

Significant Changes to the National Model Codes

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Welcome and thank you for taking the time to attend this presentation.

My name is Andre Laroche and I will highlight the most significant changes introduced into the 2020 edition of the National Model Codes.

Outline

- National Model Codes
 - What they are and who develops them
- Significant changes
 - Design and use
 - Construction methods and materials
 - Energy and environment



The presentation is broken down into two main parts.

I will start with a brief overview of the National Model Codes and how they are developed.

After that short primer on the National Model Code development system, I will highlight the most significant changes introduced in one or more of the National Model Codes.

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National Model Codes

What they are and who develops them

I'm intentionally using the term National Model Codes.

What is a model code? How are model codes different than provincial or territorial building codes and regulations?

Who develops them? How?

Let's answer those questions.

National Research Council of Canada

- 14 Research Centres
 - Construction Research Centre
 - Built Environment Regulations and Specifications
 - Codes Canada



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I work for the National Research Council Canada, which is an agency of the Government of Canada, reporting to Parliament through the Minister of Innovation, Science and Economic Development.

The NRC has 14 integrated and consolidated research centres focused on key industry sectors. These research centres represent areas of strategic importance and economic value for Canada.

Of the 14 research centers, I work within the Construction Research Centre, which aims to advance science and technology to support the Canadian construction industry. Part of this support involves the development of model building regulations.

Codes Canada is the group supporting the development of model building regulations for Canada.

Publications



The NRC publishes the following National Model Codes:

- Building Code
- Fire Code
- Plumbing Code
- Energy Code for Buildings
- Farm Building Code

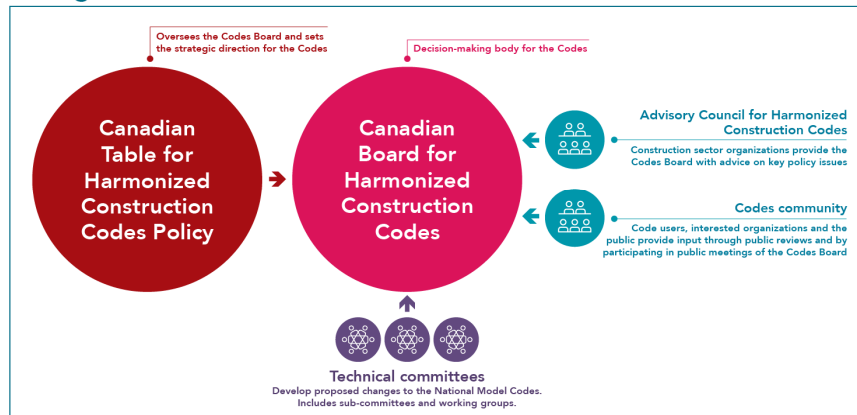
To keep pace with changes and ensure that the latest innovations and applications are applied safely by the construction industry, a new edition of the National Model Codes is published approximately every five years. Here are shown the 2020 edition.

In addition to National Model Codes, Codes Canada publishes several guides, supplements and commentaries such as the:

- Illustrated Users Guides—NBC 2015: Part 9 of Division B, Housing and Small Buildings
- Structural Commentaries (User's Guide—NBC 2015: Part 4 of Division B)
- User's Guide—National Energy Code of Canada for Buildings 2017

New harmonized code development system

New governance model to harmonize construction codes in Canada



We are transitioning into a new harmonized code development system. You can see on the screen the proposed new governance model. It is still subject to further revisions and refinements. We officially started transitioning to the new system on November 22, 2022.

The Canadian Board for Harmonized Construction Codes (Codes Board) is the decision-making body for the National Model Codes.

The Canadian Table for Harmonized Construction Codes Policy (Deputy Ministers Table) oversees the Codes Board and sets the strategic direction for the codes.

Technical committees develop proposed changes to the codes. The technical committees include sub-committees and working groups.

The Advisory Council for Harmonized Construction Codes is made up of construction sector organizations, which provide the Codes Board with advice on key policy issues.

The codes community is made up of code users, interested organizations and the public, which provide input through public reviews and participate in public meetings

of the Codes Board, technical committees and sub-committees.

Who's doing what?



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Having said that, the following has not and will not change!

In Canada, the provinces and territories pass legislation enacting building and fire regulations. This legislation either makes reference to the relevant National Model Codes or to a provincial or territorial code with or without variances. Adoption and enforcement of the codes is the responsibility of the provincial and territorial authorities having jurisdiction.

The NRC provides support to the system and is the official publisher of the Codes Canada Publications. But importantly, NRC has no regulatory authority.

How do I find out more about a specific change?



- <https://ccbfc-cccbpi.ca>

How do I find out more about a specific change?

Your first stop to get access to and learn about the development and publication of the building, energy, fire and plumbing codes is our website. You can get there directly from this link or by searching *NRC Codes Canada* in your browser. When you get there you will also find information about accessing and ordering copies of the codes (electronic copies are free!) and other publications.

If there is something specific that we talked about today, that you would like more details about, you can contact me. I will either respond to you directly or forward your request to one of my colleagues who can provide more details.

When will these changes affect me?

- <https://ccbfc-ccbpi.ca/en/national-codes-provincial-territorial-adoption/>



When will these changes affect me?

After the National Model Codes are published it is up to individual provinces and territories to pass legislation and enact regulations referencing the relevant National Model Codes or a separate provincial code. With the new harmonized code development system, the PTs have committed to adopt the 2020 edition of the National Model Codes within 24 months of their publication and then 18 months thereafter for subsequent editions. There are some jurisdictions that adopt the codes as soon as they are published or most likely within 12 months of publication. The 2020 edition of the National Model Codes was published in March 2022.

For enquiries about code adoption or enforcement in your jurisdiction, please contact your province or territory. A list of Provincial and territorial ministry contacts is provided on our website.

