The Building Code and the Regulatory Environment

by

Technical Advisor, Structural Design
National Model Codes

- National Building Code
- National Fire Code
- National Plumbing Code
- National Farm Building Code
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
National Model Codes and the Change Process

- Change is ongoing
  - Typically 5 year cycle
- From Various Sources
  - Public
  - Government
  - Academia
  - Standing Committees
  - Recent Performance
  - …
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
National Model Codes and the Change Process

- Normal Change
  - Standing Committee Approves
  - Public Review
  - To PTCBS
  - To CCBFC
  - Implementation at Next Code Cycle
National Model Codes and the Change Process

- Special Change
  - Standing Committee Approves
  - To PTCBS
  - To CCBFC
  - Immediate Implementation as Revision
  - Public Review
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)
Building Codes and the Regulatory Framework

- Construction 🆓 Regulated
- Legal Authority 🆓 Provinces
  - Adopt or Adapt
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
Building Codes and the Regulatory Framework

- Enforcement ▲ Municipalities
  - Authority Having Jurisdiction
  - Building Officials
    - Plans Examiners
    - Inspectors
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
Environmental Loads and Building Codes

- Probability Based
- Initial Cost vs Acceptable Probability of Exceedance
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 \(\wedge\) main elements
  - 1/10 year return \(\wedge\) secondary elements
  - 1/100 year return \(\wedge\) 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 $\wedge$ factor of 1.5 plus drift limits
  - Schools $\wedge$ factor of 1.3
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
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
Next Cycle
Environmental Loads

- Harmonization of Approach
  - I vs return periods
- Address Post-Disaster for Earthquake, Snow, Wind
- Address Schools for Earthquake, Snow, Wind directly resulted from ice storm
Sources of Building Related Problems

- Design Stage
  - Codes/Standards
  - Design

- Fabrication Stage

- Construction Stage

- Changing Conditions

- Maintenance

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**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
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
**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
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
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
Evaluation of Construction Products

Objective

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