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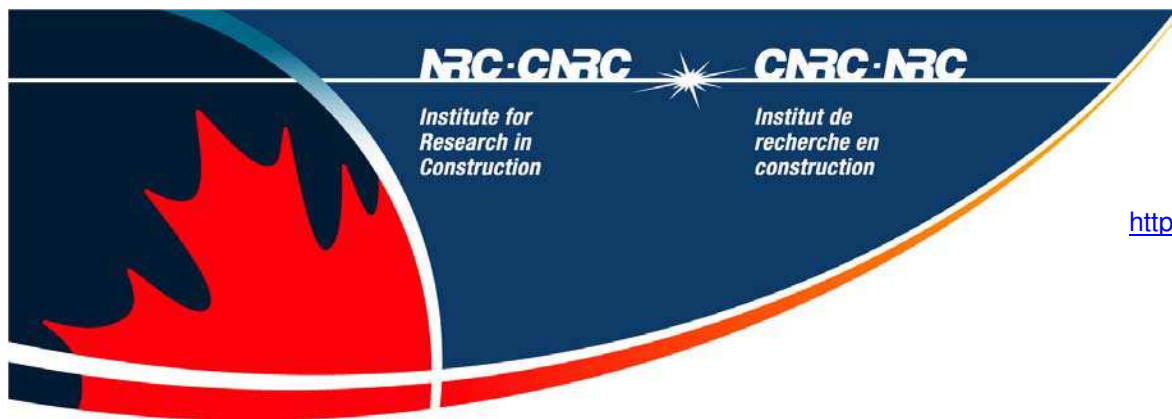
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2005 National Construction Codes: More Responsive to Innovation and Renovation

By Martin Thériault and Jim Gallagher

Submitted to *Canadian Property Management*

This article review some of the major changes in the 2005 National Building Code as they affect property managers.

Cet article passe en revue quelques unes des principales modifications du Code national du bâtiment 2005, modifications d'importance pour les gestionnaires de biens.

The 2005 editions of the three National Construction Codes are now available after extensive reviews and changes that have made them clearer, easier to apply to renovation and more accommodating to innovation.

Published this past September by the National Research Council, all three codes—the National Building Code (NBC), the National Fire Code (NFC) and the National Plumbing Code (NPC)—have been reconfigured into an “objective-based” format, a change that puts Canada in the forefront of code development.

In objective-based codes, the reasons for the regulation of building design, construction, operation and maintenance are clearly spelled out. They clearly state the objectives that code provisions are intended to achieve and describe the functions that a building or its components must perform to fulfill these objectives. Also, in objective-based codes, the intent of every code provision is explained.

This new information allows for flexibility in code compliance by helping users develop and evaluate alternative solutions (previously known as equivalencies). As a result, the 2005 editions are easier to apply to existing buildings and more accommodating to technological advances.

Designers and contractors in the business of renovating existing buildings are often confronted with situations that do not comply with the codes. Older buildings have inherent challenges because they were not designed to today’s standards. Therefore, in many cases, one often needs to resort to innovative measures, or alternatives solutions, to achieve compliance with code objectives and requirements

Another big challenge in renovation projects is cost: bringing an existing building up to modern standards can be prohibitively expensive. The new codes clearly identify the key concerns addressed by code provisions, so that other approaches to achieving the same levels of performance can be proposed. Similarly, the expanded information in the new codes facilitates the evaluation of new products and systems to determine if they are as good as those already specified.

Past editions of the national codes have always permitted designers to devise a different (alternative) solution from what the code prescribed, as long as they could prove to a regulatory official that it would work just as well. The new objective-based codes continue this tradition but make the process much clearer by actually providing information that makes it easier to develop alternative solutions while assisting building code officials to review and evaluate them.

Although the work of designers and regulators will be facilitated, most users should experience little change from the way they previously used the codes. For their day-to-day work, the new codes have essentially remained the same, containing the same code provisions – now referred to as "acceptable solutions" – as were found in the 1995 editions, though updated with many new technical changes. What is more, the code structure and vocabulary that users are familiar with remains in place. This will come as good news for those who were concerned that the 2005 editions would present a steep learning curve.

Highlights of NBC Technical Changes

The following is a review of some of the key changes in the NBC of interest to readers of Canadian Property Management.

Part 3: Fire Protection, Occupant Safety and Accessibility

Noncombustible materials

Changes have been made to allow the use of materials of limited combustibility based on specific criteria. This change was made because the previous noncombustibility requirement excluded materials that pose a low risk but have other desirable properties. This revision allows various products, such as washable interior finishes, to be used in buildings in which they were not previously permitted.

Firewalls

The requirement for masonry or concrete to be used for the construction of two-hour firewalls has been changed from a prescriptive requirement to a more performance-based requirement. This change was made in response to provincial and builder requests and to facilitate construction under adverse climatic conditions.