Get involved

- <https://ccbfc-ccbpi.ca/en/code-development-process/>



How can I get involved in the development of the National Model Codes?

As you saw in the beginning of the presentation, the harmonized code development process is ongoing and serves to evolve and improve the National Model Codes. What I showed you today represents years of work that led to the changes published in the 2020 edition of the codes. We continue to receive code change requests and technical committees meet on a regular basis—so the process continues.

Visit our website, at the link above, or by searching *NRC Code Development Process*.

When you get to the page you will find links to:

- Request a change to the code
- Participate in public review by providing comments on proposed changes
- Volunteer for committee membership
- Attend a Codes Canada public meeting

Significant changes

Design and use

Now that you are familiar with what the National Model Codes are and how they are developed, let's take a look at what the committees worked on for the past years, since the publication of the 2015 edition of the National Model Codes.

There are numerous changes considered for the 2020 edition. I will highlight only some of the most significant ones. We won't get into the technical details in this presentation but I encourage you to note anything of interest to you and either ask questions at the end or contact us for further information.

I will present the changes by subject because some of the provisions may affect multiple codes or Parts within the same code.

So, let's start with design and use!

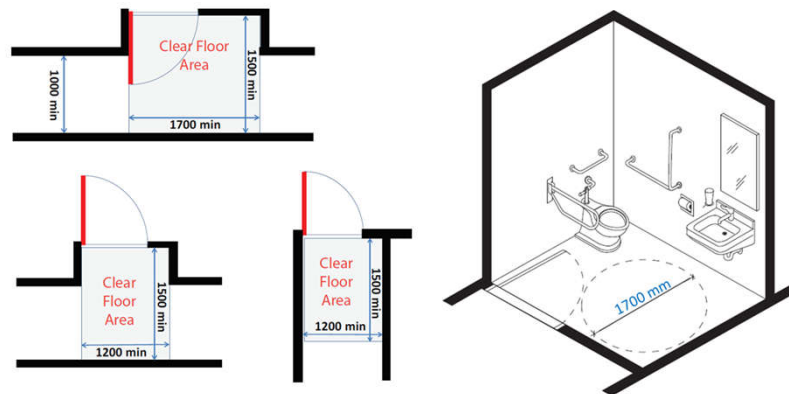
Accessibility



The first accessibility requirements were introduced in the NBC in 1965. Of course, population demographics have changed since then. A review of the NBC requirements with an accessibility objective showed that only a small fraction of the accessibility requirements in the Code reflect current best practice guidance.

The Canadian Commission on Building and Fire Codes (now replaced by the Canadian Board for Harmonized Construction Codes) and its committees, with the guidance of the provinces and territories, were hard at work developing changes, aimed at providing improved access to the built environment to a larger portion of the population through enhanced requirements for people with physical or sensory disabilities.

Anthropometrics



One important change address the minimum dimensions for accessible paths of travel for manual wheelchair users.

A recent international study revealed that the manoeuvring assumptions forming the basis of the NBC provisions for minimum dimensions, aimed at reducing barriers for wheelchair users, only cover 60% of users of manual wheelchairs.

The minimum dimensions for accessible paths of travel is increased so that approximately 90% of manual wheelchairs will be accommodated. The slide shows a few examples of what this looks like, with larger and wider floor path dimensions.

Plumbing facilities and signage



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On the left, universal washrooms are consistent with the accessibility objectives in the NBC, because they may be used regardless of the gender of the person with a disability or caregiver using them. However, these facilities are not mandatory and there was no requirement on the minimum number of toilets.

The NBC has introduced a minimum number of universal toilets to provide the same level of performance for all occupants—with some exceptions—where regular washrooms are provided.

Signage in buildings is important to safety and wayfinding. However, people with low vision may not be able to use the building's signage whether for their own safety or their right and ability to navigate through the building, and use the building's facilities on their own. The NBC requires various signs for safety and information purposes. The design of the signs is inconsistent and they are not accessible to all occupants of a building.

So now—where it is intended or required that a sign be used by the public—they should be readable by all, including those with vision loss. The result is requirements for those signs to be tactile, with the messaging both in Braille and with raised letters

(like the picture on the right). This will help ensure that all occupants in a building will be able to receive safety or wayfinding information contained on the sign.

Building access



Entrances



Elevators



Not all public building entrances were required to be accessible in the code (about 50% of entrances in the NBC 2015). This meant that a person with a disability might have to travel an extended distance to get into a building, through the back door that is barrier-free or to the accessible front door from a parking area located at the back of the building, where only a non-accessible entrance is required, compared to a person without a disability who would otherwise be able to use the nearest entrance.

New changes in the 2020 edition of the NBC requires that all pedestrian entrances to a barrier-free storey be accessible. This includes having a power door operator. This is to give all building occupants equal access to a building.

Protection of openable windows



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Data shows that every year across the country 300 to 400 children under the age of 10 are treated in hospital emergency rooms for falls from residential windows. Most of these falls are by children less than 4 years old.

Of those, approximately 30 percent (90 to 115) are admitted to the hospitals for further treatment or require specialized follow-up care.

The previous requirements for a guard or some kind of limiting mechanism, typically only applies to dwelling units located on the second floor or higher of residential or mixed use buildings.

The change requires more windows to be protected by guards or controlling mechanisms by setting up new requirements based on sill height, so that protection is available for high window sills even if they are on the ground floor.

Loads on roofs



Parking



Solar panels



Solar panels

Let's shift gears now to loads on roofs and the larger context of structural design.

