow multiple paths to ensure that their proposed building designs are compliant. Performance ratings for two of the compliance paths can be demonstrated through the use of special software that will soon be available on the Natural Resources Canada (NRCan) website.

The new code is the result of an extensive consultation process involving stakeholders from Canadian industry, multiple levels of government (federal, provincial, territorial and municipal), the construction industry, and the general public. It was developed by the CCBFC, with technical support and funding provided by the National Research Council of Canada and NRCan as part of its commitment to improving the energy efficiency of Canadian buildings and reducing greenhouse gas emissions.

The NECB will be published on November 18, 2011. It will be available in print in a full-size binder format and electronically via online subscriptions or as a downloadable PDF document. Free online presentations explaining the major changes in the NECB are scheduled to be made available on the National Codes website in December 2011.

To pre-order a copy, please visit the NRC Virtual Store starting September 30th, 2011.

**HIGHLIGHTS**

- Earthquake resistance provisions 2
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- Long-life bridges 13
The devastating earthquake that rocked Japan on March 11, 2011 generated numerous inquiries to the NRC Institute for Research in Construction Canadian Codes Centre with regard to the magnitude of earthquake that Canadian buildings are designed to withstand. There is no simple answer to this question, as the effect on a particular building depends on an earthquake’s magnitude, its distance from the building, and the building’s characteristics.

The recently published National Building Code of Canada 2010 (NBC) incorporates several new technical requirements to ensure that Canadian buildings are protected. They include prescriptive requirements in Part 9 (dealing with housing and some small building types) that provide for adequate lateral load resistance through the use of braced wall panels, as well as fastening and framing based on local seismic conditions that apply primarily to high risk areas, mainly the Pacific coast of British Columbia.

\[ \text{...the effect on a particular building depends on an earthquake's magnitude, its distance from the building, and the building's characteristics.} \]

Revisions made to requirements in the NBC for Part 3 buildings (dealing with all other types and sizes of buildings) address building site properties, irregularities, steel structures, static and dynamic procedures, and diaphragms. A quadratic equation was used to determine spectral acceleration values for Canada’s different zones to improve the fit of seismic data.

The following examples provide some guidance regarding the degree of protection for buildings in Canada’s three largest cities. In Montreal, where the probability of an earthquake greater than magnitude 7.5 is small, high-rise structures are designed to withstand magnitude 7.0 earthquakes that are at least 30 km away. In Toronto, highrisers are designed to withstand magnitude 7.0 events no closer than 50 km, while short structures are designed to withstand 6.0 magnitude earthquakes at least 30 km distant.

In Vancouver, although the expected shaking from three sources of earthquakes (continental North American plate, subducting Juan de Fuca plate, and the Cascadia subduction zone) must be taken into account, it is only Cascadia subduction zone earthquakes that result in magnitude 9 events such as the one that struck Japan. These occur in the vicinity of Vancouver Island, roughly 140 km from Vancouver, and their effect is diminished by distance. Consequently, structures in Vancouver are only required to withstand 7.0 magnitude events that are at least 50 km distant.

For more information, contact Cathy Taraschuk at 613-993-0049.
A case of potential ambiguity in the National Building Code of Canada 2010 (NBC) relating to earthquakes and the structural design of building envelope components was recently brought to the attention of the Canadian Commission on Building and Fire Codes (CCBFC). For reasons of safety, the CCBFC made changes to Sentence 5.2.2.1.(2), and its corresponding Appendix Note and approved them for immediate release.

The concern with the original wording was that users might misinterpret it to mean that structural components associated with the building envelope do not need to be designed for earthquake resistance unless the building is classified as a post-disaster building. The Sentence has been reworded to make it clear that the earthquake design of all structural components associated with the building envelope must conform to Article 4.1.8.18. of the NBC. These changes will be included in the first series of errata and revisions to the NBC 2010, scheduled to be published in the fall of 2012.

For information on downloading replacement pages for the NBC 2010 or updating the electronic version of this Code, please visit the National Codes website.

For more information, contact Cathy Taraschuk at 613-993-0049.

