

Canada's National Model Construction Codes Development System

1.0 Introduction

1.1 Canadian Commission on Building and Fire Codes

Canada has one of the best standards of construction in the world and a high degree of uniformity in building construction and fire safety across the country. Canada's centralized system for model code development and maintenance began in the 1930s. The first edition of the National Building Code of Canada was published in 1941. Subsequent adoption of the National Building, Plumbing, and Fire Codes and partnership with the provinces and territories has resulted in a progressive system that is responsive to new construction products and techniques.

The Canadian Commission on Building and Fire Codes (CCBFC), an independent committee of volunteers established by the National Research Council of Canada (NRC), is responsible for developing and updating the National Model Construction Codes. It oversees the work of eleven committees and several task groups involving as many as 300 members. The system is structured such that it is the members of the committees who establish the content of the model codes. Member expertise from industry, the regulatory community and general interest groups is balanced to ensure that all relevant sectors and geographical areas of the country are represented. These committees are administratively and technically supported by the Canadian Codes Centre (CCC) of the NRC Institute for Research in Construction (NRC-IRC).

1.2 National Model Construction Codes

On behalf of the CCBFC, the NRC publishes six National Model Construction Codes, in English and in French, which must be adopted by a regulatory authority in order to come into effect. In some cases, the Codes are amended and/or supplemented to suit regional needs, and then published as provincial codes. The six codes are:

- The National Building Code of Canada (NBC) addresses the design and construction of new buildings and the substantial renovation of existing buildings.
- The National Fire Code of Canada (NFC) provides minimum fire safety requirements for buildings, structures and areas where hazardous materials are used, and addresses fire protection and fire prevention in the ongoing operation of buildings and facilities.
- The National Plumbing Code (NPC) covers the design and installation of plumbing systems in buildings and facilities.
- The National Farm Building Code (NFBC) provides relaxations of the requirements in the NBC to address the particular needs of farm buildings.
- The National Energy Code of Canada for Buildings (NECB) and the National Energy Code of Canada for Houses (NECH) provide technical requirements for the construction of energy-efficient buildings and houses.

To assist in the application of the codes, explanatory material is published in the form of user's guides. Descriptions of all the published documents and ordering information are available at www.nrc-cnrc.gc.ca/eng/ibp/irc/publications/index.html.

2.0 Historical Background

2.1 Evolution of the Code Development System

Under the British North America Act and its successor, the Constitution Act, responsibility for building regulation in Canada rests with the provinces and territories. This responsibility was generally delegated to municipalities, which, not surprisingly, resulted in a multiplicity of regulations being developed over time as each municipality tried to deal with its own needs. These variations from one municipality to the next made it very difficult for designers, product manufacturers and contractors to conduct business in more than one region. It was also very difficult for national programs supporting housing and other construction work to be implemented. Thus, in 1937, the federal Department of Finance asked the NRC to develop a model building regulation that could be adopted by all municipalities in Canada. The result of that initiative was the publication of the first edition of the NBC in 1941.

The post-war construction boom fuelled the demand for a revised NBC, particularly one that did not require houses and small buildings to be designed by architects and engineers. To respond to the needs of an industry that was rapidly expanding, NRC established the Division of Building Research (DBR), which became the NRC-IRC in 1986. One of DBR's original mandates was to provide research support for the NBC. Then in 1948, NRC created the Associate Committee on the National Building Code whose mandate was to update and maintain the NBC on an ongoing basis and provide for broad input. The Associate Committee revised the NBC in 1953 and has subsequently published new versions about every five years. The NBC 2005 is the 12th edition.

In 1956, NRC created the Associate Committee on the National Fire Code, which produced the first edition of the NFC in 1963.

In October 1991, the two Associate Committees were replaced by the CCBFC.

2.2 Changes to the System

A number of economic realities—increasing globalization, free trade, harmonization of standards, demands for better quality and performance, and a major shift from new construction to rehabilitation—created the need to make the codes more dynamic, more responsive, and better able to accommodate innovation. The CCBFC 1995-2000 Strategic Plan addressed this need by identifying opportunities to improve the code development system in several significant ways. Two key initiatives were subsequently undertaken: one to establish a coordinated provincial/territorial/national code development system, the other to convert the National Model Construction Codes into objective-based codes.

- **Core Codes**

To facilitate provincial and territorial adoption of the National Model Construction Codes, with few or no amendments, new editions now only address issues agreed upon by all provinces and territories. Technical differences between provincial and National Model Construction Codes requirements are examined with a view to harmonizing as many as possible.

