



Mid Rise Combustible Construction in Canada

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National Research
Council Canada

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de recherches Canada

Canada

Current Requirements

National Building Code of Canada 2010

- Limited to 4 Storeys
- Floor area $\leq 1800/3600$ m²
- Sprinklered
- Floor ratings 1 hour
- No physical height restrictions



Proposed New Requirements



Mid-Rise Combustible Buildings

- Introduction of two new building construction types
- Improved fire safety during construction

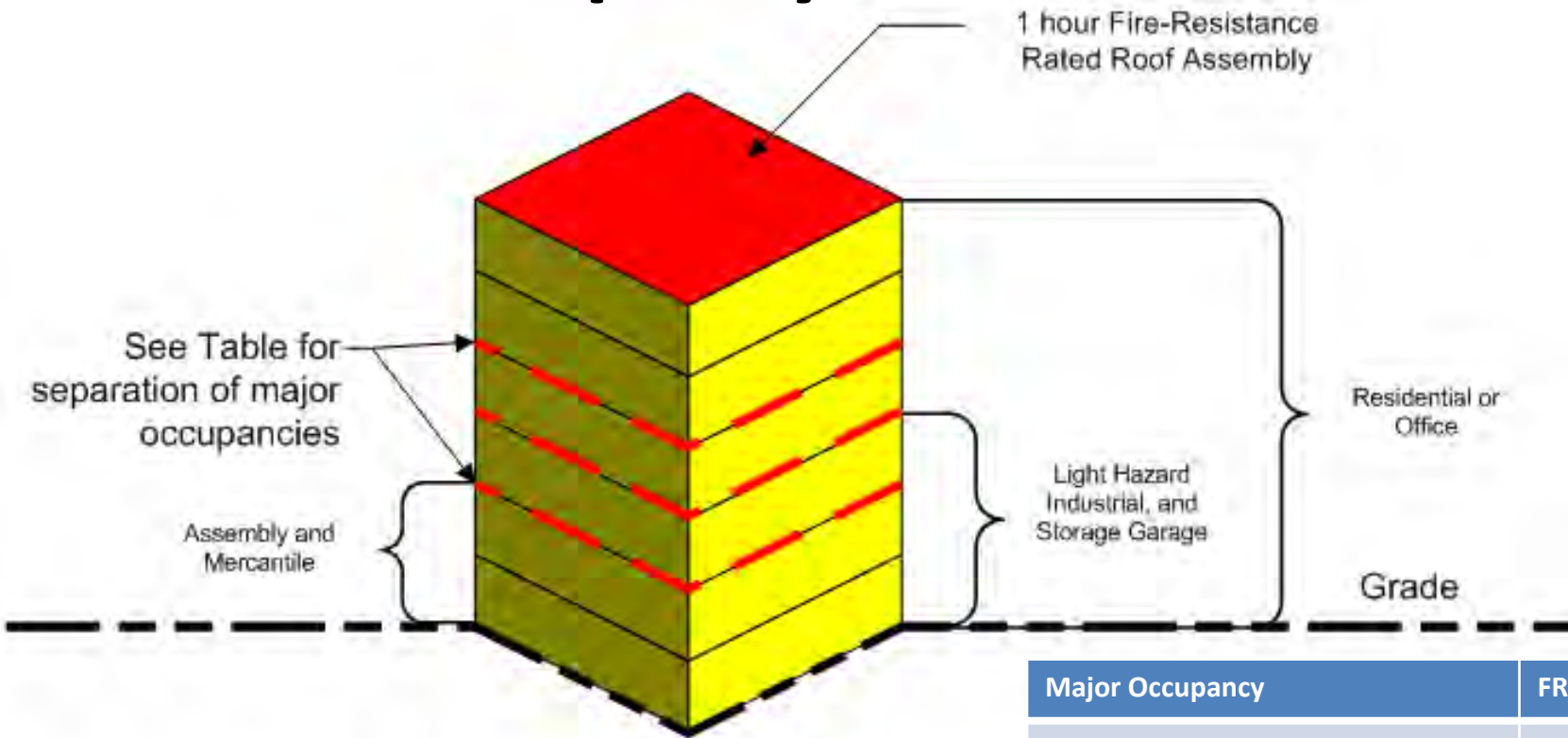
Six Storey Combustible Buildings



Restrictions

- New limits on floor areas $\leq 1500/3000 \text{ m}^2$
- New height limits $\leq 18\text{m}, 20\text{m}$ and 25m
- Firefighting accessibility
- Roofing construction
- Other fire protection measures