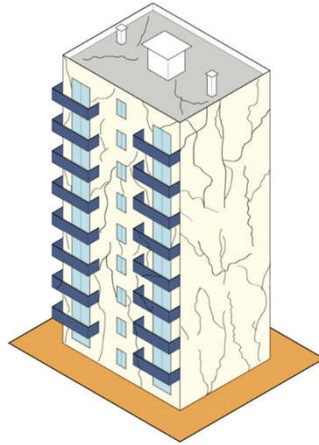
With the price of real estate at a premium, designers and building owners are getting creative. It's not uncommon to use the roof of a building for parking as seen in the picture on the left. These areas are typically cleared of snow to allow regular use. However, during a snow storm, the roof parking area is not likely to be cleared of snow until after the storm. Also, snow is usually not cleared around vehicles that are parked on the roof, which could be for extended durations over the winter. Until now these scenarios were not explicitly considered in the loading requirements in the NBC potentially leading to greater applied loads than anticipated in the design. To address this, the load combinations used for the design of rooftop parking areas was modified to include both vehicle and snow loads.

Solar panels are becoming more prevalent from initiatives to use alternative energy sources. There were many demands from industry and regulators to provide requirements related to solar panels to ensure additional loads resulting from their presence are captured. Solar panels on roofs, like the ones shown in the other two pictures, can have an appreciable impact on the applied wind and snow loads. With no code requirements, inadequate design could negatively impact structural

performance of a roof.

To address this, the NBC include requirements for snow and wind loading for roofs with solar collectors.

Serviceability limit states



The 2020 edition of the NBC also considered serviceability limit states.

For those unfamiliar with the term, serviceability limit states in structural engineering describe some of the factors limiting the use and occupancy of a building. These factors include deflection and vibration, which you can imagine would really affect the perception of safety for the occupants, as shown with the cracks on the building.

Serviceability criteria were previously included in the NBC up to the 2005 edition. However, they were moved to the structural commentaries in 2005 following the introduction of a new structural approach for combining different types of loads.

The change serves to reintroduce serviceability criteria back into the main body of the Code. The new NBC also include a table with new load combinations, to make it easier for designers to limit how much structures deflect or vibrate.

Seismic design considerations

New SFRS

- Cross-laminated timber shear walls
- Moderately ductile truss moment resisting frames
- Moderately ductile plate walls

Sloped columns

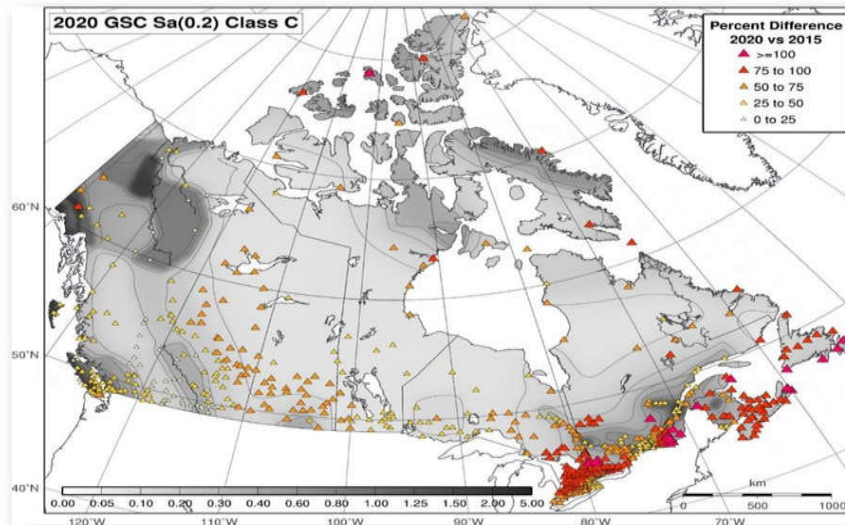


The NBC also address the evolution of architectural trends, construction methods and technologies, and the associated design considerations for seismic design.

In the world of architecture, the use of sloped columns is an emerging trend, as you can see on the picture. This can pose significant challenges for resisting loads due to earthquakes. New design checks are part of the 2020 edition of the NBC and sloped columns were added to a table of irregular structures for consideration by designers.

Additionally, there are three new seismic force resisting systems included in the design standards referenced in the NBC. Until now, these systems could not be used as an acceptable solution by industry since they were not specifically addressed in the NBC. The three seismic force resisting systems shown on the left side of this slide can now be used by designers to meet the seismic requirements of the Code.

Changes to seismic hazard



Finally, the NBC is looking at the seismic hazard values, which are updated to reflect the latest scientific data from Natural Resources Canada. Hazard values are provided in the Code for different periods for specific geographic locations.

This is a graphic showing the percentage increase for only one specific period (0.2 s). Note both the color and size of the triangles on this image. The bigger the triangle, the bigger the increase in seismic hazard. The shades of grey in the background represent the magnitude of the hazard, where darker grey means higher hazard.

So a big red triangle on a dark grey background is the worst combination because it means a large increase (red triangle), in a geographical locations which already has a high seismic hazard (dark gray).

The point of this figure is just to give you a general sense of the updated seismic hazards. Broadly speaking, in the Eastern locations, seismic hazard levels have increased for almost all time periods. However, in Western locations, changes in seismic hazard values vary across different periods.

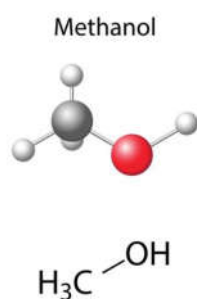
National Fire Code



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Let's move on now to fire protection.

Water-miscible liquid mixtures



The National Fire Code currently classifies flammable and combustible liquids, such as gasoline, diesel, methanol and lubricating oil, based on their flash points—a characteristic of ignitability. It does not recognize that some of these liquids can be mixed with water, which changes the flash point of the mixture.

One of the most common of those mixtures is windshield washer fluid, which contains methanol. Based solely on the flash point of methanol, windshield washer fluid would be considered a flammable liquid and highly hazardous. This means that storing windshield washer fluid at store or gas station could result in the imposition of costly measures based on the classification of a mixture that isn't as hazardous as pure methanol.

