



National Research  
Council Canada

Conseil national de  
recherches Canada

Canada

CODES CANADA



# National Building Code of Canada

Ontario First Nations Housing Conference  
Thunder Bay  
February 6, 2017

**Nedjma Belrechid**

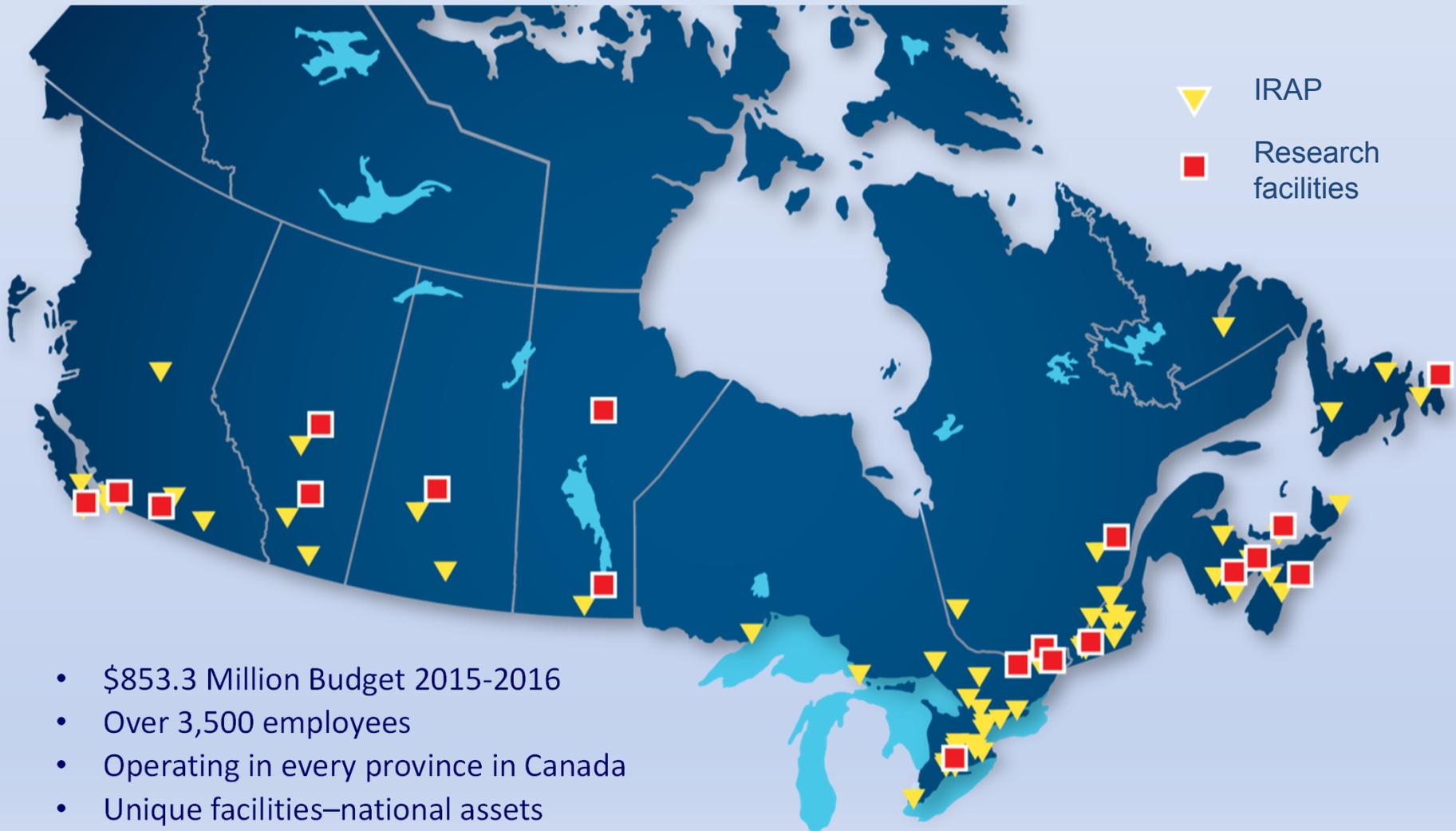


# Outline

- **About NRC**
- Codes Development System
- 2015 National Model Codes
- NBC 2015, Part 9 Significant Changes

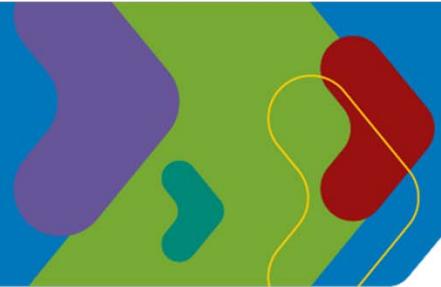


# NRC-CNRC



- \$853.3 Million Budget 2015-2016
- Over 3,500 employees
- Operating in every province in Canada
- Unique facilities—national assets
- Global reach
- 100 years of Innovation

# NRC 100 years legacy



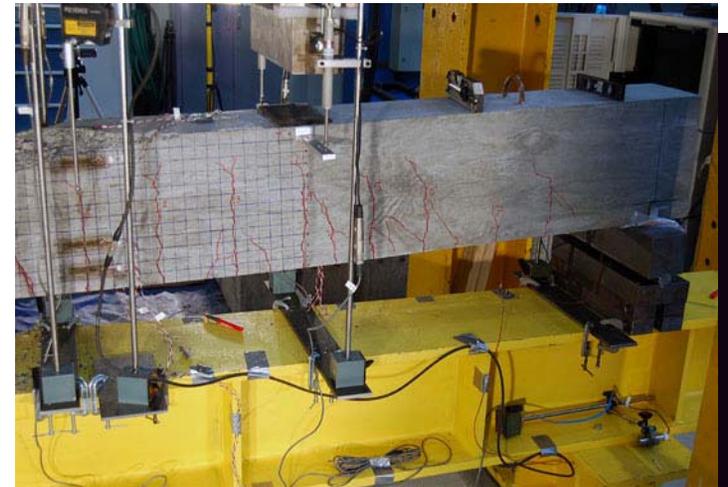
**INTERNET**



# NRC multidisciplinary expertise

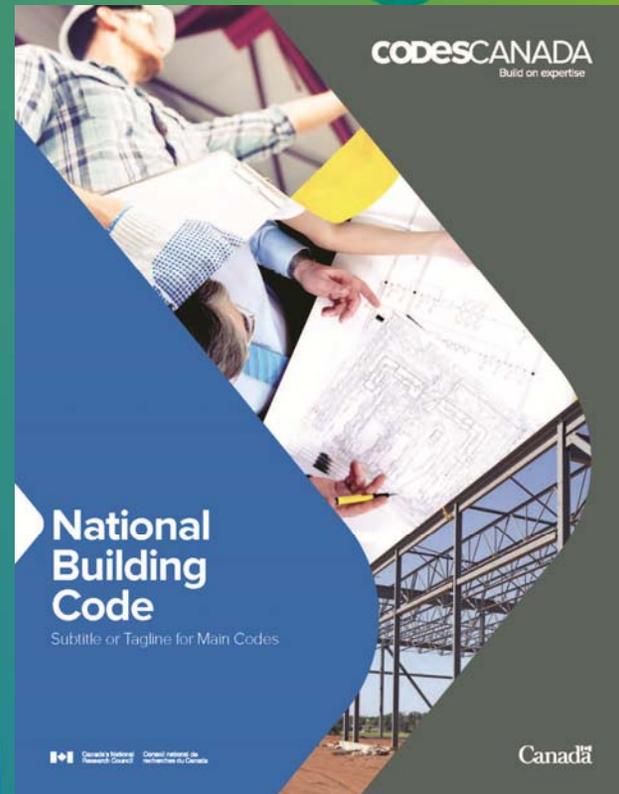
## Engineering

- Construction
  - Building Regulations for Market Access program (BRMA)
  - Codes Canada



