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The Building Code and the Regulatory Environment

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Canada

National Model Codes

- National Building Code
- National Fire Code
- National Plumbing Code
- National Farm Building Code

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National Model Codes Organization

- CCBFC
  - National Building Code
  - National Fire Code
  - National Farm Building Code
  - National Plumbing Code
- Standing Committees
  - Matrix Composition
    - Regulatory
    - Industry
    - General Interest
  - Regular Meetings
  - Consensus Based
  - Specialty Task Groups

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National Model Codes and the Change Process

- Change is ongoing
  - Typically 5 year cycle
- From Various Sources
  - Public
  - Government
  - Academia
  - Standing Committees
  - Recent Performance
  - ...

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National Model Codes and the Change Process

- Proposed Change Form
  - info re
    - problem
    - proposed change
    - rationale
    - cost implications
    - enforcement implications
- To Standing Committees as
  - normal change
  - special change
- For NBC, NPC, NFBC ⮝ Not Retroactive

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National Model Codes and the Change Process

- Normal Change
  - Standing Committee Approves
  - Public Review
  - To PTCBS
  - To CCBFC
  - Implementation at Next Code Cycle

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National Model Codes and the Change Process

- Special Change
  - Standing Committee Approves
  - To PTCBS
  - To CCBFC
  - Immediate Implementation as Revision
  - Public Review

National Building Code - Next Edition

- Objective-Based Code 2003
  - Performance Requirements
  - Prescriptive Requirements
- Will Promote Innovation
- Two Parts
  - Division A - Objectives and Requirements
  - Alternatives to Division B - Acceptable Solutions (i.e. current Code)

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Building Codes and the Regulatory Framework

- Construction ⮝ Regulated
- Legal Authority ⮝ Provinces
  - Adopt or Adapt

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Building Codes and the Regulatory Framework

- Adopt
  - Nova Scotia - minor changes
  - New Brunswick - minor changes
  - Manitoba - minor changes
  - Saskatchewan
  - Yukon
  - NWT
  - Nunavut

Building Codes and the Regulatory Framework

- Adapt
  - Ontario
  - British Columbia
  - Alberta
- In Use by Major Cities
  - Newfoundland
  - PEI
- Not Yet
  - Quebec
- Special
  - Vancouver
  - Montreal - Adopt

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Building Codes and the Regulatory Framework

- Enforcement ⮝ Municipalities
  - Authority Having Jurisdiction
  - Building Officials
    - Plans Examiners
    - Inspectors

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Building Codes and the Regulatory Framework

Three Levels of Government

- Federal
  - National Model Codes
- Provincial
  - Legal Authority
- Municipal
  - Enforcement ⅄ Plan Review and Inspection
    - Expertise
    - Downsized
    - Liability
    - Inconsistent

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Environmental Loads and Building Codes

- Probability Based
- Initial Cost vs Acceptable Probability of Exceedance

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Environmental Loads and Building Codes

- Primary Focus on Life Safety
- Snow
  - 1/30 year return on ground snow load
  - 20% uncertainty in ground snow
  - Factors applied
  - Environment Canada

Environmental Loads and Building Codes

- Wind
  - 1/30 year return ⮝ main elements
  - 1/10 year return ⮝ secondary elements
  - 1/100 year return ⮝ post-disaster
  - Factors applied
  - Environment Canada
- Tornadoes
  - Probability < 10^{-5}

Environmental Loads and Building Codes

- Earthquake
  - 10% in 50 years (about 1/500)
  - I of 1.0 for regular buildings
  - Structural and non-structural components
  - Geological Survey of Canada

Buildings Requiring Enhanced Loads

- Post-Disaster Buildings
  - Provides services in a disaster
  - Hospitals, fire stations, police stations, radio stations, telephone exchanges, power stations, electrical substations, pumping stations, fuel depots
- Earthquake
  - Post-disaster Δ factor of 1.5 plus drift limits
  - Schools Δ factor of 1.3

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Buildings Requiring Enhanced Loads

- Wind (main structural elements)
  - 1/30 year for all except,
  - 1/100 year for post-disaster
- Snow
  - No special considerations
- Ice
  - Not specifically regulated in NBC

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Part 9 Residences

- Previous for Part 3, 4, 5, 6 Buildings
- Part 9 ⮝ Prescriptive
- Masonry Reinforcement and Seismic Zone
- Anchorage of Water Heaters and Seismic Zone
- Snow Loads
- Tornadoes ⮝ Roof Anchorage
  ⮝ Foundation Anchorage

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Next Cycle Environmental Loads

- Harmonization of Approach
  - I vs return periods
- Address Post-Disaster for Earthquake, Snow, Wind
- Address Schools for Earthquake, Snow, Wind ⮝ direct result of ice storm

Sources of Building Related Problems

- Design Stage
  - Codes/Standards
  - Design
- Fabrication Stage
- Construction Stage
- Changing Conditions
- Maintenance
- . . .

IRC: Canada's Construction Technology Centre

- Mission
  - Develops core competencies, knowledge base critical to construction needs
  - Supports development, commercialization, implementation of leading technologies
  - Fosters safe, sustainable built environment through development of codes and standards

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IRC Program Areas

- Building Envelope and Structure
- Indoor Environment
- Fire-Risk Management
- Urban Infrastructure Rehabilitation
- Codes and Evaluations

Building Envelope and Structure

- Objective
  - Develop technologies for the design, construction and operation of durable, energy-efficient and cost-effective building envelope systems and structures.
- Sub-Programs
  - Wall and Window Systems
  - Roofing Systems
  - Thermal and Moisture Performance of Systems
  - Durability and Repair of Concrete Structures

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Indoor Environment

- Objective
  - Develop cost-effective technologies for the design and operation of indoor environments that maximize the comfort, productivity, health and safety of building occupants.
- Sub-Programs
  - Lighting and Human Factors
  - Ventilation and Indoor Air Quality
  - Acoustics

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Fire-Risk Management

- Objective
  - Develop technologies to enhance fire protection in buildings, save lives, and reduce the risks and cost of fire.
- Sub-Programs
  - Active Fire Protection
  - Fire-Resistant Construction
  - Residential and Commercial Buildings
  - Industrial Buildings

Urban Infrastructure Rehabilitation

- Objective
  - Develop technologies to enhance the performance and durability of road systems and buried services and to enhance the management of these assets.
- Sub-Programs
  - Urban Roads
  - Buried Utilities
  - Concrete Structures

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Code Development

- Objective
  - To develop Canada's national construction codes to assure uniformity and efficiency in construction, and to address public health and safety.
  - Further the adoption of national codes
  - Lead the construction industry toward a system of objective-based codes
  - Publish practice guides facilitating the interpretation and application of the codes

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Evaluation of Construction Products

- Objective
  - To provide a national evaluation service that facilitates market acceptance of innovative products and systems nationally and internationally.

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