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Dickens, H. B.

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# THE NATIONAL BUILDING AND NATIONAL FIRE CODES OF CANADA AND THEIR ASSOCIATED DOCUMENTS

ANALYZED

by H. B. Dickens

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Over ten years ago the function of the National Building Code of Canada (NBC), its method of preparation and extent of use in this country was outlined in CBD 66. The present Digest presents the latest information on the Code and its companion document the National Fire Code (NFC).

## Background

Code documents published by the National Research Council are the responsibility of the Associate Committee on the National Building Code (ACNBC) and the Associate Committee on the National Fire Code (ACNFC). Both delegate the preparation of technical parts of their respective codes to specialist standing committees representing technical expertise from across Canada. In all, three hundred committee members were involved in the drafting of the seventh edition of the National Building Code and the third edition of the National Fire Code, released in 1977 in both official languages. The Associate Committees are entirely responsible for Code content, but they are assisted by the staff of DBR who provide the necessary secretariat and technical support in an advisory capacity. A special Joint NBC/NFC French Terminology Committee, which works in association with the Translation Branch of the Secretary of State Department, is responsible for overseeing the quality of French translations.

This has been a most successful arrangement in the continuing development of "model" codes. Members of the Code committees are drawn from all parts of Canada and from all major sectors of the building industry and fire service. They are selected to provide a balance

of appropriate interests, but each member serves as an individual, not as a direct representative of a particular industry, association, or special interest group.

Both Codes are advisory only until legally adopted by a jurisdictional authority. Their primary purpose is the encouragement of uniform minimum safety standards across Canada, and they have been drafted in a way that will facilitate legal adoption by whichever legislative body has the necessary authority.

## National Building Code

The National Building Code is essentially a set of minimum regulations respecting the safety of buildings with reference to public health, fire protection and structural sufficiency. Intended primarily for new buildings, the NBC has limited application also to existing buildings. For example, its requirements may be applied to demolition, reconstruction, to correction of unsafe conditions or to change of occupancy. A brief summary of the main parts of the Code follows:

*Part 1* lists the definitions of the main terms used in the body of the document that are important to its proper application.

*Part 2* contains the basic administrative provisions. As these are liable to local variation they have been assembled for convenience in one part.

A unique feature of the Code arrangement is the compilation in *Part 3* (Use and Occupancy) of the fire and health provisions for safe building design based on the degree of hazard presented by the building occupancy. Most relate to safety from fires. One important section (3.2.6) deals

with safety in high-rise buildings, a subject of worldwide concern. Another section (3.2.9) deals with interconnected floor spaces (atriums).

*Part 4 (Design)* is made up of eight sections. The first (4.1) deals with the loads to be used in design calculations and the methods of design to be followed. Section 4.2 regulates foundation design and construction. Sections 4.3 to 4.8 deal with design in wood, masonry, concrete, steel and aluminum and with the materials used to clad a building and protect it from the weather. Sections 4.3 to 4.7 contain only short performance requirements and reference the appropriate CSA Standards for detailed information.

*Part 5 (Materials)*. The quality of materials is generally specified by reference to an appropriate standard, and a complete listing of these and other standards referenced in the Code and its associated documents is provided in a separate document entitled "List of Standards Referenced in the NBC and NFC and their Associated Documents." Part 5 also contains an important provision permitting the use of materials other than those directly specified in the Code if equivalent performance can be demonstrated to the satisfaction of the enforcing authority.

*Part 6 (Building Services)* and the Canadian Heating, Ventilating and Air-Conditioning (CHVAC) Code are concerned with the safe functioning of heating, ventilating, elevator and other service equipment installed in a building. The requirements deal mainly with installation. Corresponding design provisions relating to fire safety as determined by the occupancy of the building are to be found in Part 3.

*Part 7 (Plumbing)* contains only the basic legal statements with regard to scope, application and administration. All detailed technical requirements are contained in the Canadian Plumbing Code (published separately); most provincial authorities have enacted plumbing regulations separately.