The 2020 edition of the NFC provides guidance on how to classify five of the most widely used water-miscible liquid mixtures, including windshield washer fluid. This provides risk mitigation guidance that is more specific to the hazard.

Application of CSA B139 standard

- CSA B139, *Installation Code for Oil-Burning Equipment*
- Storage tank capacity

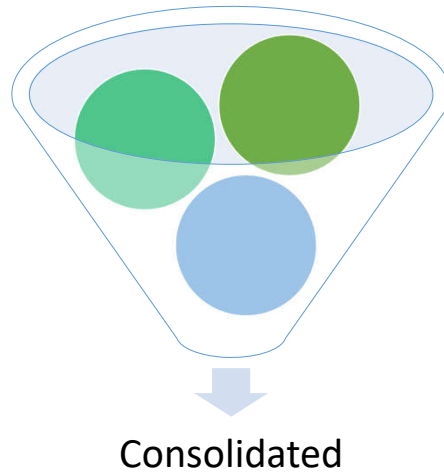


The last code cycle looked at oil burning equipment in the context of fire. The changing scope of the CSA B139 standard with the newer editions has caused significant confusion in the industry, even amongst regulators and authorities having jurisdiction versus the application of the NFC.

The NFC clearly denote that for small storage tanks less than 2500 L, the CSA B139 standard can be applied. However, for larger tanks, the NFC requirements for flammable and combustible liquids apply for both indoor and outdoor locations.

As a side note, the scope of CSA B139 standard has since changed (again!) and is still conflicting with the NFC, despite the clarification provided with the 2020 edition of the NFC. There is a task group working to resolve this issue.

Fire safety plan relocation



Fire safety planning was also addressed.

Requirements for fire safety plans were scattered in different places in the NFC and were not always consistent. You can imagine how this made it challenging for designers, regulators and building owners to ensure compliance.

Those requirements were consolidated to facilitate compliance and regulation of the requirements for fire safety plans.

National Plumbing Code



Asbestos

Remove references to asbestos



HVAC system and equipment



Asbestos cement drains



ASTM D 3019-08* restricted to non-asbestos materials

* ASTM D 3019-08, Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered

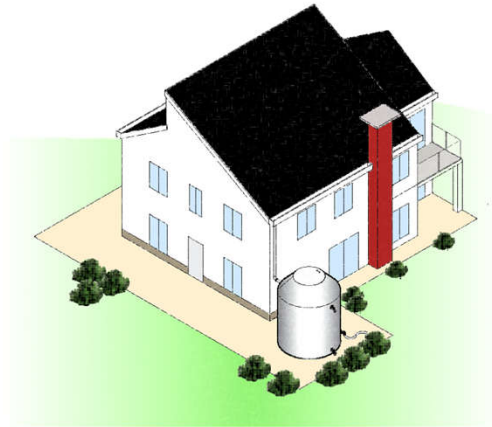
Due to the known health risks of airborne asbestos, Canada has banned its use. Accordingly, the NBC removed all specific instances where asbestos was listed as an acceptable building material.

For example, one change clarifies that the use of asbestos is strictly prohibited in HVAC systems and equipment, including insulation coverings, air distribution systems and any accessories that form part of an HVAC system or related equipment.

Similarly,

- Another change would remove asbestos drains and vents as acceptable solutions in the NPC. This change removes all code wording and Explanatory Notes pertaining to the use of asbestos.
- A qualifying statement was added in Part 9 to ensure that the ASTM D 3019-08 standard is only used for non-asbestos type materials.

Rainwater harvesting



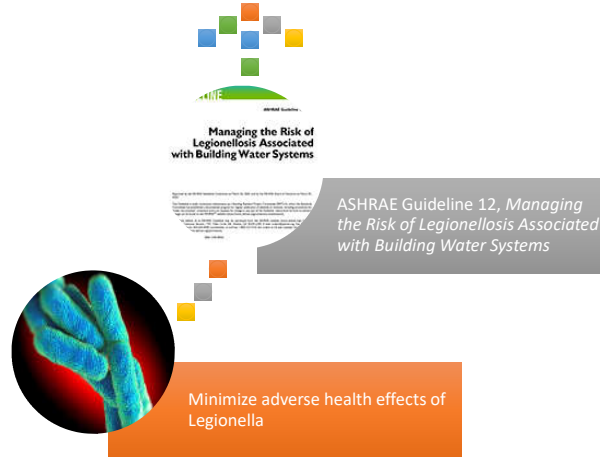
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Harvesters collect non-potable rainwater and currently the NPC is silent on these systems.

A change clarifies how to properly connect harvester systems together.

Additional changes are included to ensure proper labelling and good engineering practices are followed.

Legionella



Legionnaires' disease is a potentially fatal respiratory illness that is caused by exposure to Legionella bacteria.

A number of changes address the growth and transmission of Legionella in buildings. They include:

1. Drain pans in HVAC system designed to ASHRAE 62.1 standard
2. Systems should be accessible for cleaning and maintenance
3. Materials for drain pans should be corrosion-resistant and non-porous
4. New standards and guidelines such as ASHRAE Guideline 12 are introduced
5. Revised requirements for evaporative heat rejection systems and evaporative air coolers misters and atomizers as well as air washers and humidifiers

These changes are intended to minimize adverse health effects caused by Legionella and other bacteria.

This package of changes represents a massive effort where the relevant technical committees partnered with Health Canada and Public Services and Procurement Canada to come up with a solution that suits everyone.

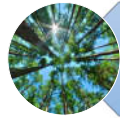
Significant changes

Construction methods and materials

The construction industry, technology, methods and materials are constantly evolving. Developers, architects, engineers, builders and building owners across Canada are always seeking additional options for a greater variety of heights and sizes of buildings that are permitted to be constructed of wood.