Issues falling outside the scope of the core codes are now dealt with in separate documents published by that province or territory. If several provinces and territories wish to address the same issue, the CCBFC will consider developing a separate code on that issue. The two energy codes and the NFBC are examples of such non-core documents.

- Provincial/Territorial Participation**

The provinces and territories may now examine proposed changes to the National Model Construction Codes at every stage of the code development cycle. Their concerns are addressed by the CCBFC so that standing committees do not waste time developing changes that are unacceptable to the authorities having jurisdiction. The aim is to reduce the number of amendments that are required before provincial or territorial adoption thus allowing for faster adoption.
- Coordinated Public Reviews**

Public reviews of proposed changes to the National Model Construction Codes are now coordinated such that code users are consulted once annually, usually in the fall. Fixed dates for public reviews allow code users to plan their provision of input into the review process. Provinces and territories are invited to coordinate the review of changes to their codes with the national public review; they also advertise the national public review and encourage participation in their jurisdiction. Thus, the input of all code users—even from code users in provinces having their own codes—is made available to the national process.
- Improved Policy Input**

The Provincial/Territorial Policy Advisory Committee on Codes (PTPACC), a committee made up of senior representatives appointed by provincial and territorial deputy ministers, provides policy advice to the CCBFC.
- Equitable Sharing of Code Development Costs**

Revenue from code sales continues to be the principal source of funding for the development and production of the model codes. Arrangements have been put in place so that even provinces that publish and sell their own codes can make equitable contributions to the national code development system. The NRC is the other funding partner of the national code development system.
- Objective-Based Codes**

Previous editions of the NBC, NFC and NPC had equivalency provisions that permitted the use of materials, equipment, systems, methods of design or construction procedures not specifically prescribed. When something new was proposed, however, it had to be demonstrated that it provided the level of performance required by the codes. This “equivalency” approach was retained in the 2005 objective-based codes and converted into the “alternative solution” compliance path to the codes. Code users now have the choice of using the “acceptable solutions” prescribed in the codes or demonstrating that a proposed “alternative solution” provides at least an equivalent performance. Converting these codes to an objective-based format has made them more accommodating to innovation by clarifying their scope as well as the intent behind their requirements. Each code provision is now supplemented by clearly stated objectives, functional statements and intents.

As a result, the 2005 objective-based codes provide additional information that helps proponents and regulators determine what minimum performance must be achieved, thereby facilitating the evaluation of new products and construction techniques. Thus proponents and regulators who assess code conformance now have a better common understanding of the minimum performance expected by the codes.

2.3 CCBFC Review of Priorities in 2008

In 2008, the CCBFC Executive Committee held a strategic session to review the implementation of changes to the national code development system since their introduction in 1995. The session also provided an opportunity to review the role of the CCBFC, its mission, and the environment in which it operated. Major elements of this reflection by the CCBFC included new goals and objectives as well action plans to achieve the strategic objectives. The action plans address four near-term priorities: communications and marketing, timeliness and responsiveness to change, harmonization of provincial/territorial and national codes, and sensing of emerging issues.

2.4 Policies and Procedures Updated

The CCBFC also developed and adopted new policies and procedures in early 2009 that better reflect the changes made in recent years to the national code development system, as well as the closer ties with PTPACC. The new policies and procedures contain the operating procedures of the national code development system, terms of reference for the CCBFC and its committees, and a description of the supporting role of the NRC-IRC.

2.5 Protocol for Adding New Objectives

Following requests to add energy efficiency and water use efficiency requirements in the core codes, it was determined that these did not fit within the National Model Construction Codes' four existing objectives (safety, health, accessibility, fire and structural protection of buildings). The matter was discussed with the provinces and territories, and a joint CCBFC/PTPACC task group was established to develop a protocol for considering the addition of new objectives. Adopted by the CCBFC in early 2009, the six-step protocol is being used to develop a new energy efficiency objective that can form the basis for energy efficiency requirements in the National Model Construction Codes. A water use efficiency objective is also being considered through application of the protocol.

3.0 Codes and Standards

3.1 Scope and Application of the National Model Construction Codes

The NBC is concerned with health, safety, accessibility and the protection of buildings from fire or structural damage. It applies to the construction of new buildings and to the demolition or relocation of existing ones. It also applies when a building's use changes or when it is significantly renovated or altered. Some provincial building codes also address energy conservation.

The NFC applies to buildings and facilities already in use and regulate activities that create fire hazards. It contains requirements regarding the maintenance of fire safety equipment and egress facilities, and provides direction on the safe use of combustible materials and dangerous goods in both new and existing buildings or facilities. It also requires fire safety plans in anticipation of emergencies. In sum, the NFC aims to reduce the likelihood of fires, particularly those that may present a hazard to the community, and to limit the potential damage caused by fires and by the handling and storage of hazardous materials.