*Part 8 (Construction Safety Measures)* is intended to protect the safety of the public in the vicinity of construction sites. It is quite short since all detailed technical requirements are included in the Canadian Construction Safety Code. The latter also contains a section dealing

with the safety of workmen on construction sites.

*Part 9 (Housing and Small Buildings)* provides detailed requirements for the construction of houses and small buildings up to 6000 sq ft per floor and three storeys in height, and applies to all occupancies except assembly, institutional and high-hazard industrial. The residential provisions of this Part, combined with additional requirements concerned with both quality and amenity, make up the *Residential Standards*. This is published as a separate document under ACNBC auspices and is used by Central Mortgage and Housing Corporation to govern all construction under the National Housing Act.

### **Supplements to the National Building Code**

The Code is supported by supplementary documents that contain relevant technical information but do not form a legal part of the Code when the NBC is adopted as law.

*Supplement No. 1 (Climatic Information for Building Design in Canada)* contains information on snow, wind, and other design weather data for all parts of Canada. It is through the use of the appropriate climate factors summarized in this Supplement that the Code can be applied nationally.

*Supplement No. 2 (Fire Performance Ratings)* provides a guide to the determination of the fire-resistance, flame-spread and smoke-developed ratings of materials in construction in relation to the provisions of the Code. It gives a procedure for calculating the fire-resistance rating of construction assemblies, based on generic descriptions of the materials used in these assemblies.

*Supplement No. 3 (Commentary on Part 3)* is intended to explain the requirements of Part 3 of the Code that relate to health and fire safety and depend upon the use of a building and its type of occupancy. This Supplement, which is still in preparation, will also contain material in support of the high-rise fire safety requirements in Part 3 (3.2.6). This material has been issued separately under the title "Measures for Fire Safety in High Buildings."

*Supplement No. 4 (Commentaries on Part 4)* consists of explanatory material and related technical design information useful in the appli-

cation of the structural design requirements in Part 4 of the Code; for example, progressive collapse and structural integrity, effects of deformations in building components, limit states design, effects of earthquakes, foundations, serviceability criteria for deflections and vibrations, and snow, wind, and rain loads.

*Supplement No. 5* (Building Standards for the Handicapped) contains provisions to facilitate the use of buildings by handicapped persons. Certain designated facilities in this Supplement are required by the 1977 NBC (3.2.7) to be incorporated in "Public Buildings" as defined in Part 1 of the Code.

In addition to these documents, which are intended to be used in direct association with the National Building Code, the ACNBC has recently issued a document entitled "Measures for Energy Conservation in New Buildings." Aimed at providing a basis for controlling energy consumption in new buildings, it has been published separately to distinguish its cost-benefit, conservation-oriented approach from that of the Code, which is directed towards public safety. A Commentary is available to assist the user in the application of these measures.

One other document in the ACNBC series is the "Canadian Farm Building Code." In addition to basic standards, it contains recommendations relating to the functional requirements of farm buildings and good farm management practice. The latter is not a primary concern of the Associate Committee, which is exploring the possibility of another agency's assuming responsibility for publishing this material.

Other changes in the format of National Building Code documents contemplated for the 1980 edition include discontinuing publication of the Canadian Heating, Ventilating and Air-Conditioning Code and the Canadian Construction Safety Code and including the appropriate requirements in Parts 6 and 8 of the NBC. In addition, the administrative provisions in Part 2 of the NBC will be removed and issued as a separate document. The Code itself will include a "Guide to Enforcement" similar to that contained in the current edition of the NFC.

### **National Fire Code**

Whereas the National Building Code has only limited application to existing buildings, the

National Fire Code applies to buildings in use. It establishes the necessary standards to maintain an acceptable level of fire safety within existing buildings and prevent, contain and fight fires originating outside buildings. It also sets standards for the transportation of flammable and combustible liquids.

The National Fire Code includes a section entitled "Guide to Enforcement" that contains advice to the adopting authority in preparing the administrative provisions necessary for the legal enactment of the Code. It identifies various enforcement options and lists the relevant legislative considerations in adopting the National Fire Code for legal use. This "Guide to Enforcement" replaces the Part on Administration included in the first edition of the Code and is intended to provide greater flexibility in adapting the Code for use by any level of jurisdictional authority.