Now available!
User’s Guide – NBC 2010, Structural Commentaries (Part 4 of Division B)

The User’s Guide – NBC 2010, Structural Commentaries (Part 4 of Division B) is intended to help Code users understand and apply the design requirements provided in Part 4 of Division B of the National Building Code of Canada 2010 (NBC). This practical guide contains valuable background information and, in some cases, provides guidance regarding certain design questions. The new edition reflects technical changes incorporated into the NBC and provides additional material on issues likely to be addressed in the next edition of the Code. Topics addressed by the revised material include the intent of the post-disaster building classification; live loads due to use and occupancy; extensive material to support the changes related to earthquake design; and more detailed figures for snow loads on buildings.

This Guide is published by the National Research Council of Canada under the authority of the Canadian Commission on Building and Fire Codes and is offered in a practical 8.5x11 soft cover book, as a downloadable PDF file, or through a Web-based subscription service (10-day, 1-year or 5-year).

To order a copy, visit the NRC Virtual Store or complete the order form.
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| National Building Code 2010 | $275 | $600 |
| National Fire Code 2010 | $190 | $200 |
| National Plumbing Code 2010 | $165 | $600 |
| Practical 2010 NBC User’s Guide: Structural Commentaries (Part 4) | n/a | n/a |
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REVISED SEPTEMBER 2011
This year’s annual fall public review relating to the National Model Construction Codes will deal primarily with proposed changes to the 2010 edition of the National Building Code (NBC) as well as to the National Fire Code (NFC) and the National Plumbing Code.

The proposed changes to the NBC will address issues related to locking devices on doors in care and treatment occupancies, standards referenced in Part 5, minimum separation distances of exhausts and outdoor air intakes, fasteners driven with power tools as well as clarification of anchorage requirements for buildings on surface foundations. Other proposed changes will clarify a number of requirements in Parts 3, 4 and 5 of the NFC and in the NPC.

Proposed changes to incorporate energy efficiency for houses and small buildings into Part 9 of the 2010 NBC are scheduled to be submitted to public review in the winter 2012.

The Canadian Commission on Building and Fire Codes (CCBFC) invites all interested parties to take part in this public review, which will run from October 24 until December 16, 2011 on the National Codes website. An explanation of the proposed changes, as well as instructions on how to submit comments, will be provided.

For more information, contact Anne Gribbon, Secretary to the CCBFC, at 613-993-5569.

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Stay informed using new RSS feed on National Codes website

News about Canada’s National Model Construction Codes is now available through a Rich Site Summary (RSS) feed that allows subscribers to easily stay informed about newly published information on the National Codes website. Subscribers using an RSS reader are notified whenever new content is added and can go directly to that content, thereby eliminating the need to manually check the website.

This content includes links to new pages listed in the What’s New box on the home page as well as updates to the following pages: meeting minutes, calendar of committee meetings, CCBFC and Standing Committee member lists, and the lists of approved CCBFC and Standing Committee activities.

To sign up for RSS feed, visit the National Codes website.
The Canadian Commission on Building and Fire Codes (CCBFC) and the Provincial/Territorial Policy Advisory Committee on Codes (PTPACC) have formed several joint task groups to address code development priorities over the next year.

The CCBFC/PTPACC Joint Task Group on Farm Buildings will outline the work necessary to update the technical requirements in the National Farm Building Code (last published in 1995). This will include specifying the approach for drafting technical requirements. Another key element is to determine how to incorporate large farm building requirements into the National Building Code of Canada 2010 (NBC) and to define the appropriate publication for small farm building requirements.

The Joint Task Group on Code Harmonization, established to address technical differences between provincial/territorial and national codes, will carry out pilot studies on one or two code topics and then develop a protocol, as well as mechanisms, to resolve differences.

The Joint Task Group on Impact Analysis (Phase II) will continue work begun in Phase I, in which general guidelines were developed to assess the impact of code changes. Phase II will develop more comprehensive guidelines to assist standing committees and code change proponents to evaluate the costs, benefits and enforcement implications of a proposed change.

The Joint Task Group on New Objectives (Phase II) will complete the work begun in Phase I (development of a protocol to address new objectives in the codes) by developing protocols to modify or remove an existing objective.

The Joint Task Group on Scoping of a Water Use Efficiency Objective will follow the protocol for new code objectives in their consideration of a request to add water-use efficiency as an objective to the NBC and the National Plumbing Code.

The Joint Task Group on Code Development System Review will examine the current code development system and processes to assess what needs improvement. The group will consider broad system requirements, including standards, education, value-added products, and timelines for adoption, as well as capacity and funding issues. Opportunities to streamline code development processes will be identified. A report with recommendations will be prepared to facilitate stakeholder consultation.