So, let's take a closer look at what is new with the 2020 edition of the National Model Codes about construction methods and materials.

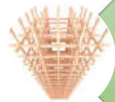
Current limitations



Wood



Construction



Technology

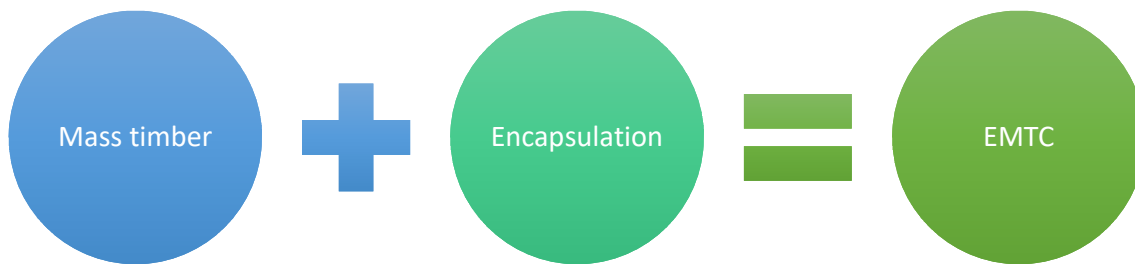


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Under the current NBC requirements, wood construction is limited in height based on a distinction between combustible and noncombustible construction. This was introduced in the fire safety requirements in the Code over 50 years ago.

Building outside of those prescriptive solution options typically requires the submission and evaluation of an alternative solution to the code requirements. Thus, shifting the onus on the regulators to approve a new building design.

New type of construction



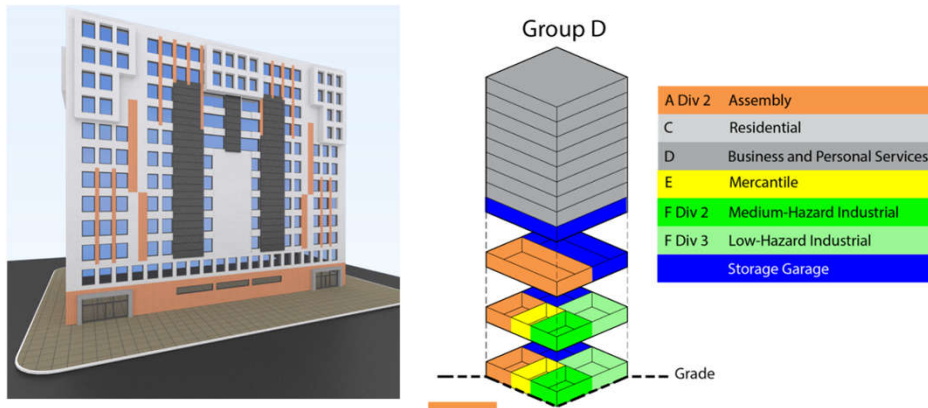
In response to industry trends in construction technology, a new type of construction classification called encapsulated mass timber construction, or EMTC, is introduced in the NBC and NFC.

For the purposes of the National Model Codes, EMTC, is defined as a type of construction in which a degree of fire safety is attained by the use of encapsulated mass timber elements, with minimum cross-sectional dimensions, with a covering encapsulation rating.

The essential characteristics for this type of construction is that there are requirements for minimum dimensions for the major structural wood elements (mass timber) as well as a requirement for *encapsulation ratings* to be applied to the mass timber elements.

Encapsulation rating refer to the time that a material, or assembly of materials, will delay the ignition and combustion of the mass timber elements when exposed to fire.

Acceptable solutions



Buildings up to 12 storeys in building height constructed using EMT will now be included within the acceptable solutions in the NBC. The prescriptive requirements include provisions for mixed-use occupancies and cladding—to name a few—as shown on the right side of the screen.

Requirements are also introduced into the NBC to address specific risks and hazards related to EMT buildings—particularly during construction.

Large farm buildings

Past



Present



After a quarter century, new National Model Codes provisions for farm buildings were developed.

The current NFBC was last published in 1995. Since that time, the farming industry has evolved significantly and the requirements for farm buildings have not kept up. The typical single storey, small area, timber post- and beam-framed farm buildings (picture on the left) from a quarter century ago no longer represents the multi-storey, large area, modern structures designed and built today to meet the farming industry's demands as shown on the right.

Farming operations have also become more complex and the provisions of the NFBC no longer reflect these modern, often more automated farming operations. Although it may seem that modern farming operations are similar to industrial operations, there are some distinct differences that were considered in the development of this set of changes.

Focus of attention

The diagram illustrates the focus of attention for large farm buildings, organized into four categories. Each category is represented by a small image above a colored text box. The categories are: General (blue box), Fire protection and occupant safety (teal box), Structural design (light green box), and HVAC (green box). The images above the boxes are: a red farm building, a green exit sign, the interior steel frame of a large building, and a building with multiple HVAC units.

General

Fire protection and occupant safety

Structural design

HVAC

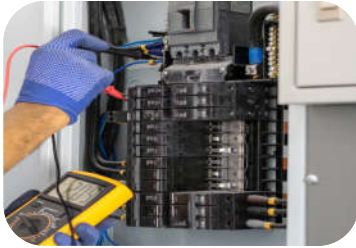
 CBHCC
Canadian Board for Harmonized
Construction Codes

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The building requirements for large farm buildings are in a new Part 2 in the 2020 edition of the NBC. The Part provides general requirements applicable to all large farm buildings and more specifically address more specific applications for fire protection, structural design and HVAC requirements.