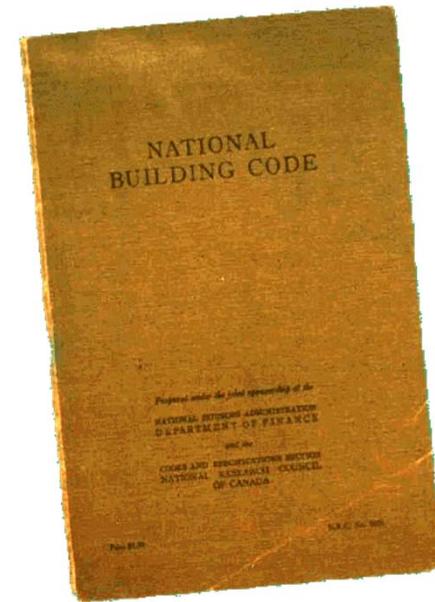
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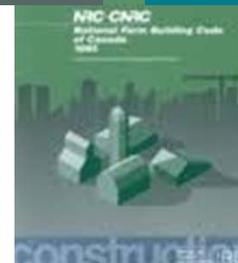
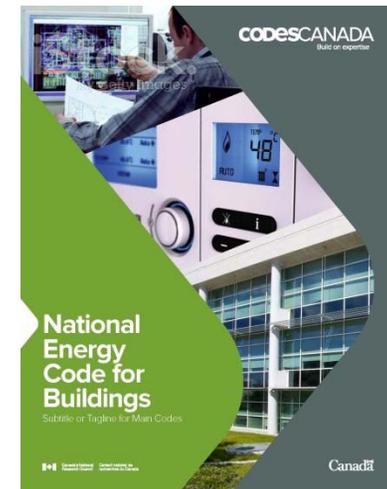
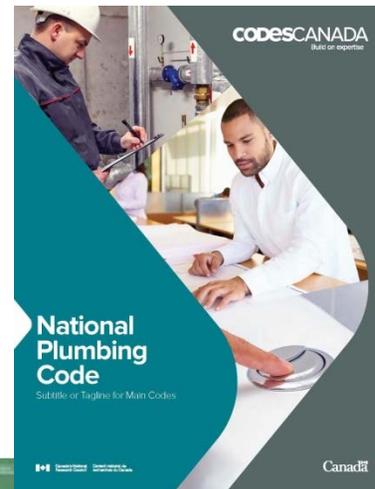
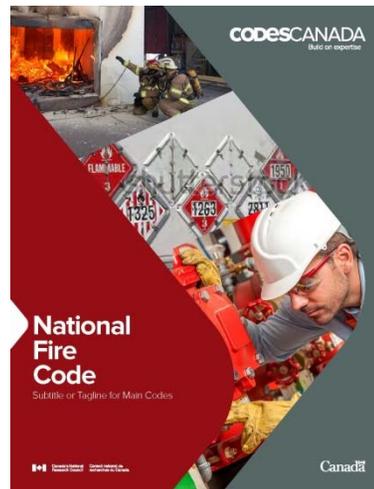
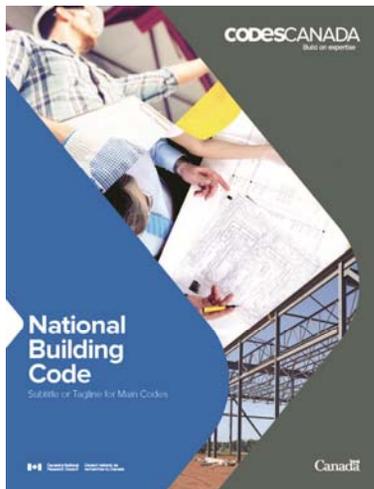
# Historical background

- Early 1930's - mounting pressure from architects, builders, insurers etc.
  - no national model codes
  - no provincial codes
  - multiplicity of municipal codes
- 1941 – 1st national model building code



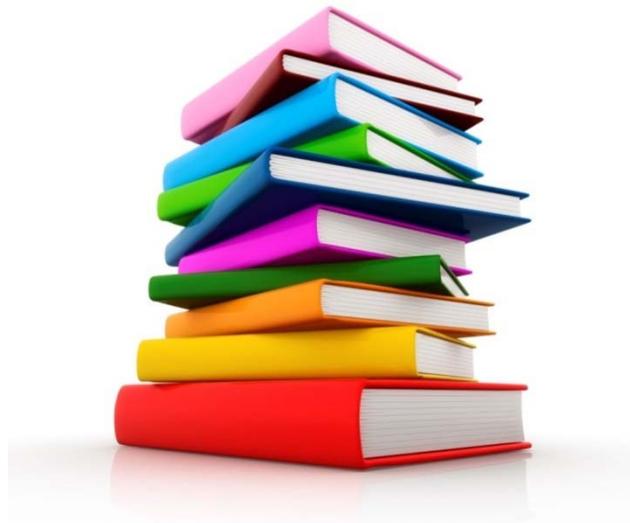
# Codes & guides

- 50+ Codes published since 1941
- Most current



## Codes & guides

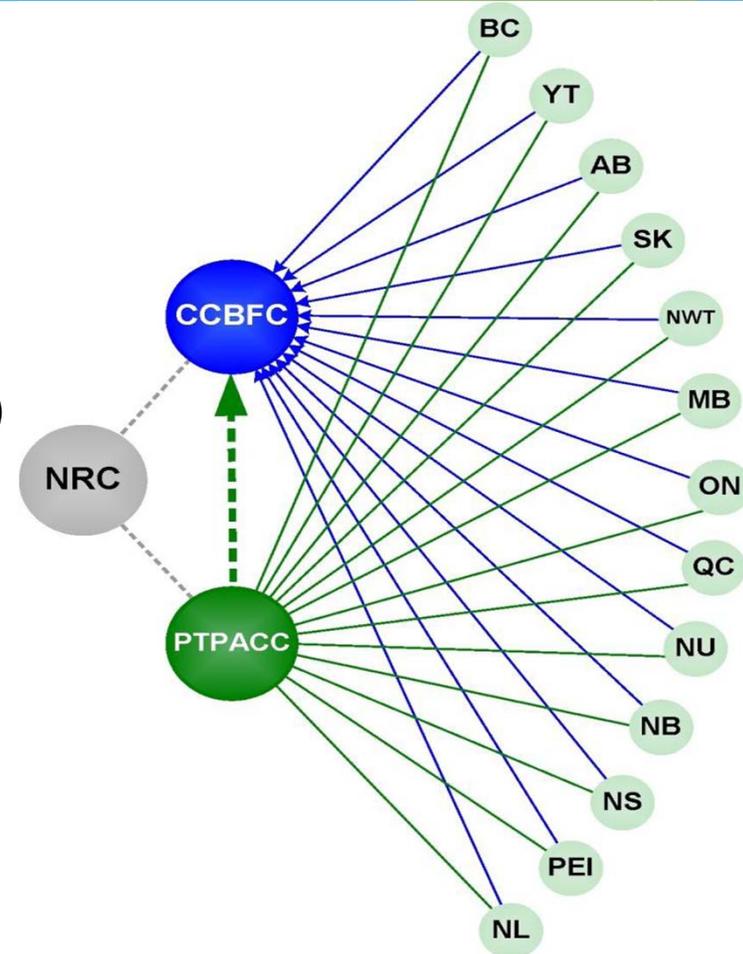
- › Over 75 guides, supplements and commentaries
- › **Coming soon:** Illustrated User's Guide–NBC 2015  
Part 9, Housing and Small Buildings



# Code development system – Collaboration

## Partners

- Provinces and Territories (PTPACC)
- Canadian Commission on Building and Fire Codes (CCBFC)
- National Research Council Canada (NRC)



# Provincial / Territorial role

## Canada's governance

- 1 Federal government
- 10 Provincial plus 3 territorial governments
- >1000 Municipal governments



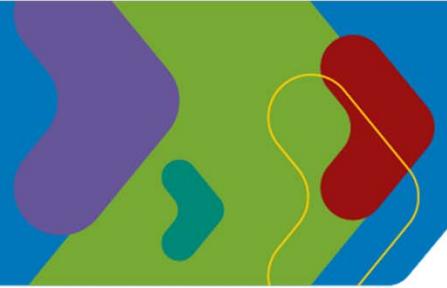
# Provincial / Territorial role

## Provinces and Territories

- › Enact building and fire regulations
- › Inspect and enforce the Code
- › Interpret Code requirements
- › Initiate training programs
- › License trades and professions
- › Provide policy guidance