Mezzanines

A number of changes have been made regarding mezzanines including the calculation of building area, fire-resistance rating, and exit travel distance. This evolution intends to facilitate plan review and design, and reduce the difficulties users were having with the previous requirements.

Part 4: Structural Design

Structural design needs have received a slight facelift.

Live loads

Snow load is no longer considered to be a live load. This allows a more rational treatment of the load combinations because the full design snow load does not have to be taken into account in combination with the full design live load derived from the use and occupancy.

Earthquake design

The earthquake acceleration values have been adjusted to provide a more geographically accurate calculation of the earthquake effects on structures. Eight categories of structural irregularities have been defined to better categorize buildings for earthquake design. Dynamic analysis has been established as the default analysis method for earthquake design. (The use of the equivalent static force procedure is allowed when certain criteria are met.) Requirements have been added for the interconnection of deep foundation units and spread footings, the magnitude of the tying force, and the transfer of earthquake loads between the superstructure and substructure.

Part 5: Environmental Separation

Part 5 of the NBC, Environmental Separation, has also received somewhat of an overhaul.

Air leakage and vapour diffusion

Information has been added to clarify the treatment of air leakage, vapour diffusion, precipitation ingress, and ingress of moisture from the ground. The requirements for controlling air leakage and vapour diffusion have been amended to present the basic requirements in more performance-based terms and to recognize the role of venting to achieve the intents of the requirements.

Heat transfer and ice damming

Changes to the heat transfer control requirements acknowledge providing means to dissipate heat can be important in some instances, such as offering a means to control heat transfer (e.g., reducing the likelihood of ice damming).

Part 6: Heating, Ventilating, and Air-conditioning

The new codes include a few minor—but important—changes in HVAC products and design.

Ventilation

Wording has been revised to clarify the types of spaces that do not require ventilation. In addition, changes have been made to permit natural ventilation where climatic conditions make it feasible and where suitable substantiating information is provided to the authority having jurisdiction.

Carbon monoxide alarms

Carbon monoxide alarms are to be required in buildings that contain a residential occupancy and a fuel-burning appliance or a storage garage.

Part 9: Housing and Small Buildings

Changes have been made to clarify when Part 9 applies, when Part 9 loads can be used for design under Part 4, and when the design must be done under Part 4. Other changes are discussed below.

Simplified snow load calculation

The simplified approach previously applicable only to wood-frame construction has been extended to structures of any material where there is a high degree of redundancy created by closely spaced, repetitive members and the total roof area does not exceed that for Part 9 buildings (regardless of firewalls) and there are no obstructions that contribute to significant snow accumulation.

ICF walls

Detailed prescriptive requirements for engineered insulating concrete form (ICF) walls for small houses have been added, applying to both foundations and above-ground walls. Other changes permit higher masonry foundation walls for a given thickness if the masonry incorporates reinforcing.

Keeping the rain out

A new climatic indicator, the moisture index, has been added to identify high moisture load regions. The indicator is a single number that reflects both the amount of rainfall that a location receives and the duration of drying periods. Two planes of protection are required to provide protection from precipitation—the first is the cladding and the second is the sheathing membrane and flashing, with or without a drained and vented air space. All residential buildings are required to be constructed with two planes of protection (no face-sealed cladding). In high moisture load regions, the two planes of protection need to be separated by a capillary break.

New Organizational Layout

Although they retain much of their past look and feel with their familiar provisions, all three codes have been reorganized into three divisions, A, B and C.

Division B holds the most similarity to the 1995 editions because it contains the technical provisions, now known as acceptable solutions. For most projects, typical code users will likely use Division B because the provisions have been in effect and proven to work for many years.

Division A accommodates the new information that embodies and constitutes the objective-based format. For those who wish to develop innovative designs and approaches (alternative solutions), Division A is the part they will use to assess whether the alternative solution provides equivalent performance to the acceptable solution (technical provision) of Division B. Division A includes compliance options and new information called “Objectives” and “Functional Statements.” The objectives describe the overall goals that a code’s provisions are intended to achieve; for the National Building Code, for example, these objectives are safety, health and accessibility of occupants, and fire and structural protection of buildings. Functional statements describe the functions that a building must perform to fulfill the objectives.

Division C contains administrative provisions, which have all been consolidated into this one place from various places in the 1995 codes. Division C also contains general provisions for the review and documentation of alternative solutions.

The process of using the objective-based format will be greatly facilitated when the CD-ROM versions of the codes are released in early 2006. The CD-ROM versions will enable users to navigate back and forth easily between the various parts of the codes and access and understand the information they need to help them develop alternative solutions.

In December, NRC, in coordination with the provinces and territories, began a series of two-day seminars across Canada to review the most significant technical changes in the 2005 NBC, NFC and NPC.

To order the 2005 National Construction Codes, please visit NRC's Virtual store at www.nrc.gc.ca/virtualstore

For more information on the codes and the seminars:

www.nationalcodes.ca

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