Occupancy Combinations



Residential and Office Occupancy

Major Occupancy	FRR
Assembly	2 hour
Residential/Office	2 hour
Mercantile	2 hour
Industrial or Storage Garage	1.5 hour



Fire Safety During Construction and Demolition

- Security fencing, boarding or barricades
- Stairwell to top floor level installed as construction goes up



Fire Safety During Construction and Demolition

- Fire hydrant access
- Water supply on site
- Refuse disposal chutes



Aiming for 2015 Model Codes

- Technical proposals voted on this Spring
- Public Review this Fall
- Commission approval next year

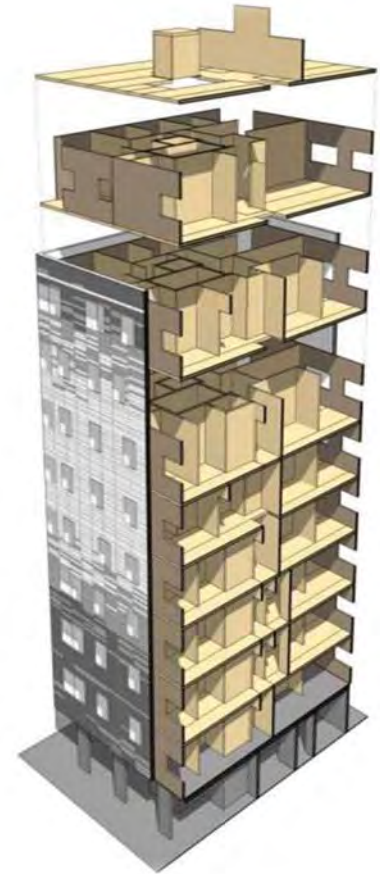


NRC's Midrise Wood R&D Project

Goals:

- Short-term: inform decisions on changes for 2015 NBCC
- Longer-term: re-evaluate concept of combustible vs noncombustible construction (height & area limits, new performance-based approach)

Timeline: 2012 to 2017





Midrise Project – Research Activities

New solutions for:

- Wall and floor assemblies
- Exterior wall assemblies
- Encapsulation



Solution: Wall and Floor Assemblies

- New stronger assemblies for 1st and 2nd floors of mid-rise buildings
- Fire Resistance Tests (light weight frame and CLT)
- Acoustical Tests (sound transmission, flanking and impact)



Solution: Exterior Wall Assemblies

- Fire Spread Tests
(along surface and penetration into cavities)
- Hygrothermal Performance Tests





Solution: Encapsulation

Purpose: delay ignition of wood structural elements using noncombustible materials

- Type X gypsum board
- Cement board with fibreglass
- Gypsum concrete

Analyze existing test data:

- 50 small-scale, 18 full-scale walls, 80 full-scale floors

Determine impact of:

- gypsum thickness, number of layers, stud material, cavity insulation, etc.



Solution: Encapsulation

Full-Scale tests of furnished apartments

- Lightweight wood frame
- Cross laminated timber
- Lightweight steel frame





Solution: Encapsulation





Ongoing / Future Research

Quantify fire risks:

- Fire blocking of concealed spaces and penetrations
- Relate sprinkler and fire resistance requirements

Monitor ongoing activities for issues:

- CCBFC/NBC committees
- Stakeholder consultation group

Review code requirements, research and design guides from other countries



Library Square Kamloops, BC



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Questions?

www.nationalcodes.nrc.gc.ca

Thank you



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