# Provincial / Territorial role

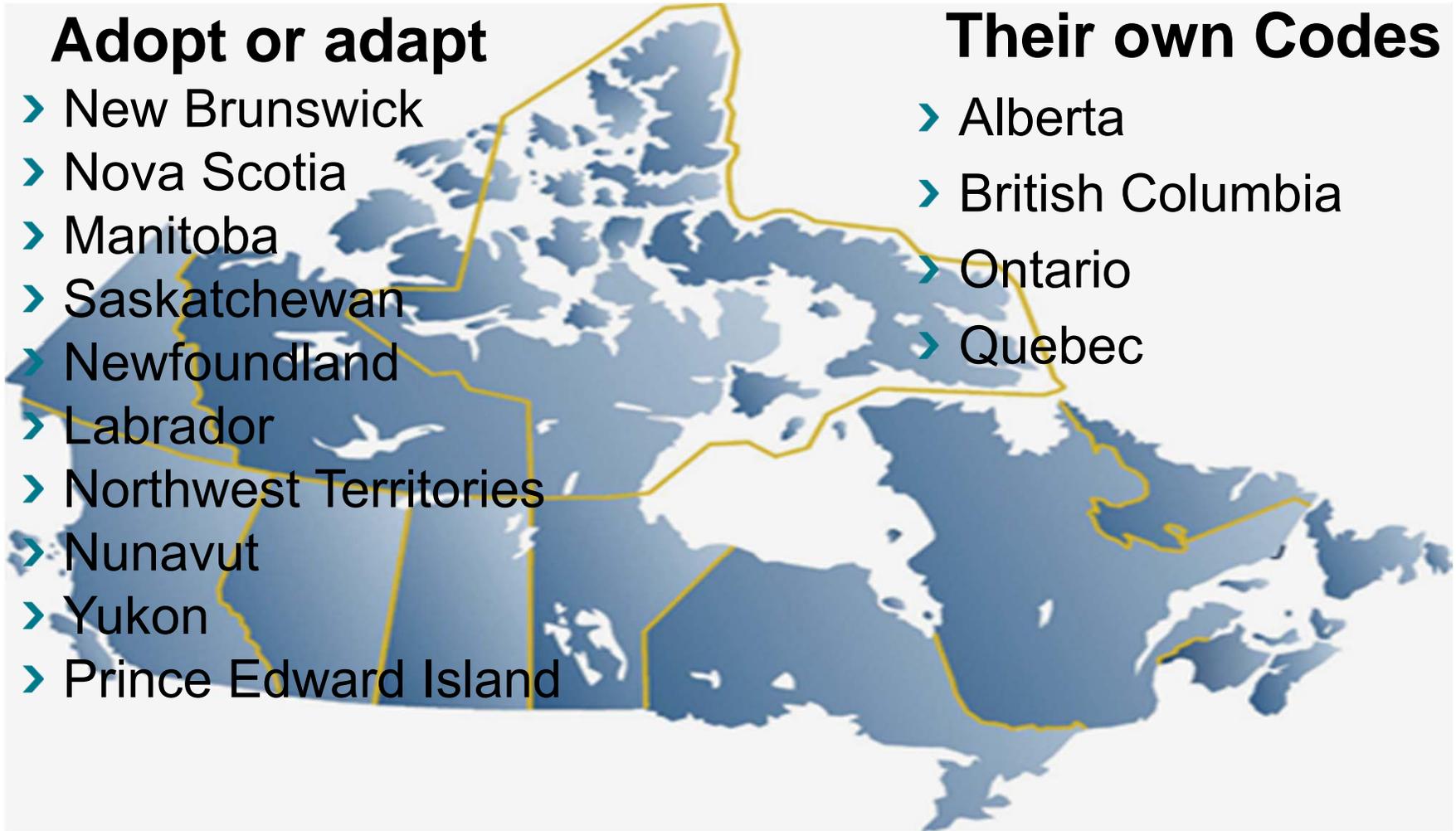


## Adopt or adapt

- New Brunswick
- Nova Scotia
- Manitoba
- Saskatchewan
- Newfoundland
- Labrador
- Northwest Territories
- Nunavut
- Yukon
- Prince Edward Island

## Their own Codes

- Alberta
- British Columbia
- Ontario
- Quebec



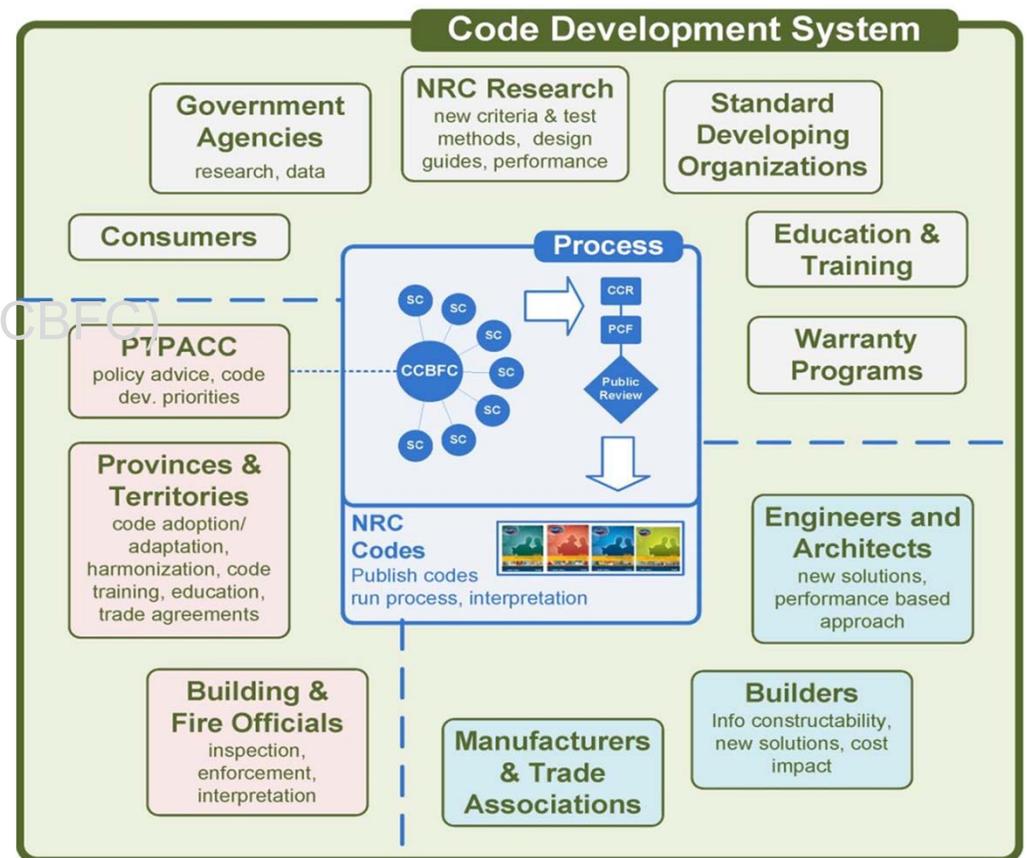
# Code development system - Collaboration

## Partners

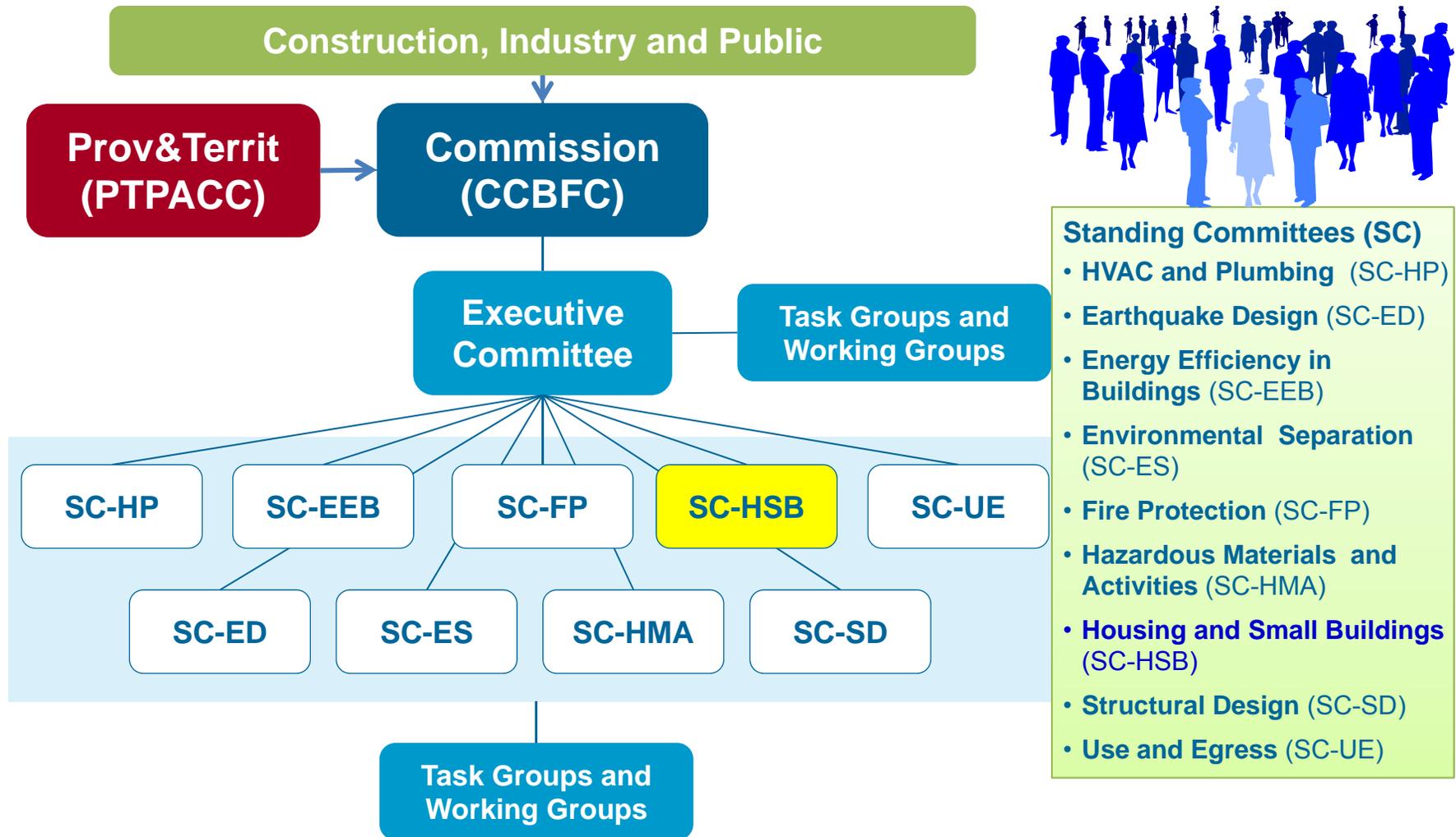
- Provinces and Territories (PTPACC)
- Canadian Commission on Building and Fire Codes (CCBFC)
- National Research Council Canada (NRC)