For more information, contact Anne Gribbon, Secretary to the CCBFC, at 613-993-5569.
NEW CCMC EVALUATION REPORTS AND LISTINGS

<table>
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<tr>
<td>Palram Americas, Inc.</td>
<td>Suntuf®, Palruf®, Palopaque®, Sunlite®, Palsun® and Suntop® (polycarbonate and polyvinyl chloride panels)</td>
<td>13450-R</td>
<td>Plastic Wall and Roof Panels</td>
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<tr>
<td>The Dow Chemical Company</td>
<td>STYROFOAM™ Brand SPF CA</td>
<td>13501-L</td>
<td>Spray-Applied Rigid Polyurethane Foam Insulation - Medium Density</td>
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<tr>
<td>Nuco Inc.</td>
<td>PF-600 E84 Class I Spray Foam, PF-200</td>
<td>13520-L</td>
<td>Bead-Applied Two Component Polyurethane Air Sealant Foam</td>
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<td>4001/5830 Series</td>
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<td>Extruded Expanded Polystyrene Insulation Board</td>
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For further information on the performance, usage and limitations of these products, as well as for other reports and listings by NRC-CCMC, see the Web Registry of Product Evaluations.

Two new Construction Technology Updates now available

NRC-IRC has just released two new Construction Technology Updates (CTUs).

CTU 77 – Performance of Solar Shading Devices
This Update reports the results of a study that compared the performance of houses equipped with typical interior blinds (base case), with houses employing other shading devices. The other shading devices investigated were: interior, reflective blinds (with a surface that reflects sunlight); interior, reflective roller screens; between-pane, metallic reflective blinds; exterior insulating rollshutters; and exterior screens. The performance of houses without shading devices was also included in the comparison.

CTU 78 – Building Egress Using Photoluminescent Markings
The use of photoluminescent material systems in buildings is gaining acceptance in North America as a valuable safety feature for users of exits and stairwells in the event of power failure and the loss of emergency lighting. This Update describes the characteristics and installation of photoluminescent markings.

The complete list of CTUs can be found on the NRC website.
Building Science Insight is a national seminar series presented by the NRC Institute for Research in Construction (NRC-IRC). It provides construction professionals with up-to-date information on technical advances and on issues impacting the industry. **This year’s half-day seminar** will address the topic of Building Information Modeling (BIM) through presentations and demonstrations.

BIM focuses on improving the communication and re-use of information generated during the design and construction of a building or civil infrastructure. Central to the process is the use of sharable data models. It allows BIM project stakeholders to derive all their required drawings, reports and schedules, and pass back information that will be required by others. The resulting models can also be used by owners for facility operation and management.

These models typically represent the physical and functional components of a facility, their three-dimensional geometry, properties and relationships. This leads to improved collaboration and communication, and can have a significant impact on return on investment to the project’s participants.

The 2011/2012 seminar will focus on BIM and how it is influencing practices in the construction sector. NRC experts will explain how it is not only about creating and updating digital models (databases), but also on how practitioners can get information from these BIM models to improve their own performance and share their information with others.

**Presentation 1: Status, relevance and context of BIM in the construction sector** With references to current industry practice, this presentation will provide an overview of what BIM is, who is currently using it, why they are using it, and when and where it is playing a significant role in the life cycle process. Illustrative examples and visuals will be used to provide insight into some of the tools and technologies used in BIM. Challenges associated with the adoption and implementation of BIM within existing business environments will be summarized. Some of the commonly used standard data exchange methods will also be briefly discussed.

**Presentation 2: Considerations for transitioning to BIM in projects** Summarizing from case studies, emerging practices, implementation guidelines, and growing professional expectations, this session will review how BIM is transforming current construction practices. The presentation includes an introduction to new project delivery practices, professional roles and expectations with respect to BIM, as well as a concise review of model-sharing practices and interoperability technologies supporting these new relationships.

**Demonstration 1: Illustrating the re-use and evolution of model information over the life cycle** This demonstration will provide insight on how building information captured during the early stages of the project, such as design and fabrication, is re-used for later activities in the project’s life cycle, including construction and maintenance. It is illustrated with examples from the precast concrete and structural steel industries. Concepts for extraction of building component parameters and linking of life cycle information to building components are also discussed.