By being incorporated in the NBC each requirement is now assigned objectives and functional statements like all other code provisions. The requirements for farm buildings were designed to address the safety of human occupants only and do not consider any of the other code objectives such as property protection and health.

National Fire Code



Inspection



Liquid manure



Storage



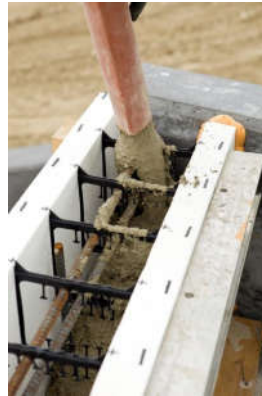
Additionally, specific requirements for large farm buildings are introduced within existing Parts of the NFC.

A few changes to note include:

1. Requirements for the inspection of mechanical and electrical equipment at regular intervals. This is in order to control the risk of fire hazard caused by a mechanical or electrical malfunction.
2. The addition of requirements specific to the control of gasses and vapours for farm buildings having under-floor liquid manure storage to mitigate the atmosphere of dangerous gases created in these buildings.
3. The introduction of specific requirements for the storage of flammable and combustible liquids on farms.

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Insulated concrete form



The current requirements for using above-ground insulated concrete form construction (ICF) were limited to single-family dwelling units.

The change removes this limitation and allows other building types (2 storey or less) to be constructed with above-ground ICF walls using prescriptive requirements.

A number of small changes to ICF provisions also include references to standards, attachment of cladding and interior finishes, and clarification in Explanatory Notes.

Safety glazing



CAN/CGSB-12.1, *Safety glazing*

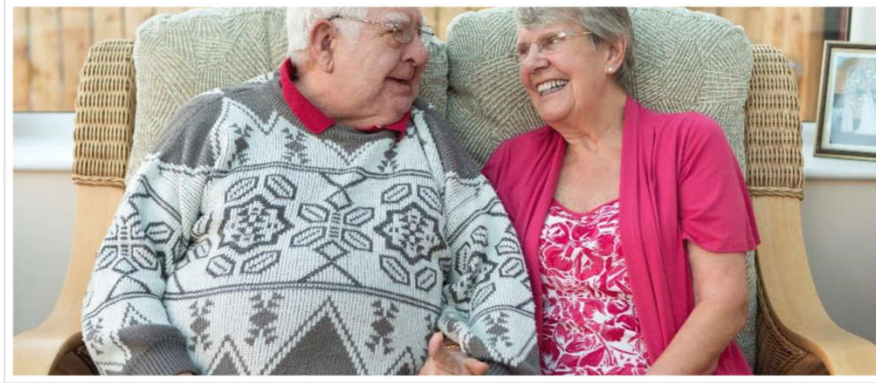
Wired glass is used by designers when introducing glazing into doors and windows, particularly in fire separations with the objective to maintain the integrity of the fire separations when exposed to a fire. The problem is that there are a number of documented severe injuries resulting from human impact with wired glass, mostly occurring in schools, where wired glass is used as a security feature to prevent entrance in a building.

This change is for assembly occupancies (such as schools) and requires glazing used in locations subject to human impact to meet the requirements of an updated standard for safety glazing.

This means that traditional, uncoated, wired glass may not meet the requirements of the new standard and so will not be permitted to be used in areas subject to human impact in assembly occupancies.

But this does not mean that wired glass was removed from the NBC. Wired glass is still permitted—as it currently is—except for areas subject to human impact in assembly occupancies.

New occupancy classification



There is a demand for affordable lodging for the aging population in a home-type environment.

Care occupancies are currently subject to the requirements of the fire safety provisions for large buildings in the NBC, which, among other things, require sprinklers.

Sprinklers increase the construction costs thereby negatively affecting the feasibility of constructing—or converting—small, home-type care facilities.

To allow these facilities, a new subset of care occupancies called *home-type care occupancies* is introduced in the NBC providing prescriptive solutions for housing and small buildings.

Home-type care major occupancy



Unlike the existing NBC requirements for care occupancies that are based on protect-in-place measures, such as sprinklers, compensating for the difficulty of conducting a full evacuation of these facilities; these new prescriptive requirements address building design—ensuring adequate means of egress—that allows the full evacuation of residents in a timely manner.

Some of the compensating measures for home-type care occupancies include limits on the number of occupants, limits on where the occupants receiving care can be located in the building, as well as enhanced alarm and detection requirements.

The new occupancy type within Part 9 of the NBC (dealing with housing and small buildings) will allow for construction of small care facilities—or the conversion of existing homes and small buildings into care facilities—using construction techniques and expertise already familiar to designers and builders of other small residential buildings.

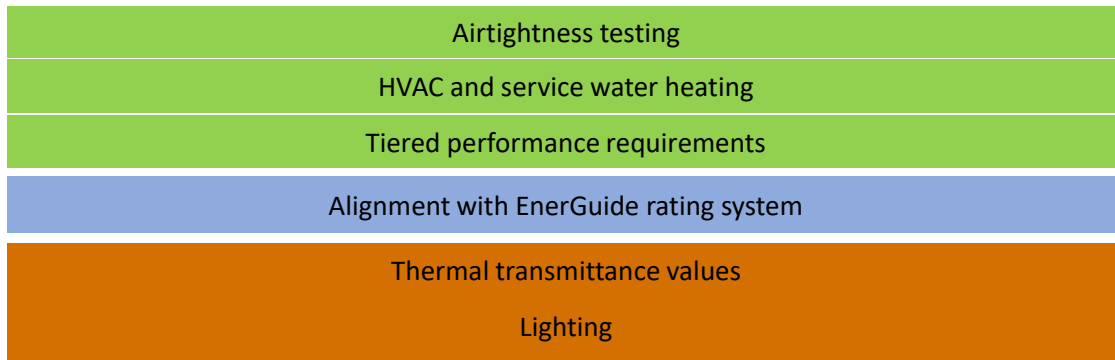
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Significant changes

Energy and environment

And finally, but not the least energy efficiency improvements.