## Stakeholders

- Construction industry
- Regulators
- General public

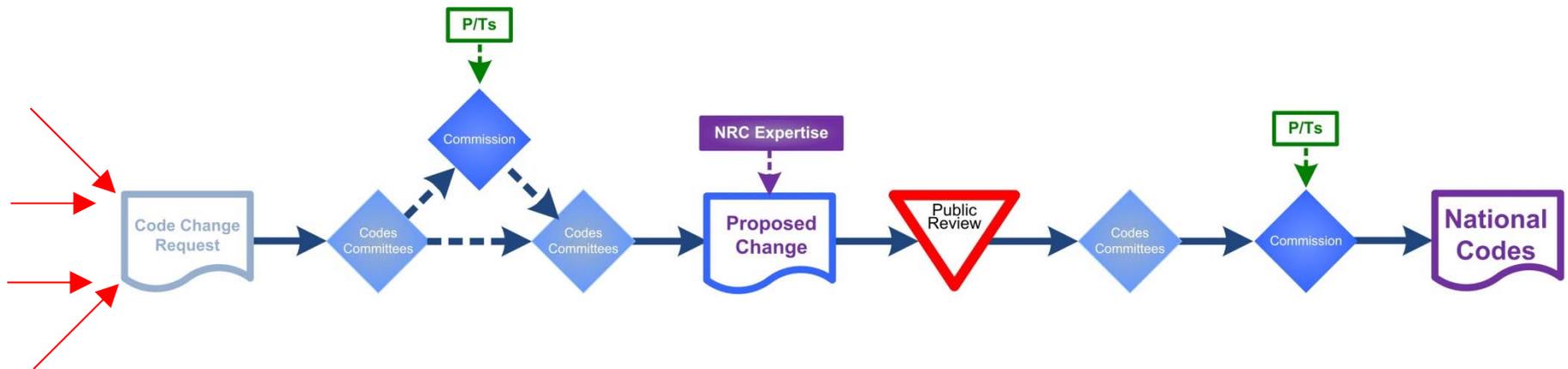


# Canadian Commission on Building and Fire Codes



- Standing Committees (SC)**
- HVAC and Plumbing (SC-HP)
  - Earthquake Design (SC-ED)
  - Energy Efficiency in Buildings (SC-EEB)
  - Environmental Separation (SC-ES)
  - Fire Protection (SC-FP)
  - Hazardous Materials and Activities (SC-HMA)
  - **Housing and Small Buildings (SC-HSB)**
  - Structural Design (SC-SD)
  - Use and Egress (SC-UE)

# From request to requirement



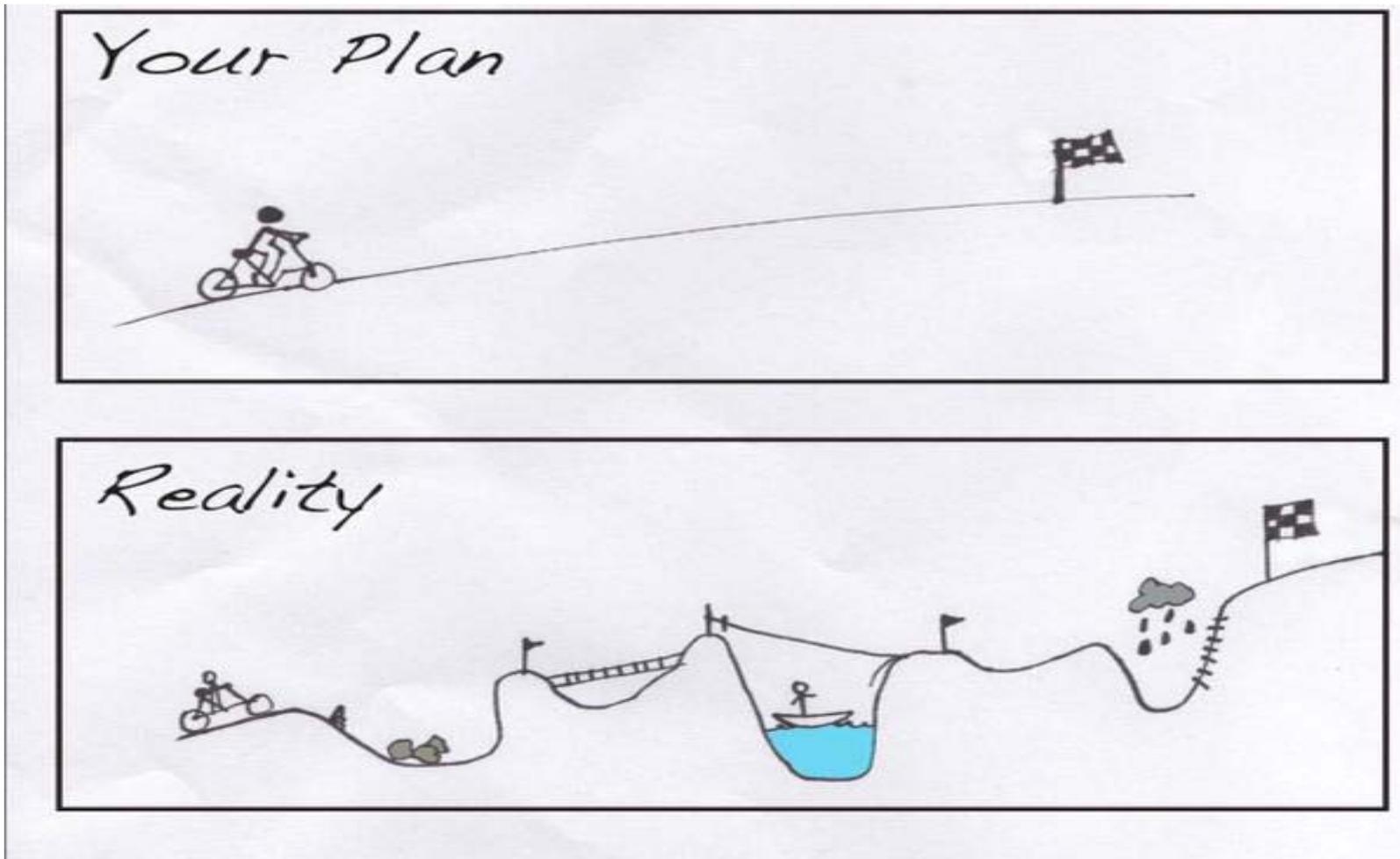
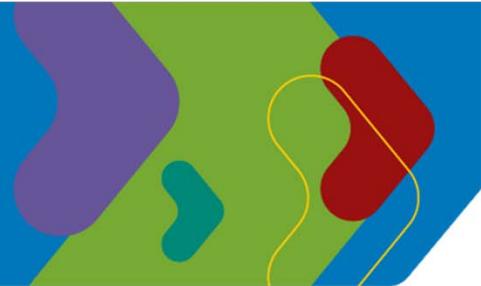
Continuous process

[www.codescanada.ca](http://www.codescanada.ca)

# Evidence and consensus



# The path may not be easy



# Get involved!

- Volunteer for a standing committee, a task group
- Submit a code change request (CCR)
- Submit public review comments on proposed changes (PCF)
- Respond to information requests
- Attend a meeting as an observer

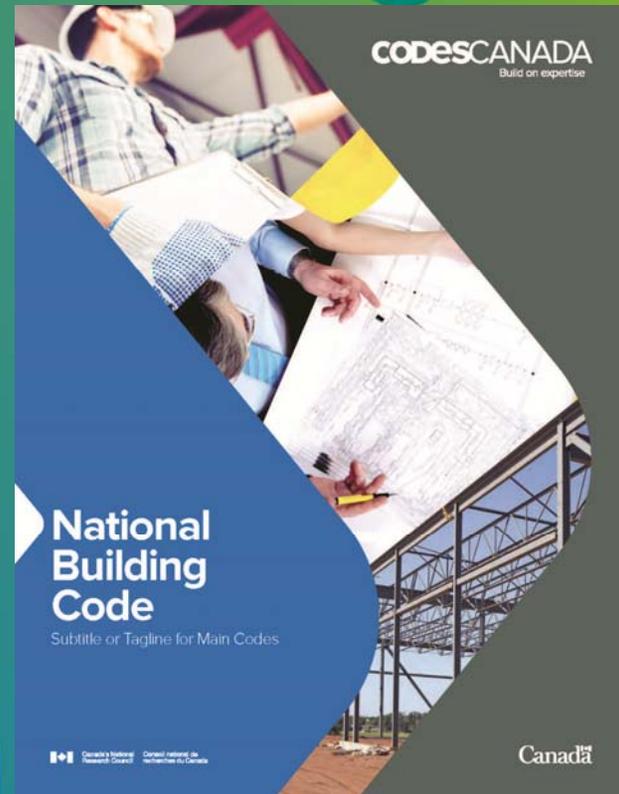


# Standing Committee on Housing and Small Buildings (SC-HSB)



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- **2015 National Model Codes**
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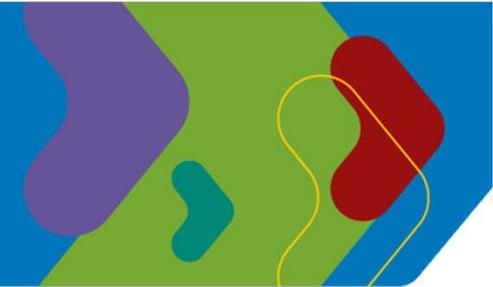