**Demonstration 2: BIM – Introductory use and contributions** This demonstration will illustrate how freely available tools allow construction firms or contractors to re-use and contribute to BIM models, without needing the original design software suites. Several tools will be used to view models; extract specifications, measurements, quantities; check for conflicts; and revise the model content to reflect as-installed conditions. During the demonstration, the use of multiple BIM interoperability specifications will also be noted.

Registration includes refreshments and a printed copy of the presentations. Please visit the website at [www.bsi.gc.ca](http://www.bsi.gc.ca) for more details and registration information.

Special thanks to the [Canadian Construction Association](http://www.canadianconstructionassociation.com) and the [Institute for BIM in Canada](http://www.ibimcan.com) for their support with this event.
Millions of cubic metres of concrete are produced in Canada each year, consuming large quantities of coarse aggregate, sand, and ordinary Portland cement (OPC). There is growing interest in finding alternatives for these materials for both economic and environmental reasons. While supplementary cementing materials (SCMs) have been used for many decades as partial replacements for OPC, new sources of replacement materials, such as alternative SCMs and alternative aggregates, will be needed.

With regard to alternative SCMs, one possible source is by-products of industrial processes, such as the residual material from a new plasma-assisted waste conversion technology. This by-product is water-cooled to produce a glassy black slag. Since a key goal of the technology is that no remaining material is sent to landfills, the NRC Institute for Research in Construction (NRC-IRC) was asked to evaluate the slag for use in concrete.

A preliminary analysis indicated that the slag had oxide chemistry very similar to that of blast furnace slag (BFS), a widely used SCM. This result suggested that the test slag could be evaluated for use as an alternative SCM. As large volumes of an alternative SCM need to be produced to make it economically attractive to the construction industry, NRC-IRC proposed that the slag also be evaluated for use as a fine aggregate.

Researchers investigated the chemical behaviour of the test slag produced under five different operating conditions and compared it to a commercial BFS. They then ground the slag to the same size as the commercial product and evaluated it using a variety of tests. The results showed that the slag had similar properties to the BFS. It was consistently amorphous and had oxide content similar to that of the commercial slag. Key elements of chemical performance, including its pozzalanicity (ability to react with the calcium hydroxide in hydrated cement), its hydration behaviour when blended with OPC, and its ability to provide resistance to detrimental alkali-silica reactions, were all comparable to commercial BFS.

These promising results led to a second stage of testing, in which the researchers examined the performance of the material in mortar and concrete samples (see video). They measured the compressive strength of three samples of each in which 10, 20 and 50% of the OPC was replaced with the test material. Early curing time strength results showed similar performance to a commercial BFS.

In parallel tests, the researchers ground the test slag to the size distribution of ASTM standard sand and mixed it into mortar and concrete samples made with OPC alone, so that the slag’s performance as sand could also be evaluated. They found the performance of the ground slag sand to be similar to an ASTM sand.

The researchers are now conducting further tests assessing freeze-thaw action, alkali-silica reactivity, and longer-term strength. Final results will be available in Fall 2011.

For more information about this research or the testing of materials for use in cement and concrete, contact Dr. Jon Makar at 613-993-3797.

Information about the plasma-assisted waste conversion process may be found at: http://www.zerowasteottawa.com/en/.
A nationwide survey of 150 Canadian building, property and facility managers was recently conducted to establish the level of awareness of indoor air quality issues and improvement strategies among building professionals responsible for commercial buildings.

The survey, designed and commissioned by the Canadian Committee on Indoor Air Quality and Buildings (CCIAQB), showed that the building professionals generally had a positive view of the indoor air quality (IAQ) in their building, rating it as ‘very good’ (35% of respondents) or ‘good’ (48%). Eleven percent said it was ‘slightly good,’ and 3% said it was ‘poor,’ suggesting there was room for improvement in some of the surveyed buildings.

Despite their own favourable impression of IAQ in their buildings, almost nine in ten building professionals (86%) stated that their tenants report health issues related to IAQ. They mentioned the following issues which, they believed, had the greatest impact on health, or triggered the most complaints about health and IAQ in their building:

- dust and particles - 26%
- cosmetic scents and odours - 25%
- volatile organic compounds (VOCs) - 20%
- bacteria and moulds - 10%

Six percent of building professionals felt that occupants bear some responsibility for ensuring good indoor air quality, especially when it comes to fragrances and odours.