In Canada, building and fire codes are developed cooperatively with the goal of achieving compatibility. Generally, when a new building code is adopted, it is not applied retroactively: existing buildings that comply with the code in effect at the time of their construction are generally not required to be upgraded so that they comply with the new code. Unlike building codes, however, fire codes may contain retroactive requirements that apply to all buildings, regardless of when they were built.

The NPC is concerned with health, safety, and the protection of buildings or facilities from water and sewage damage. It covers the design and installation of plumbing systems in buildings and facilities. It applies to the construction of new buildings and to the demolition or relocation of existing ones and also applies when a building's use changes or when it is significantly renovated or altered.

The NFBC addresses the special nature of the occupancies of non-residential farm buildings. Farm buildings that do not qualify under specific criteria are required to conform to the NBC in all respects.

The NECB and NECH were designed to complement the building codes. They set out minimum requirements for energy efficiency that may be adopted in whole or in part into provincial or territorial legislation and codes or, alternatively, that may be used as guidelines for the construction of energy-efficient new buildings.

3.2 Differences Between a Code and a Standard

National Model Construction Codes and standards are developed through similar consensus-based committee processes and extensive public review. There is no precise and universally recognized definition of the differences between a code and a standard.

Generally, a code—

- is broad in scope, i.e. it covers a wide range of issues, and
- is intended to be given the force of law through adoption by a provincial, territorial or municipal authority.

In the construction context, generally a standard—

- is narrow in scope, i.e. it covers a limited range of issues, and
- is intended to be given the force of law by being referenced in a code adopted by a provincial, territorial or municipal authority or by being referenced directly by a provincial, territorial or municipal regulation.

Some standards do not become legal requirements but are simply used by a specific industry or trade as the recognized articulation of "good practice."

A code will often reference several standards, thus giving them the force of law in jurisdictions where that code is adopted. For example, the NBC references more than 200 standards.

3.3 Standards Development Organizations

Standards development organizations are major contributors to construction regulation in Canada. Hundreds of standards are used by the construction industry. The NBC references almost 200 documents directly (and many more indirectly) that are largely prepared by Canadian standards development organizations accredited by the Standards Council of Canada, such as:

- the Canadian General Standards Board (CGSB)
- the Canadian Standards Association (CSA)
- Underwriters Laboratories of Canada (ULC), and
- the Bureau de normalisation du Québec (BNQ).

Standards from American organizations, such as the American Society for Testing and Materials and the National Fire Protection Association, are also referenced.

4.0 Code Development: Roles and Responsibilities

4.1 Role of the Canadian Commission on Building and Fire Codes

The CCBFC is a decision-making body established by the NRC to provide direction and oversight on the development of the National Model Construction Codes and encourage uniformity of building and facility regulations throughout Canada. It is made up of voting and non-voting members from across Canada who are appointed by NRC on the recommendation of the CCBFC Selection Committee. Voting members are volunteers who are chosen for their individual interests and expertise.

The Commission normally meets once a year in February and meetings are open to the public. Guidelines for visitors attending meetings are available at www.nationalcodes.ca

The CCBFC Chair reports annually, or as requested, to the NRC through the Vice-President responsible for the NRC-IRC. Through PTPACC, the CCBFC receives advice from and informs provincial and territorial authorities of issues, priorities, requests and decisions on matters relating to the National Model Construction Codes.

The CCBFC develops Canada's National Model Construction Codes through a committee-based process and formally approves all Code documents and technical revisions prior to publication by the NRC. The CCBFC also establishes the following committees and oversees their work (see Figure 1 at the end of the document):

- Executive Committee (acts as a standing committee on Divisions A and C of the Codes)
- Standing Committee on Building and Plumbing Services
- Standing Committee on Earthquake Design
- Standing Committee on Energy Efficiency in Buildings
- Standing Committee on Environmental Separation
- Standing Committee on Fire Protection
- Standing Committee on Hazardous Materials and Activities
- Standing Committee on Housing and Small Buildings
- Standing Committee on Structural Design
- Standing Committee on Use and Egress
- CCBFC Technical Translation Verification Committee

The CCBFC may approve the creation of short-term task groups, working groups and advisory groups to study specific issues and make recommendations to either itself or the applicable standing committee.

The CCBFC Technical Translation Verification Committee is responsible for verifying the technical accuracy of the translations of all Codes published in French.

