

The design and construction industry is becoming aware of the advantages of mid-rise wood construction as a result of the promotional activities of Wood WORKS!, such as its Wood Solutions Fairs, educational events, and its web site. In Ontario, industry is finally able to build mid-rise buildings as a result of the latest Ontario Building Code (OBC) amendment that came into effect on January 1, 2015. The amendments are contained in Ontario Regulation 191/14. Table A, at the end of this CodeLetter, contains a summary of the major code changes.

Ontario's code amendments are largely based on the proposed changes that will be incorporated into the 2015 model National Building Code of Canada (2015 mNBC), which will be published later this year. However, in keeping with the traditional "made-in-Ontario approach", the OBC contains a number of "unique" deviations from the 2015 mNBC, especially in the areas of:

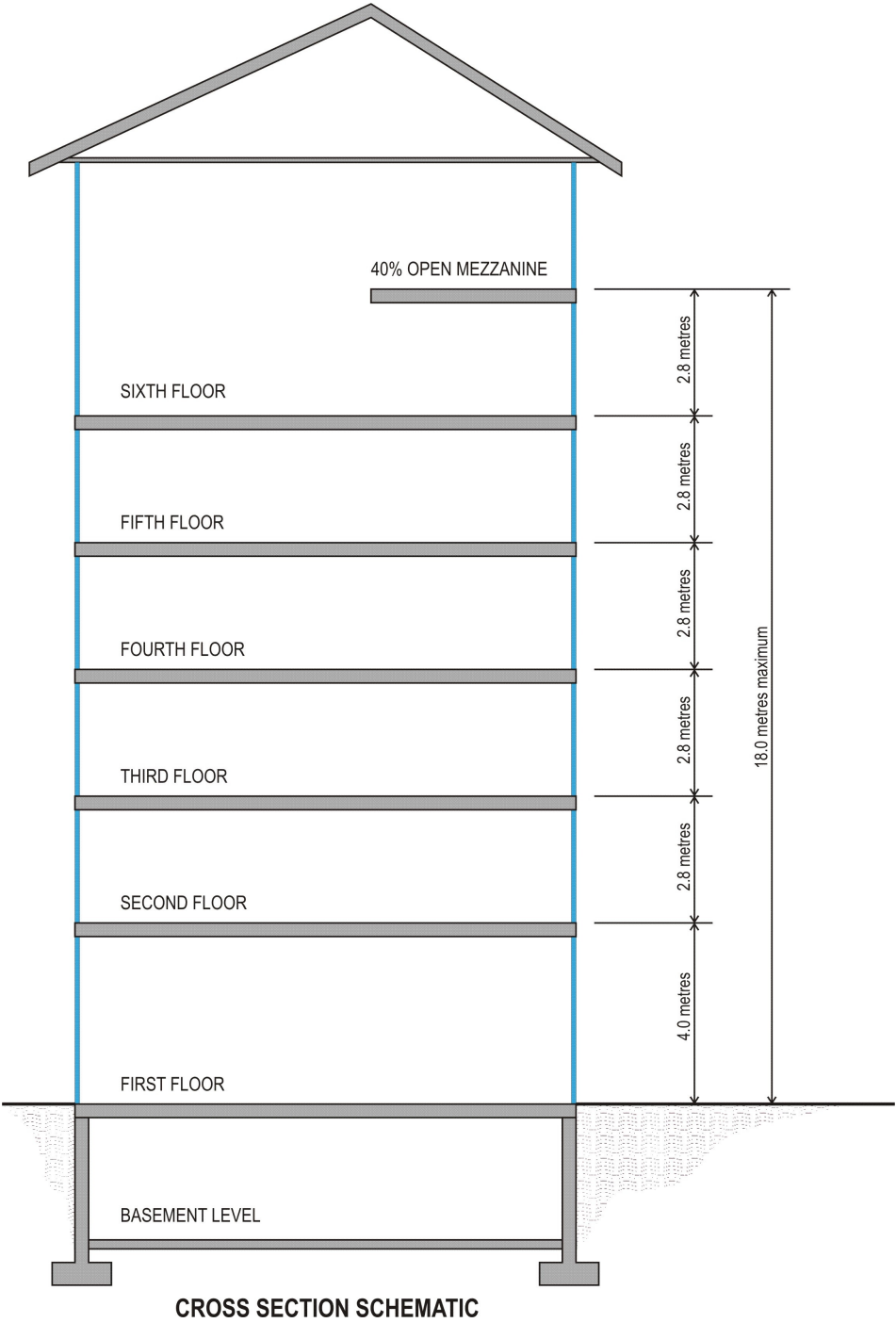
1. Requirement for 10% of the building perimeter to be located within 15 metres of a street
2. Class 'A' roofing required for combustible roof coverings
3. Non-combustible cladding required, if the building is more than 4 storeys in building height
4. Increased fire blocking of concealed spaces
5. Non-combustible exit enclosures
6. Additional requirements to obtain an occupancy permit
7. Fire safety during construction (not regulated by the OBC or the Ontario Fire Code)