# 2015 Model codes

- 5 Public reviews
- 373 NBC changes
- 100 NFC changes
- 27 NPC changes
- 3179 Comments



# 2015 Model codes



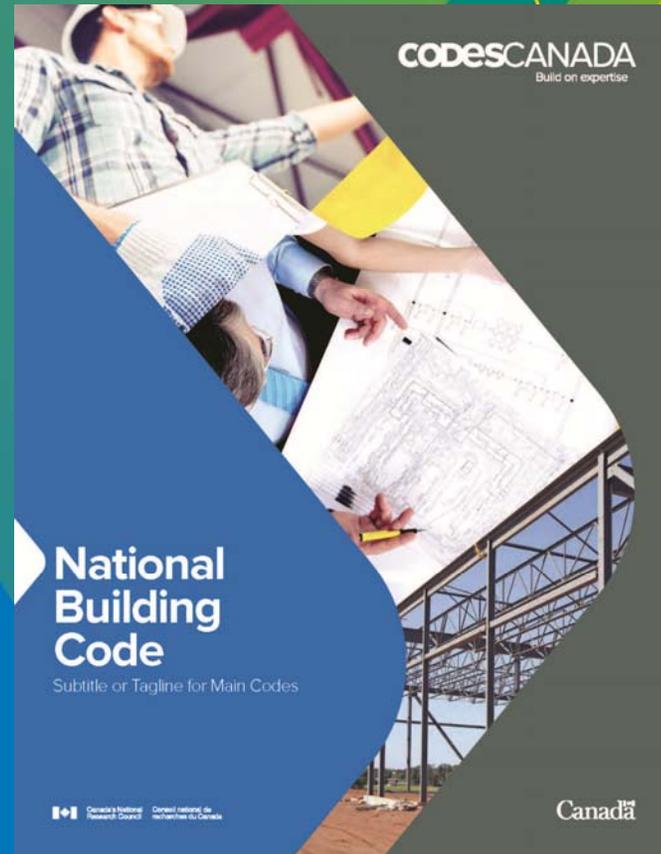
Code	Division	Number of PCFs
NBC	Div.A 1	9
NBC	Div.A 2	1
NBC	Div.A 3	1
NBC	Div.B 1	2
NBC	Div.B 3	139
NBC	Div.B 4	61
NBC	Div.B 5	31
NBC	Div.B 6	16
NBC	Div.B 9	107
NBC	Div.B C	2
NBC	Div.B D	3
NBC	Div.C 2	1
<b>TOTAL</b>		<b>373</b>

Code	Division	Number of PCFs
NFC	Div.A 1	2
NFC	Div.B 2	11
NFC	Div.B 3	29
NFC	Div.B 4	26
NFC	Div.B 5	31
NFC	Div.B 6	1
<b>TOTAL</b>		<b>100</b>

Code	Division	Number of PCFs
NPC	Div.A 2	1
NPC	Div.B 2	26
<b>TOTAL</b>		<b>27</b>

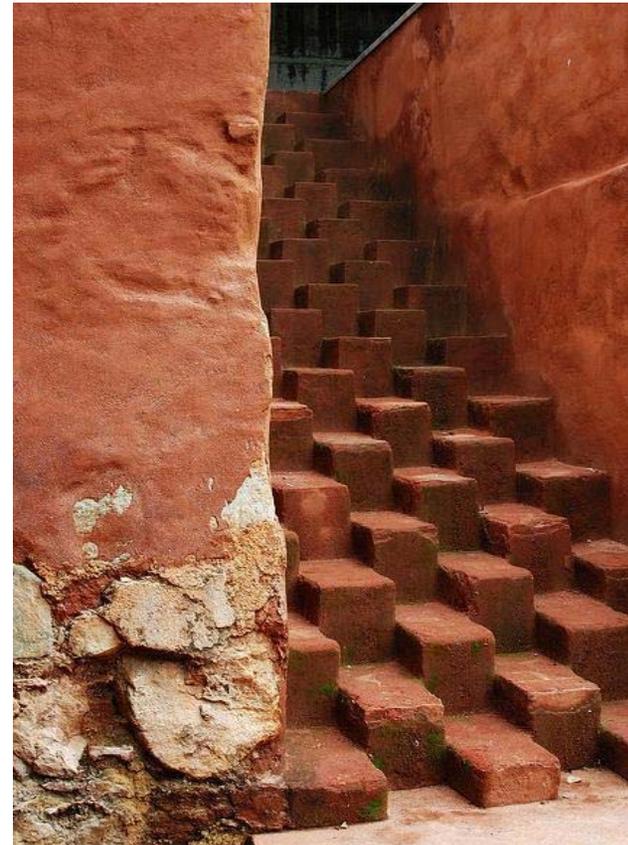
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# Outline

- Terminology
- Dimension of rectangular tread
- Dimension of tapered tread
- Stairs configurations
- Guards
- Handrails



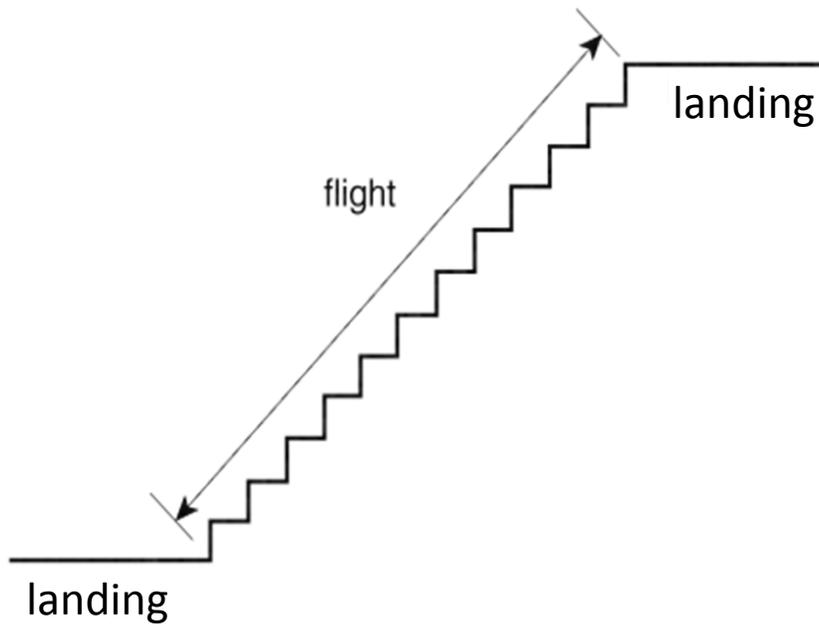
Christopher Holden:

<https://www.flickr.com/photos/maximalideal/4871758457>

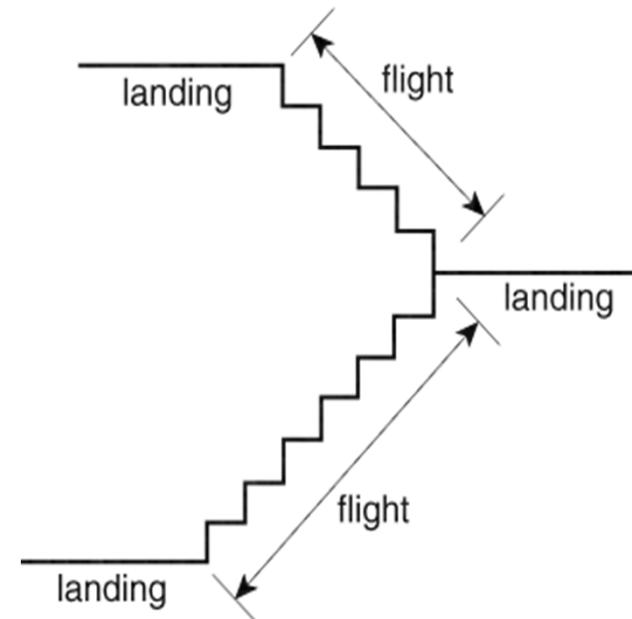
# Terminology

## > Flight

Stair with one flight



Stair with two flights

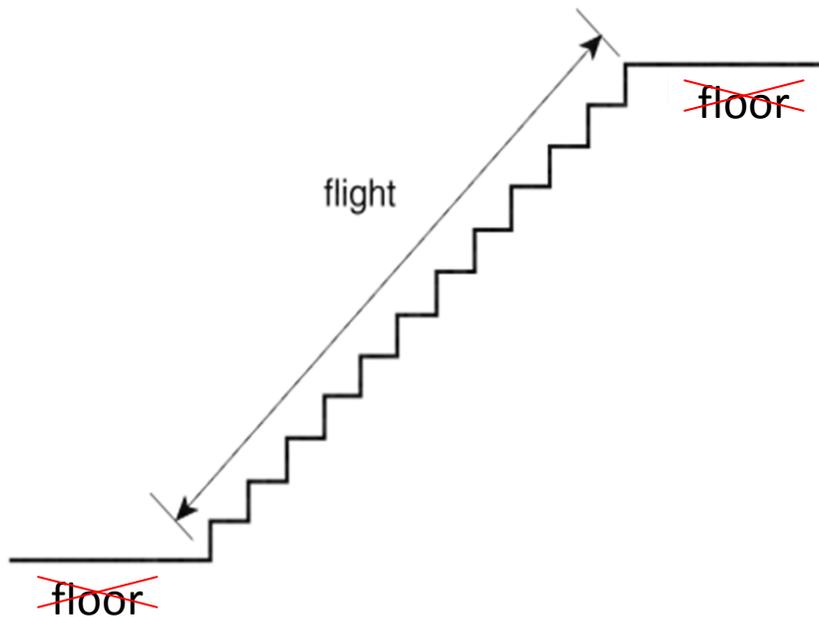


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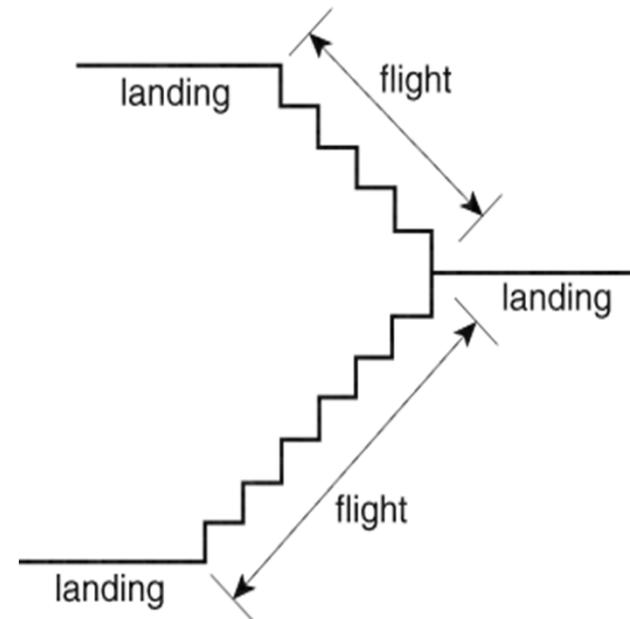
# Terminology

## > Flight

Stair with one flight



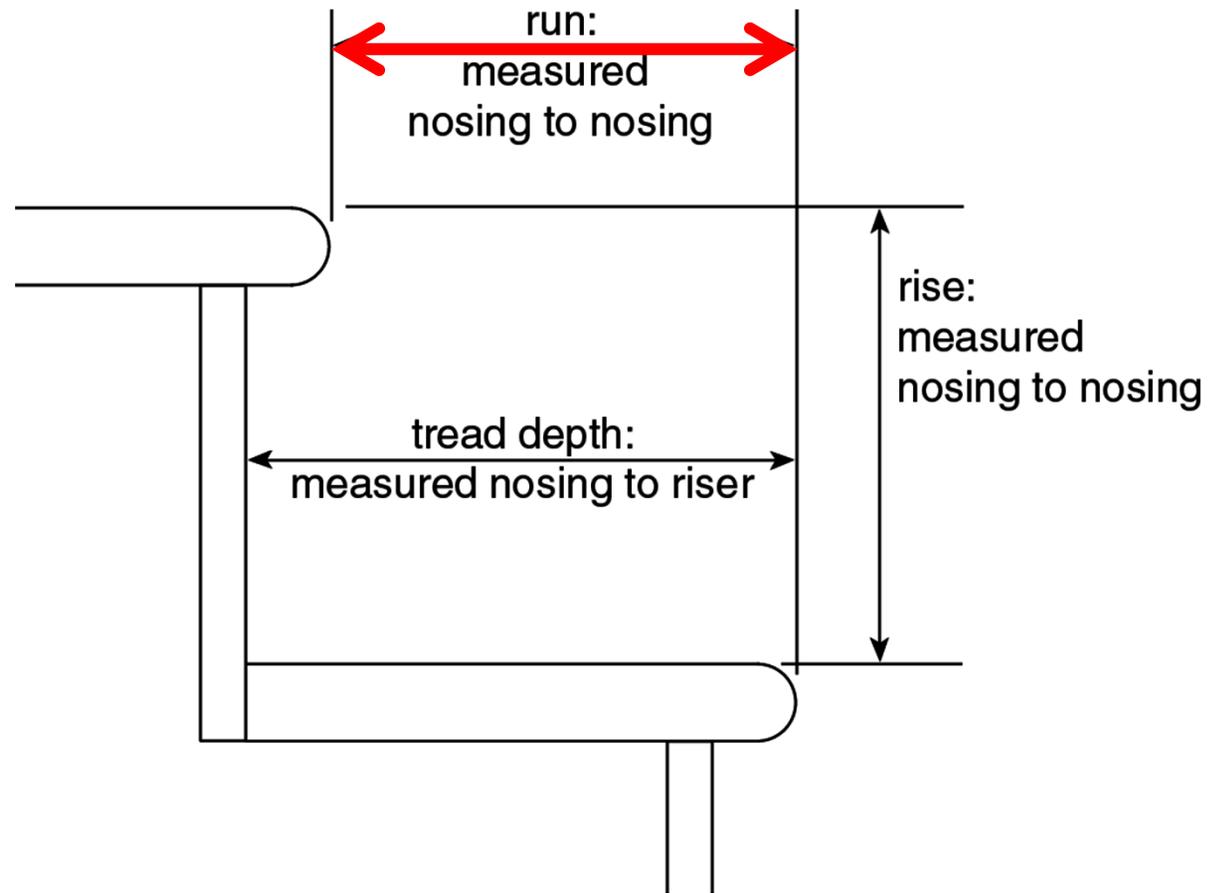
Stair with two flights



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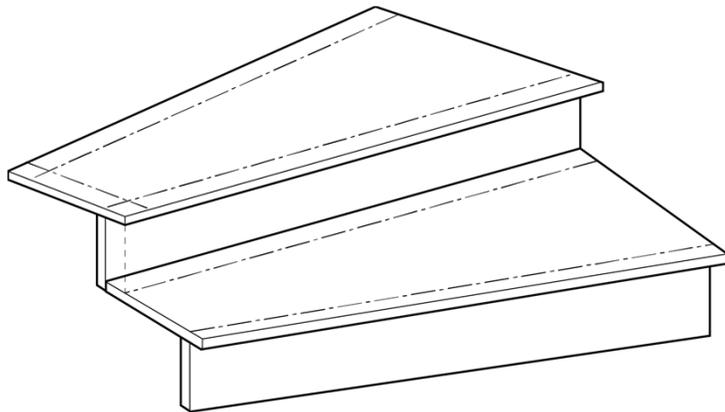
# Terminology

## ➤ Run



# Terminology

- Tapered treads in curved flights

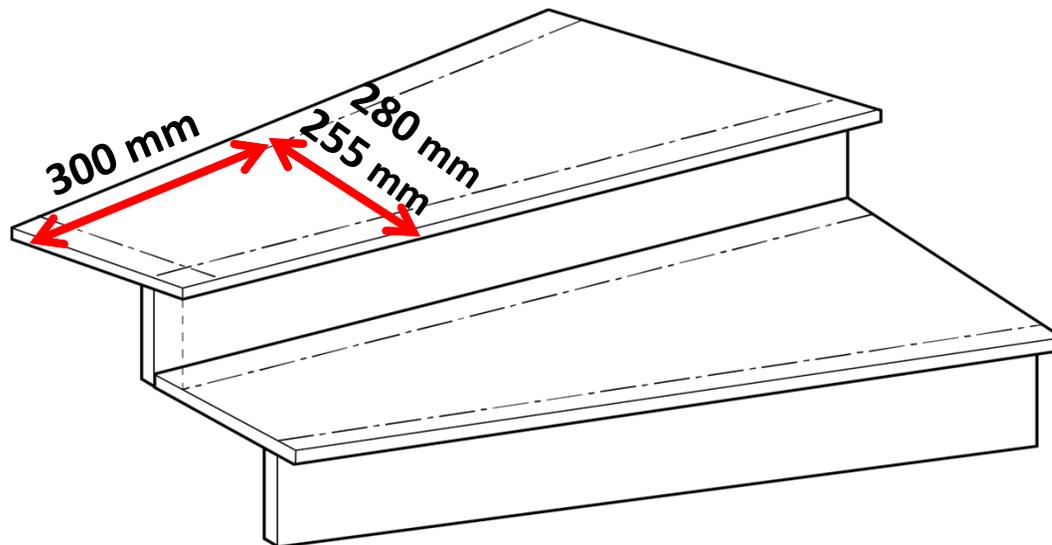


Treppe, Leipziger, Messe, Sachsen:

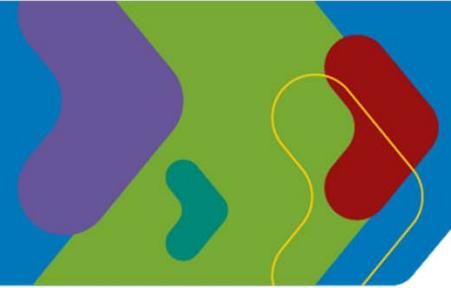
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# Tapered treads in curved flights

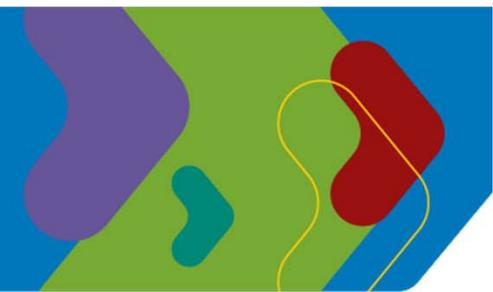
- › Dimensions of tapered tread



# Run dimension in dwelling units



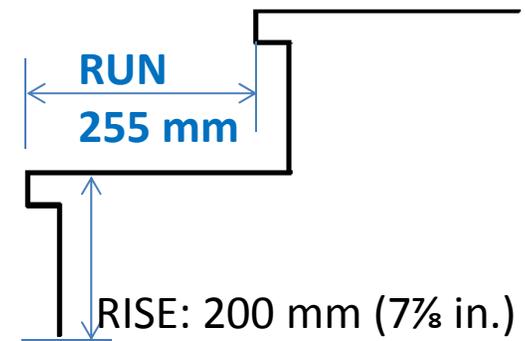
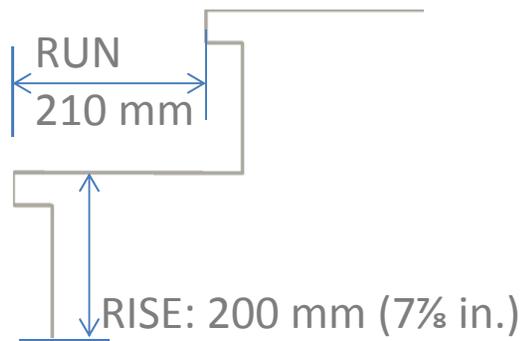
# Run dimension in dwelling units



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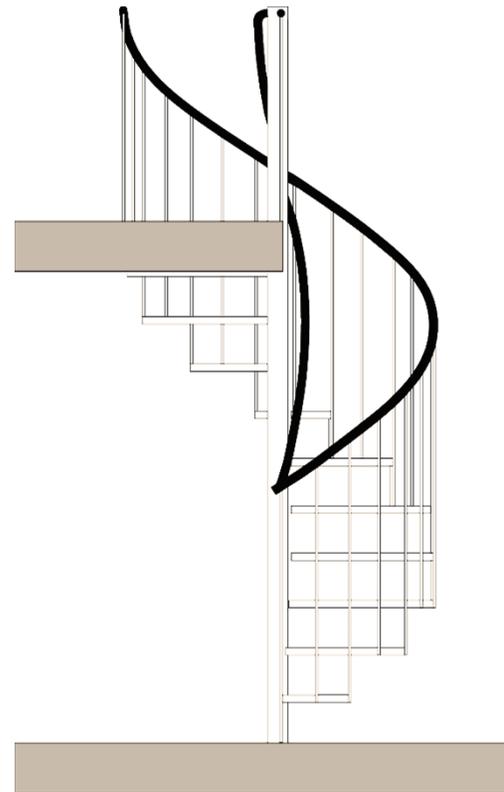
NBC 2010

NBC 2015



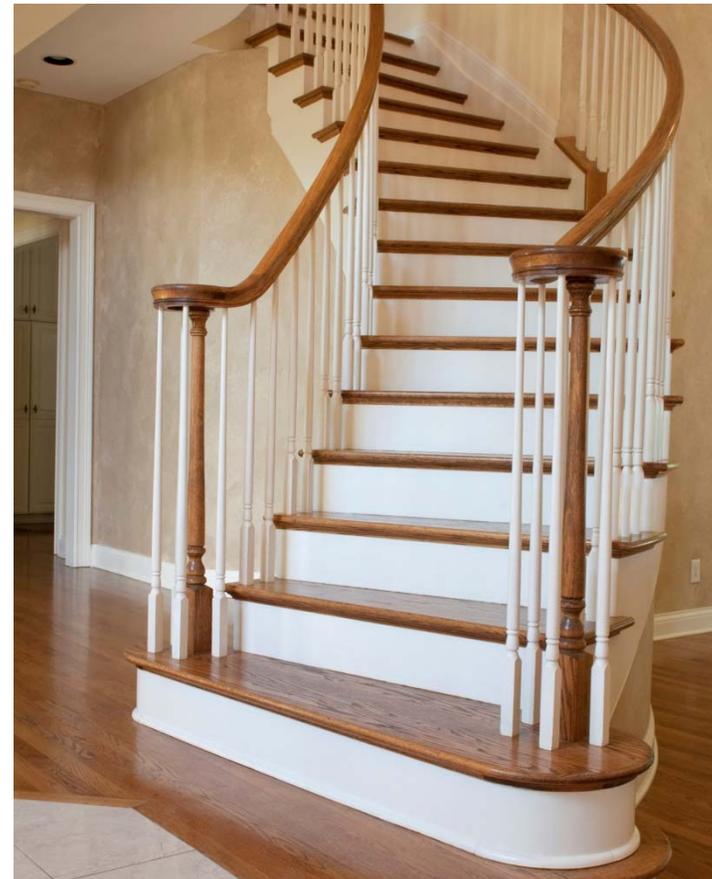
# Spiral stairs

- Code did not permit spiral stairs
- **Now!** Permitted
  - As secondary stairs
  - Used by less than 3 people
  - Not in exits

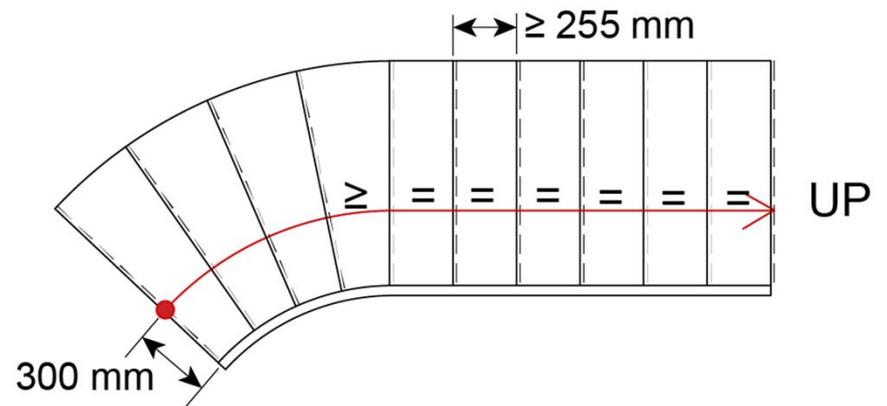
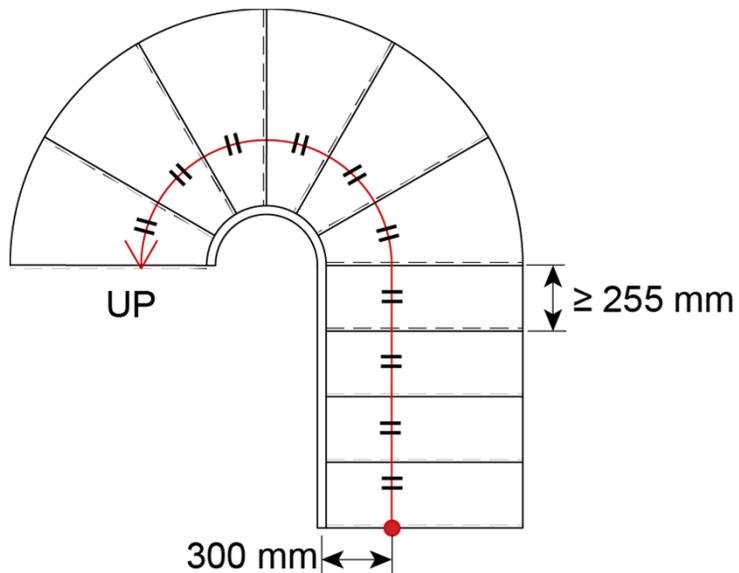