4.2 Role of the Executive Committee

The Executive Committee looks after CCBFC business between CCBFC meetings by undertaking specific tasks assigned to it by the CCBFC, addressing policy or coordination problems that may arise and responding to requests for review of procedural actions taken by any subcommittees. It also recommends proposed changes to Divisions A and C of the core codes and similar content for non-core codes.

The Committee meets at the call of the CCBFC Chair and may hold joint meetings with PTPACC, as the need arises. Its Chair is the CCBFC Chair and its membership includes at least four voting CCBFC members. Meetings are held in camera, except those portions that deal with changes to Divisions A and C of the core codes and similar parts of non-core codes.

4.3 Role of the Standing Committees

Each CCBFC standing committee is responsible for a code or sections of a code and related documents, such as user's guides, and advises the CCBFC on technical issues and recommended changes. Meetings are normally held twice annually in spring and fall, unless otherwise authorized. Annual work plans balancing the number of requests and priorities against time constraints, capacities and resources are prepared by each standing committee in the fall for approval by the CCBFC.

Members are appointed by the CCBFC chair on the recommendation of the CCBFC Nomination Committee. The membership of each standing committee conforms to a matrix that provides for regulatory, industry, and general interest categories as well as equitable geographical representation. Non-members are welcome to observe the committee meetings or to address the committees on specific agenda items. Meetings are often held outside Ottawa to facilitate regional involvement. Guidelines for visitors attending meetings are available at www.nationalcodes.ca.

4.4 Role of the NRC-IRC

NRC-IRC is involved in every aspect of the development of the National Model Construction Codes. Committee work is supported by the latest technical information and expertise available within the NRC-IRC. Correspondingly, the committees refer many of the technical problems relating to code requirements to the NRC-IRC for study and possible inclusion in its research programs. This two-way flow of information has proven mutually beneficial.

The essential link between the standing committees and NRC-IRC research staff is provided through the CCC and the research advisors appointed as non-voting members to the standing committees.

When the committees need more information to make informed decisions, studies are performed to provide the missing data. These studies are not only performed by NRC-IRC but also by provinces, manufacturing groups and various consortia having similar interests. For more information on the NRC-IRC, see www.nrc.gc.ca/irc.

4.5 Role of the Canadian Codes Centre

NRC-IRC houses the Canadian Codes Centre (CCC). The CCC's technical advisors, who are mostly architects or engineers, provide technical support to the CCBFC committees and task groups as well as administrative support, including the organization of meetings, the preparation and distribution of agenda packages, and the preparation of minutes.

Technical advisors receive code change requests, review and evaluate them, and advise the appropriate committees on their implications. They are often required to prepare technical studies or committee papers that provide additional information and background data to the committees to assist them in their decisions. They also facilitate access to research resources.

Technical advisors help regulatory officials and other code users understand the codes' requirements; however, final interpretation of the codes rests with the authorities having jurisdiction.

Most technical advisors also perform a coordinating function as members of various standards development committees.

Despite the involvement of CCC staff in the work of the standing committees, they do not have voting status. It is the volunteer committee members who decide what code changes should be recommended to the CCBFC, which in turn makes the final decisions.

More information about the CCC is available at www.nrc.gc.ca/ccc.

4.6 Role of Other Groups at NRC-IRC

The Codes and Evaluation Production and Marketing Group is responsible for the editing, translation, and production of codes and related documents, including some provincial codes.

NRC-IRC's Client Services unit is responsible for sales and distribution of the products. More information is available at www.nrc-cnrc.gc.ca/eng/ibp/irc/publications/index.html.

4.7 Role of the Provinces, Territories and Municipalities

Canada's constitution gives the ten provinces and three territories jurisdiction over construction. Some cities also have this authority through a special relationship with their provincial authority. To enact building and fire regulations, the provinces, territories, and municipalities pass legislation that references the relevant National Model Construction Codes or provincial code.

The provincial and territorial authorities having jurisdiction are responsible for:

- adopting and enforcing laws and regulations
- providing interpretation of such laws and regulations
- providing training and education in such laws and regulations
- establishing roles and responsibilities of trades people and professionals.

In 2001, as part of the improvements to the code development system, the Provincial/Territorial Policy Advisory Committee on Codes (PTPACC) was formed to provide policy advice to the CCBFC. Three PTPACC sub-committees were also set up to deal with each code individually.

5.0 Process for Developing the National Model Construction Codes

Codes are continuously evolving to accommodate new technologies, materials, construction practices, research, social policy, and the changing needs of Canadian society. Globalization and free trade, for example, have led to the harmonization of some North American standards and increased use of international standards.