The Ontario government has wisely reduced the 2015 mNBC's requirement for 25% of the building perimeter to face a street down to 10% in the OBC to recognize the challenges of infill projects in urban areas. This has been offset by more stringent fire safety requirements for roof coverings, non-combustible cladding, and increased fire blocking.

Another fire safety offset is the requirement for non-combustible exit enclosures to have a 1.5 hr. fire resistance rating. Designers will have to exercise care in the placement and alignment of exit enclosures in Ontario mid-rise buildings. Since the general code requirement is that non-combustible construction having a fire resistance rating cannot be supported on combustible construction, all supports for exit enclosures have to be of non-combustible construction. The common perception is that this requirement applies only to the exit stairwell - but this is not the case, at all! If an exit stairwell is located in the core of your new avant garde mid-rise combustible building, the designer has to consider how the path, at the ground level, will lead from that stairwell to the exterior of the building. That path, which is usually an interior exit passageway, has to be enclosed on all sides (in 3 dimensions: floor, ceiling, walls) using noncombustible construction. Furthermore, that enclosure cannot be supported by combustible construction! A similar design challenge will arise if the exit stairwell is offset horizontally, at any level.

A common myth is that the mid-rise building permitted by this code amendment can only contain 6 above grade levels. Since the the maximum permitted vertical distance from the the floor level of the first storey and the floor level of the uppermost storey or mezzanine is 18 metres, it is possible to achieve 7 levels, including one mezzanine level in the building, in many cases, as

illustrated in the following sketch:



In this illustration, the 6th floor contains an open mezzanine that can be as large as 40% of the floor area. Note that the maximum height of 18 metres is measured between the floor level of the first storey and the floor level of the uppermost storey or mezzanine, in order to comply with the limitations set in the Ontario Building Code.

TABLE A

Summary of the Major Changes in O. Reg. 191/14 Applicable to Mid-rise Wood Buildings

ONTARIO BUILDING CODE REQUIREMENT	6 STOREY COMBUSTIBLE CONSTRUCTION BUILDING PERMITTED AFTER DEC. 31, 2014
Maximum height, in storeys	6 storeys; [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Maximum height, in metres, of top storey or mezzanine floor level above the required fire access route	20 m, measured between the required fire access route and the floor level of the uppermost storey or mezzanine [Div. B, Sentence 3.2.5.6.(2)]
Maximum height, in metres, between the floor level of the first storey and the floor level of the uppermost storey or mezzanine	18 m, measured between the floor level of the first storey and the floor level of the uppermost storey or mezzanine [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Maximum building area, in sq. m., for a Group C, Residential Major Occupancy building	2,250 m ² , for a 4 storey building 1,800 m ² , for a 5 storey building 1,500 m ² , for a 6 storey building [Div. B, Article 3.2.2.43A.]
Maximum building area, in sq. m., for a Group D, Business & Personal Services Major Occupancy building	4,500 m ² , for a 4 storey building 3,600 m ² , for a 5 storey building 3,000 m ² , for a 6 storey building [Div. B, Article 3.2.2.50A.]
Type of construction permitted	Combustible or non-combustible [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Sprinkler protection	Building is sprinklered [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Locations where additional sprinkler protection is required	Balconies or decks that project 610 mm or more from the exterior wall of the building [Div. B, Sentence 3.2.5.13.(7)]
Roof fire resistance rating	1 hr. fire resistance rating [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Can roof fire resistance rating be waived for supervised sprinkler system connected to fire department?	No [Div. B, Sentence 3.2.2.17.(2)]
Type of construction permitted for roof assembly	Noncombustible construction or fire-retardant treated wood where the roof assembly is higher than 25 m., measured from the floor level of the first storey to the highest point of the roof assembly (non-contiguous roof assemblies at different elevations may be evaluated separately) [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]