With regard to improving IAQ in commercial buildings, the respondents stated that this was best achieved by:

- increasing ventilation - 45% of respondents
- controlling pollutants at source - 30% of respondents
- air cleaning - 25% of respondents

Some of the surveyed professionals had experience with installing and using specific means of improving IAQ (such as HVAC systems, portable air conditioners, heat recovery ventilators and commercial duct cleaning services).

The success of these interventions was most commonly assessed on the basis of reduced occupant complaints. Between 20-25% saw reduced complaints, depending on the intervention type, while in the case of heat recovery ventilators, only 5% saw reduced complaints. Only 12-14% of respondents verified the success of an intervention using IAQ testing.

The most frequently mentioned IAQ features incorporated into buildings were air filters (38%), and air quality or CO₂ sensors (33%). The majority (63%) of building professionals said there were no indoor air quality features/devices missing from their building; however, close to 25% identified at least one missing design feature for assuring the desired air quality, as follows:

- air quality or CO₂ sensors - 9%
- air humidification systems - 5%
- air filtration or HEPA filters - 4% and 3% respectively

This IAQ awareness survey is part of a strategy to solicit input from key stakeholders in Canadian industry. It is also meant to provide a baseline data set against which future renditions of the survey can be measured.

The complete survey is available on the NRC-IRC website in Report NRCC-53981. For more information on the survey, contact Dr. Alexandra Thompson.

**What is the CCIAQB?**

The Canadian Committee on Indoor Air Quality and Buildings (CCIAQB), created in 2008, is funded through the Canadian government’s Clean Air Regulatory Agenda with the objective of reviewing and validating relevant information related to indoor air quality (IAQ) in buildings, identifying critical knowledge gaps, and closing them through several approaches. The goal is to improve IAQ in buildings and, ultimately, the health of occupants.

For more information on the CCIAQB, contact the Secretary, Luc Saint-Martin at 613-993-7844.
In support of the Canadian government Clean Air Agenda, the NRC Institute for Research in Construction (NRC-IRC) launched an Indoor Air Initiative under the direction of NRC-IRC ventilation researchers. A component of this initiative is to develop performance evaluation protocols to assess the effectiveness of technologies aimed at improving air quality. The project will generate reliable information that builders, building operators and homeowners can use to select technologies for residential or commercial environments.

The first protocol developed by NRC-IRC researchers was one to assess the performance of portable air cleaners (PACs). PACs are prevalent in the marketplace but current protocols are based only on particle removal, sound output and energy efficiency. The new NRC-IRC protocol is more comprehensive. It includes an evaluation of the removal of volatile organic compounds (VOCs) as well as for emissions and by-product formation from using PACs.

Consideration of by-product formation is important because PAC usage could end up adding ozone, ultrafine particles and/or VOC pollutants, which have been shown to have a significant impact on health.

NRC-IRC’s comprehensive protocol evaluates PAC performance in five areas:
- particle removal ultrafine to fine (10 nm to 5 um)
- removal of selected VOCs (percent removal of selected VOCs)
- by-product formation (ozone, VOC and ultrafine particles)
- sound power levels of the appliance (dBA)
- energy efficiency (energy efficiency index, cleaning efficiency vs. power consumption)

To validate the protocol, 12 PACs incorporating several technologies (filtration, ionization, electrostatic precipitation and oxidation) were tested.

The indoor air quality impact and energy use testing was conducted under standardized conditions using the Full-Scale Test Chamber Facility, a 55 m³ stainless steel emissions chamber with an optimized HVAC system. For more information, please contact Dr. Zuraimi Sultan at 613-991-0891.

The acoustical performance portion of the protocol was conducted by NRC-IRC acoustics researchers using a large reverberation chamber. For more information, contact Acoustic Testing at IRC.

The evaluation protocol has been submitted to the International Organization for Standardization (ISO) for possible development into an ISO standard method.

Full details of this project can be found in the reports 54013 and rr-311.