Development of code content is a consensus-based process that relies on the voluntary contributions of standing committee and task group members, and the public. A common process—from the initial proposing and consideration of code change requests to the publication of approved changes—is followed for all codes. An important feature of the code development and maintenance process is the extent of public involvement. Canada's code-writing process has one of the most extensive public review procedures in the world.

5.1 Proposed Changes

1. Submission

Code change requests can be submitted to the CCC by regulatory officials, design and safety professionals, manufacturers and suppliers, contractors, building managers or owners, consumers, and other public and private sector stakeholders—in fact, by anyone with an interest in the codes. CCBFC standing committee members and NRC-IRC staff may also propose changes.

2. Work Plan

Each code change request is reviewed by the appropriate standing committee. After this initial review the standing committee determines if it wishes to work on it and to include it in its work plan for CCBFC approval and priority setting. Work plan approval and priority setting by the CCBFC ensures that code development work focuses on issues of importance to the provinces and territories as well as stakeholders.

3. Review

Once authorized by the CCBFC the appropriate standing committee undertakes a detailed review of the code change request. If the proposed change is complex and requires significant analysis, a task group may be established to study it and make recommendations. When a change has implications for a part of a code that is the responsibility of other committees, all affected committees review the change. For example, a proposed change to NBC Part 9, Housing and Small Buildings, may need to be reviewed by the committees responsible for Parts 3, 4, or 6, and may also lead to a corresponding change in one of those parts.

A standing committee may reject a proposal, amend the wording, defer it pending receipt of more information or research, or approve the proposed change.

4. Pre-public Review

The provinces and territories have the opportunity to review draft proposed changes. If any of them has serious policy or administrative concerns about the inclusion of a certain proposed change for public review, the proposed change can be withdrawn or deferred for further discussion prior to public review.

5. Public Review

All proposed changes approved by the standing committees are made available for public review annually, in the fall, for two months. Additional public review periods may be called, when necessary, at other times of the year. This allows those most affected by a proposed change to provide feedback and increases the range of expertise available on any subject. Provinces and territories are invited to coordinate their public review activities with the national public review periods.

The availability of the public review documents is announced in Construction Innovation (NRC-IRC's quarterly newsletter, which is posted at www.nrc-cnrc.gc.ca/eng/ibp/irc/ci/current-issue.html) and on the National Code Documents Web site at www.nationalcodes.ca. The Internet is the primary format for distribution of public review information and receipt of comments.

6. Post-public Review

Following the public review period, the standing committees review the submitted comments. A proposed change moves forward only once all comments have been taken into consideration. Some proposed changes may be deferred or withdrawn at this point. The provinces and territories then review the final version of the proposed changes from a policy perspective and identify their concerns before the changes are submitted to the CCBFC for final approval.

7. CCBFC Approval

Following review of the proposed changes by the provinces and territories, the recommended changes are submitted to the CCBFC, and then, if approved, they are published in the next edition of the codes.

8. Translation

The approved changes are translated into French. The translation is reviewed by the Technical Translation Verification Committee to ensure accuracy, enforceability and consistency within the French documents.

6.0 Evaluation of New Technology and Systems

The evaluation of building products, materials, or systems as to their conformance to codes and standards is a difficult and time-consuming activity. A number of organizations, such as the Canadian Standards Association and Underwriter's Laboratories of Canada, provide full third-party certification for safety-related products or systems for which standards exist. The National Model Construction Codes do not require such certification, only that the product or system meets the minimum performance required by the standard. Code enforcement officials, however, often rely on certification as evidence that such is the case.

To provide the construction industry with a national evaluation service for innovative materials, products and systems, NRC in 1988 created the Canadian Construction Materials Centre (CCMC) at the NRC-IRC. This service includes the evaluation of new and innovative products for which no standards exist, and of products for which standards exist but for which no third-party certification program has been established. Most provinces, territories and municipalities use CCMC's evaluation reports as a basis for determining compliance of new products to codes. See www.nrc.gc.ca/ccmc for more information.

7.0 Summary

The National Model Construction Codes are developed and maintained using a broad-based consensus process. Individuals from all segments of the Canadian construction industry have the opportunity to contribute to the development of the codes, either directly, through committee membership, or indirectly, by submitting or commenting on proposed changes.

The improvements to the code development system for the 21st century are innovative, at the leading edge, and uniquely Canadian. They ensure openness and transparency, and minimize disruption to the design and construction industries, while responding to the realities and opportunities of the modern global economy.

Figure 1: Structure of the Canadian Commission on Building and Fire Codes