The various requirements for fire safety in the National Fire Code have been grouped in seven parts. *Part 1* contains definitions and stipulates how the Code applies. *Part 2* provides for the control of common fire hazards and for general maintenance requirements of fire separations, heating appliances and air-conditioning systems. In addition, it makes provision for the maintenance of fire department access and means of egress and the establishment of fire safety plans. *Part 3* is concerned with property protection for industrial and commercial occupancies in which hazardous materials are stored or used. *Part 4* deals with the requirements for the storage, handling and transporting of flammable and combustible liquids. *Part 5* contains requirements for the storage and handling of hazardous materials. *Part 6* is a new section on fire protection installations that includes the provision and maintenance of portable extinguishers and the inspection, testing and maintenance of fire alarm, standpipe, sprinkler and emergency power systems. The inspection, testing and maintenance of fire emergency systems installed in high buildings are covered in *Part 7*, which is intended to complement the specific requirements for high-rise buildings provided in Part 3 of the NBC.

In addition to the NFC, the ACNFC has prepared two model fire department codes that provide guidance on the organization and operation of both "paid" and "volunteer" fire

departments by municipal government. Recent surveys indicate that these have served their intended purpose and are no longer in demand. They will be withdrawn as soon as current stocks are exhausted.

### **Relation of NBC and NFC**

The NBC and NFC have been developed as complementary and coordinated documents. To avoid duplication of requirements and provide some flexibility in their application to existing buildings, the National Fire Code makes reference to appropriate requirements in the National Building Code and makes their application to existing buildings subject to the discretion of the authority having jurisdiction.

It is particularly important that fire and building officials be not only conversant with the fire safety standards of these Codes but involved jointly in their enforcement so that the best expertise of both groups can be fully exploited to ensure a satisfactory standard of safety in the community.

### **Code Revisions**

Code committees have been greatly assisted by informed criticism and comment regularly submitted. Code users are encouraged to present written briefs on proposals for change and to consult with Code support staff on questions related to the use of Code documents. Recently provision has been made for formal public comment on all future changes to the Code. To facilitate this the next editions of the NBC and NFC are scheduled for 1980, with subsequent revisions planned at three-year intervals. It is intended that the technical committee work proceed on an annual cycle, with proposed Code revisions to be issued yearly for public comment; final revisions are to be incorporated in each new three-year edition of the document. The only exception to this procedure will be the release of interim revisions of an emergency nature.

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### **Use of the NBC and NFC**

In the past the NBC has received extensive use through voluntary adoption by municipal governments. More recently, most provincial governments and the two northern territories have adopted or are using the National Building Code as the basis for their own building codes, having withdrawn from their municipalities previously delegated rights to establish local codes. These jurisdictions are in the process of making similar use of the National Fire Code as the basis for fire prevention regulations.

A development of some importance to such provincial use of the National Building Code is the formation of a Provincial Advisory Committee on the National Building Code. This Committee was established by and is fully representative of all ten provinces and the two northern territories. It provides a most useful liaison mechanism between the adopting authorities and the Associate Committee with respect to the legal use of the National Building Code in Canada. The Provincial Advisory Committee has accepted responsibility for coordinating future provincial proposals for changes to the National Building Code and is potentially a most effective tool for attaining a uniform approach to NBC enforcement across the country. It is hoped that a similar mechanism can be established for the National Fire Code as it becomes more generally used in a regulatory way by the provincial and territorial authorities.

### **How to Obtain the Codes**

All orders and inquiries on the NBC and NFC should be directed to: Codes Secretariat, ACNBC/ACNFC, National Research Council of Canada, Ottawa, Ontario K1A 0R6.

A price list for all Code documents in both official languages will be sent on request. Each copy of the NBC and NFC contains a tear-out card for return. It entitles the sender to receive copies of the NBC/NFC News, issued about four times a year and containing information on Associate Committee activities and related Code matters.