ONTARIO BUILDING CODE REQUIREMENT	6 STOREY COMBUSTIBLE CONSTRUCTION BUILDING PERMITTED AFTER DEC. 31, 2014
Roof covering classification	'A' classification, if combustible [Div. B, Sentence 3.2.15.2..(3)]
Floor assembly fire resistance rating	Fire separation with a 1 hr. fire resistance rating [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Floor assembly within a multi-storey dwelling unit	1 hr. fire resistance rating [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Mezzanine floor fire resistance rating	1 hr. fire resistance rating [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Are other major occupancies permitted?	Group A, Division 2 major occupancies, Group E major occupancies and storage garages are permitted, if located below the 3 rd . floor. [Div. B, Article 3.2.2.43A. Article 3.2.2.50A.]
Minimum fire separation between a Group 2, Division 2 major occupancy and a Group C major occupancy	Fire separation with a 2 hr. fire resistance rating [Div. B, Article 3.1.3.1.]
Minimum fire separation between a Group 2, Division 2 major occupancy and a Group C major occupancy	Fire separation with a 2 hr. fire resistance rating [Div. B, Article 3.1.3.1.]
Type of cladding permitted if limiting distance is not an issue	Non-combustible cladding required, if the building is more than 4 storeys in building height [Div. B, Article 3.1.4.8.]
Construction of exposing building face	Where the building is more than 4 storeys in building height and the maximum permitted area of unprotected openings is more than 10% of the exposing building face, cladding need not be noncombustible if the wall assembly is tested to ULC-S134 and complies with Sentences 3.1.5.5.(3) and (4) [Div. B, Article 3.2.3.7.]
Maximum flame-spread rating of combustible piping	25 [Div. B, Article 3.1.4.9.]
Fire blocks in horizontal concealed spaces	Fire blocks required unless the concealed space is filled with noncombustible insulation [Div. B, Article 3.1.11.5.]
Firewalls	2 hr. non-masonry or non-concrete firewalls permitted if buildings on both sides are sprinklered [Div. B, Sentence 3.1.10.2.(4)]

ONTARIO BUILDING CODE REQUIREMENT	6 STOREY COMBUSTIBLE CONSTRUCTION BUILDING PERMITTED AFTER DEC. 31, 2014
Minimum fire separation of exits	Non-combustible fire separation with a 1.5 hr. fire resistance rating and cannot be supported by combustible construction [Div. B, Article 3.2.2.43A. Article 3.2.2.50A. Sentence 3.4.4.1.(3)]
Minimum percentage of the building perimeter located within 15 m. of a street required for the building to face one street	10% [Div. B, Sentence 3.2.2.10.(3)]
Emergency power supply for lighting and fire alarm systems	1 hr. [Div. B, Sentence 3.2.7.4.(1) Sentence 3.2.7.8.(3)]
Earthquake design for timber shear walls	Increased loading and shear wall requirements for a building constructed with more than 4 storeys of continuous wood construction [Div. B, Article 4.1.8.10. Article 4.1.8.11. Article 4.1.8.12.]
Design of plumbing systems	Plumbing shall be designed and installed to accommodate the maximum relative structural movement provided for in the construction of the building [Div. B, Article 7.1.7.1.]
Additional requirements to obtain an occupancy permit	Required smoke alarms and carbon monoxide alarms are complete and operational [Div. C, Article 1.3.3.5.]

A free 18 page annotated version of the mid-rise combustible construction amendments to the 2012 Ontario Building Code arising from O. Reg. 191/14 has been posted on the [CodeNews website](#).

The direct link to this document is:

<http://www.codenews.ca/docs/midrise2014.pdf>

About the author: Alek Antoniuk is best known for co-ordinating and managing the technical development of the 2006 and the 2012 editions of the Ontario Building Code. He also played a lead role in managing the code advisory services of the Ontario Ministry of Municipal Affairs and Housing since 1989. He publishes a web site for information about construction codes at: www.codenews.ca.