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### Ranking of particle removal rates of PACs tested, listed by technology (higher ranking means better removal of particles from air)

<table>
<thead>
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<td>Electrostatic Precipitation</td>
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<tr>
<td>HEPA based PAC-1</td>
<td>8</td>
</tr>
<tr>
<td>HEPA based PAC-2</td>
<td>9</td>
</tr>
<tr>
<td>Ion Generation PAC-1</td>
<td>3</td>
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<tr>
<td>Ion Generation PAC-2</td>
<td>3</td>
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<td>Plasma cluster ionization</td>
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<td>Photo Catalytic Oxidation PAC</td>
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<td>Ultraviolet Germicidal Irradiation PAC</td>
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Highway bridges often show premature signs of distress such as cracking of the concrete and corrosion of the reinforcement. This can impair structural performance and shorten service life. A new approach to bridge construction holds promise to mitigate these problems and improve performance, compared to normal design practice.

This would constitute a significant contribution to sustainability in bridge technology.

The concept is to employ pre-cast/pre-stressed girders made of ultra high performance concrete (UHPC) and a reinforced concrete slab made of low-shrinkage high performance concrete (HPC). Such a design approach could keep maintenance interventions at a minimum and reduce life cycle costs.

The use of nano-engineered UHPC could enable cost-effective bridge designs with fewer girders that have a smaller cross section and/or a longer span. This means smaller volumes of concrete would be used, thus reducing the superstructure dead load significantly. For deck construction, the use of a self-curing HPC recently developed by the NRC Institute for Research in Construction (NRC-IRC), with low-shrinkage and low-chloride permeability, could prevent cracking and delay reinforcement corrosion significantly.

NRC-IRC is seeking partners for a new project with the main objective to develop a simplified structural and durability design approach for this type of UHPC/HPC bridge superstructure. The approach would be consistent with the Canadian Highway Bridge Design Code and existing pre-cast/pre-stressed concrete technology.

The project may extend to building a demonstration UHPC/HPC slab-on-girder highway bridge. Its performance would be measured using long-term remote monitoring. Service life and life cycle cost predictions using advanced probabilistic analyses will be conducted as well.

Preliminary predictions indicate that the service life of bridge decks could be extended by a factor of four, and associated life cycle costs reduced by a factor of three, compared to decks made with conventional normal strength concrete. This would constitute a significant contribution to sustainability in bridge technology.

For more information, contact Dr. Daniel Cusson at 613-998-7361 or Dr. Husham Almansour at 613-993-0129.
The NRC Institute for Research in Construction (NRC-IRC) is collaborating with Transport Canada to identify the knowledge gaps and strategic research needs in the area of structural health monitoring of bridges in order to improve their management and overall performance. Upon sufficient interest among the stakeholders and available funds, Transport Canada’s Transportation Development Centre (TC-TDC) wishes to implement a nation-wide initiative that will promote, fund, and coordinate research and development on advanced bridge monitoring strategies for Canada’s roadway and railway bridges.

The judicious use of advanced bridge monitoring strategies on safety-critical bridges can offer many advantages for infrastructure owners striving to address today’s complex challenges. For instance, a more accurate knowledge of the life cycle performance of a bridge network obtained through advanced bridge monitoring can provide comprehensive, timely information to help decision makers to manage maintenance and rehabilitation programs.

Bridge monitoring can also help engineers re-assess and update traffic and environmental loads and associated safety factors used in the design and evaluation of bridges, including the effects of climate change. Consequently, the safety, structural performance, and durability of critical bridges can be optimized, the risks of failure reduced, and life cycle costs minimized.

During a workshop to be held in November 2012, stakeholders and technical experts will be invited to provide input and feedback for the first draft of this initiative, which will be finalized before March 31, 2013.

For more information, contact Dr. Daniel Cusson at 613-998-7361, or Daniel Hébert of Transport Canada at 613-949-9430.
## Upcoming Events

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<th>Date Range</th>
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<td>30 NOV – 2 DEC</td>
<td>Construct Canada, Toronto.</td>
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<tr>
<td>4-7 OCTOBER</td>
<td>Greenbuild 2011: Greenbuild International Conference and Expo, Toronto.</td>
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<td>26 OCTOBER</td>
<td>20th Contech Building Events Trade Show, Quebec.</td>
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<td>29 NOVEMBER</td>
<td>20th Contech Building Events Trade Show, Montréal.</td>
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<td>4-5 DECEMBER</td>
<td>Seventh Symposium on Roofing Research and Standards Development, Tampa.</td>
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### BUILDING INFORMATION MODELING

[BSI Building Science Insight 2011/12](www.bsi.gc.ca)