Energy efficiency



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A total of 22 changes are introduced into the NECB and Section 9.36. of Division B of the NBC for Part 9 buildings.

I will focus on some of these changes as listed on the slide:

- Changes under the first green items impact both NECB and NBC
- Changes related to alignment with the EnerGuide rating system apply only in the NBC (in blue)
- The two orange boxes at the bottom represent changes limited to the NECB

Airtightness testing—NECB

ASTM E3158, *Standard Test Method for Measuring the Air Leakage Rate of a Large or Multizone Building*

ANSI/DASMA 105, *Test Method for Thermal Transmittance and Air Infiltration of Garage Doors*

ASTM E283, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*



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The change on airtightness for the NECB includes whole building testing as an option in the prescriptive path.

Testing standards are referenced to reflect current practice such as:

- the building is to be prepared in accordance with ASTM standard E 3158
- overhead doors are to be tested in accordance with either of the other two standards shown on the screen i.e. ANSI/DASMA 105 or ASTM E 283

The target airtightness (although optional) of $1.50 \text{ L}/(\text{s}\cdot\text{m}^2)$ results in average energy savings of 5.6 to 11.7 %.

Airtightness testing—NBC

Airtightness levels

Airtightness metrics

CAN/CGSB-149.10-2019, Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method



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The change on airtightness in the NBC includes details on how to conduct an airtightness test if a code user chooses to do so as part of the performance path.

Different airtightness levels are defined in terms of most commonly used metrics such as:

- air changes per hour
- normalized leakage area
- normalized leakage rate

In addition, the CAN/CGSB 149.10 standard is being updated to the 2019 edition.

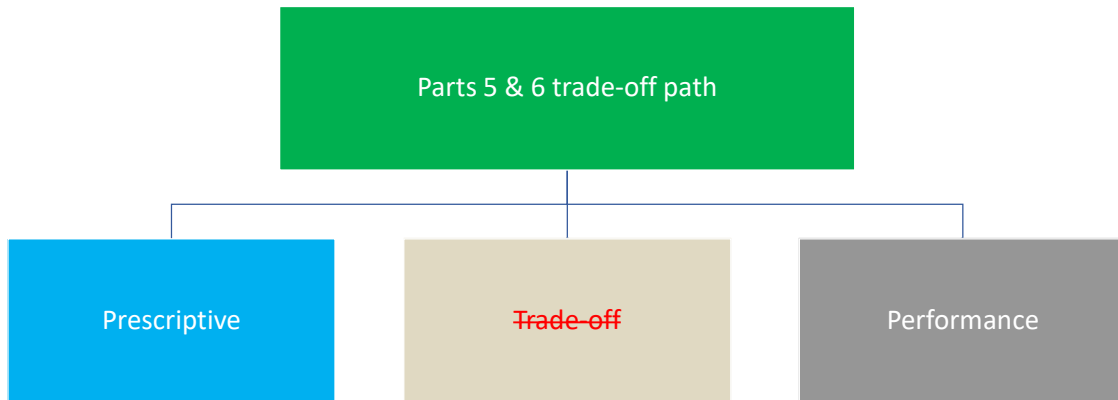
Air leakage



The section on air leakage was totally revamped to shift the current focus on performance of air barrier *materials* to performance of air barrier *assemblies as a whole*.

The total overhaul of the section on air leakage offers, for the first time, codification and clarification of known approaches and better reflects current industry practice.

HVAC and SWH* —NECB



* Service water heating

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The NECB Parts on HVAC and service water heating and pumping systems trade-off paths (found in Parts 5 and 6) are complex and not used by the industry. This was confirmed by a pilot survey undertaken with consultants, builders, building officials and energy modelers.

This change deletes both Part 5 and 6 trade-off paths.

Deleting them avoids updating the tables every time the prescriptive requirements are updated and introduce potential misses resulting in confusion of application in the field.

HVAC and SWH performance—NECB and NBC



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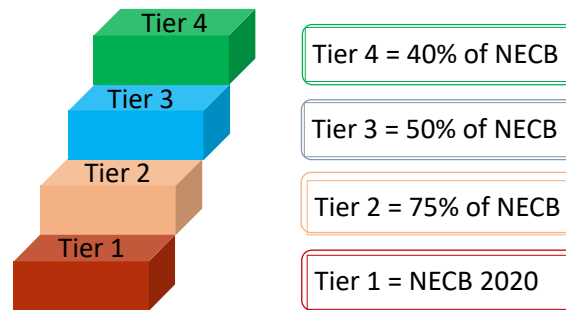
The HVAC and SWH performance requirements both in NECB and Section 9.36. of the NBC are out of date and do not align with current and anticipated minimum Canadian standards for their manufacture and sale.

The updates to equipment performance requirements in the NECB and Section 9.36. of the NBC include:

- adding equipment that was previously missing such as single-package vertical air conditioners (SPVAC) and heat pumps, electric furnaces, etc.
- aligning equipment with the forthcoming amendments to the federal energy efficiency regulations and other standards such as ASHRAE and CSA

The changes have limited impact due to the fact that the equipment is already or soon to be regulated to those performance levels through regulations beyond the codes. Alignment of the codes requirements and regulations will reduce confusion and inconsistency in the market.

Tiered performance requirements—NECB



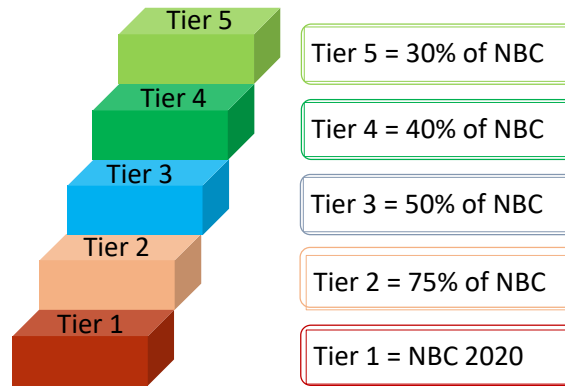
Tiered performance requirements is a relatively new concept in the National Model Codes. This is a departure from the traditional concept where codes are the minimum acceptable requirements.

The intent is to prepare the industry for increasingly stringent energy efficiency codes in the future and acclimate industry to the use of performance modeling solutions as a comprehensive compliance methodology.

A new Part is introduced into the NECB.

It proposes four tier levels with each successive tier being more stringent in terms of the building overall energy consumption. As you can see, tier 1 energy consumption is the same as the current set of requirements found in the NECB 2020, while the energy consumption reduces as we go up in tiers.

Tiered performance requirements—NBC



Similar to NECB, a new Subsection (~~9.36.6.~~) is introduced for tiered performance requirements for Part 9 buildings. It defines five tiers with each tier specified in terms of two parameters:

- overall energy consumption
- building envelope performance

The voluntary tiers will offer increased flexibility to authorities having jurisdiction by providing choices about which tier they want to adopt.

Tiered performance requirements

New point-based prescriptive path

Energy conservation measures earn points

Currently available for Tiers 1 and 2

In addition to performance path, a new prescriptive compliance option to achieve tiers is also provided for the NBC.

Here, code users choose to include certain energy efficiency measures beyond the baseline NBC requirements to earn points. An increasing number of points is required for each successive tier.

This compliance path was currently developed for tiers 1 and 2, and will be extended to tiers 3 to 5 in the 2025 edition of the code.

Alignment with EnerGuide rating system—NBC



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Some of the assumptions used in Section 9.36. of the NBC do not reflect the latest research in housing and are not aligned with those used in Natural Resources Canada's EnerGuide Rating System, or ERS.

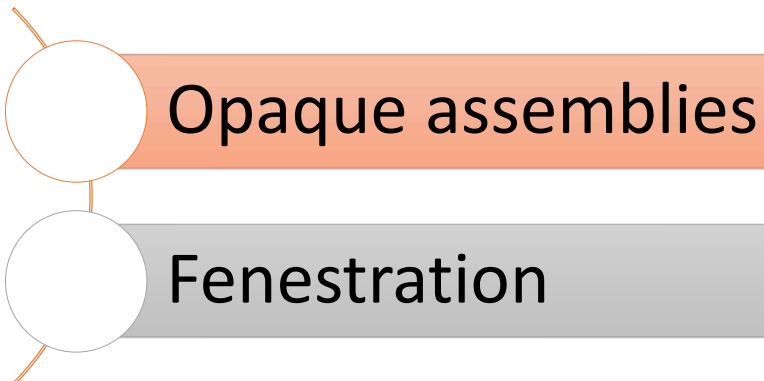
The absence of such alignment results in the NBC not benefiting from the tools and network of energy advisors out in the field and missing the opportunity of simplifying the use of performance modeling.

First, the NBC is now aligned with the EnerGuide Rating System.

Second, the EnerGuide Rating System is added as an acceptable compliance path.

With these changes, code users who are voluntarily using ERS will not be required to complete duplicate energy modelling to demonstrate compliance with the NBC. This will streamline implementation and enforcement, and will reduce costs for the industry.

Thermal transmittance values—NECB



In order to decrease the overall building energy consumption, the thermal performance of the building envelope has to be improved through better thermal performance of opaque and fenestration surfaces.

To accomplish that, two more changes are included to the building envelope requirements of the NECB:

1. Thermal transmittance values for opaque building assemblies is changed, which results in archetype averaged energy savings of 0.1 to 1.2%.
2. Thermal transmittance of fenestrations and doors is changed in consultation with the fenestration industry resulting in archetype averaged energy savings of 0.5 to 2.8%.

Lighting—NECB



ASHRAE 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings*

Interior lighting:

- To catch up with the advancement happening for the lighting product efficacy in the Canadian and North American marketplace, the lighting power density values in the NECB are updated.
- It harmonizes the NECB with ASHRAE Standard 90.1. Relative to NECB 2017, the effect of this change on the overall building energy savings ranges from 0.2 to 5.9%.

Exterior lighting:

- Certain exterior lighting areas are not addressed by the NECB and this exhibit a gap in the current provisions. To address this issue, a new table is added to address the exterior lighting areas not covered by the existing Code provisions.
- This change also harmonize NECB with ASHRAE 90.1 standard.

A consultant study found that the lighting designers will have no difficulty in new lighting designs within the proposed lighting power density values, as the lighting system costs will be lower than the NECB 2017 baseline values, resulting in a simple payback of less than a year.

Summary

- Harmonized code development system
- Design and use of buildings
- Construction methods and materials
- Energy and environment



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This conclude my presentation.

I have covered some of the most significant changes introduced into the 2020 edition of the National Model Codes.

The subjects in this presentation that are listed on the screen focused on:

- How the National Model Codes are edited and published
- Changes introduced for accessibility, protection of windows, water-miscible liquid mixtures, permitted storage tanks for oil burning equipment, fire safety plan, loads on roof, serviceability and seismic hazards
- Then, new type of construction (EMTC), asbestos, large farm buildings, insulated concrete form (ICF), safety glazing and home-type care occupancy
- Finally, energy efficiency improvements and the introduction of tiers, rainwater harvesting system and Legionella

Thank you



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Thank you very much for attending this presentation.

Free code documents, including the 2020 edition of the National Model Codes, the final report of the Joint Task Group, and links to attend public meetings for TGs working on AEB are available on the NRC website.