# Mixed-run flight in dwelling units

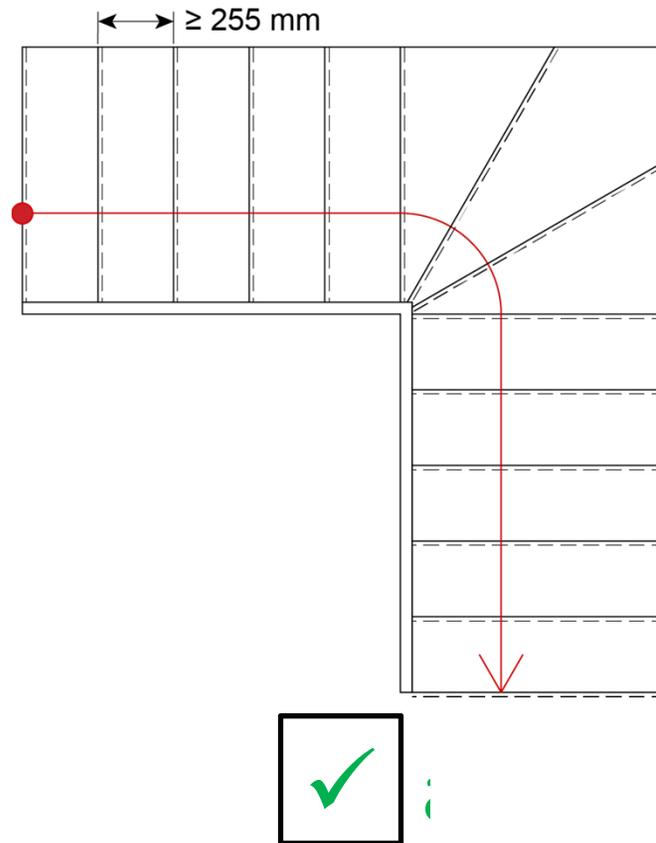
- › Code did not permit mixed treads in a flight
- › **Now!** Flexibility to mix in dwelling units
  - Tapered and rectangular treads in the same flight
  - With restrictions to the run dimensions of treads



# Mixed-run flights in dwelling units



# Winders in dwelling units

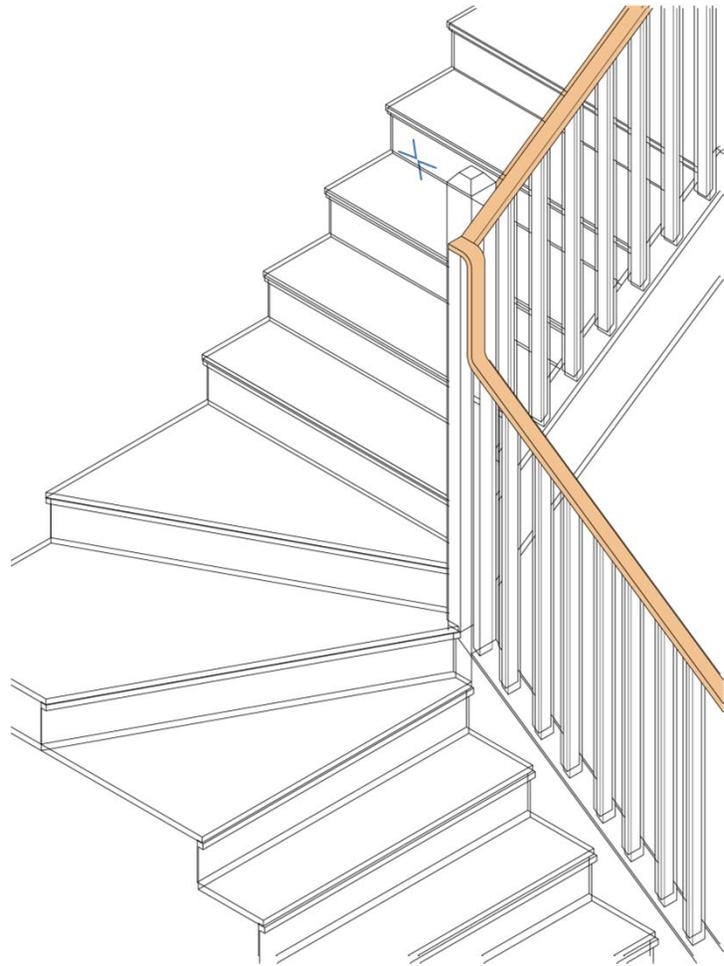
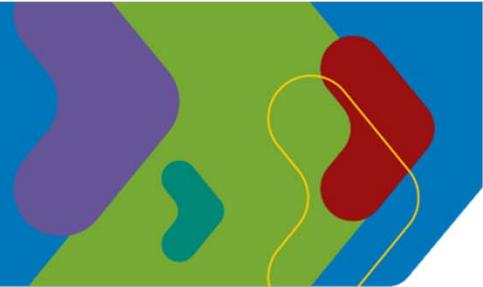


# Ornamental guards

- Restricted choices
- **Now!** Permitted when less than one floor-to-floor elevation (4.2 m)

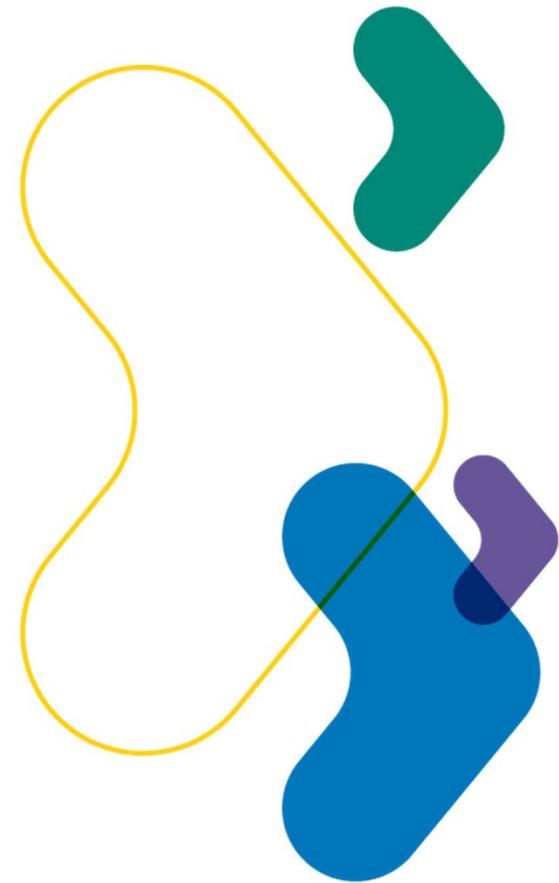


# Continuity of handrails



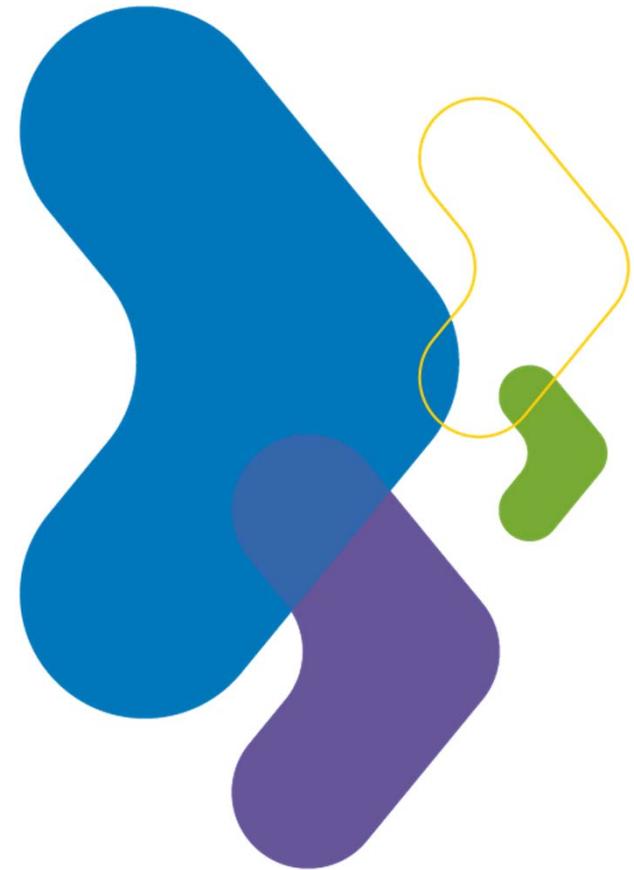
# Takeaways

- › Terminology
- › Dimension and uniformity of tapered tread
- › Run dimension in dwelling units
- › New stair configurations in dwelling units
- › Guards design
- › Continuity of handrails

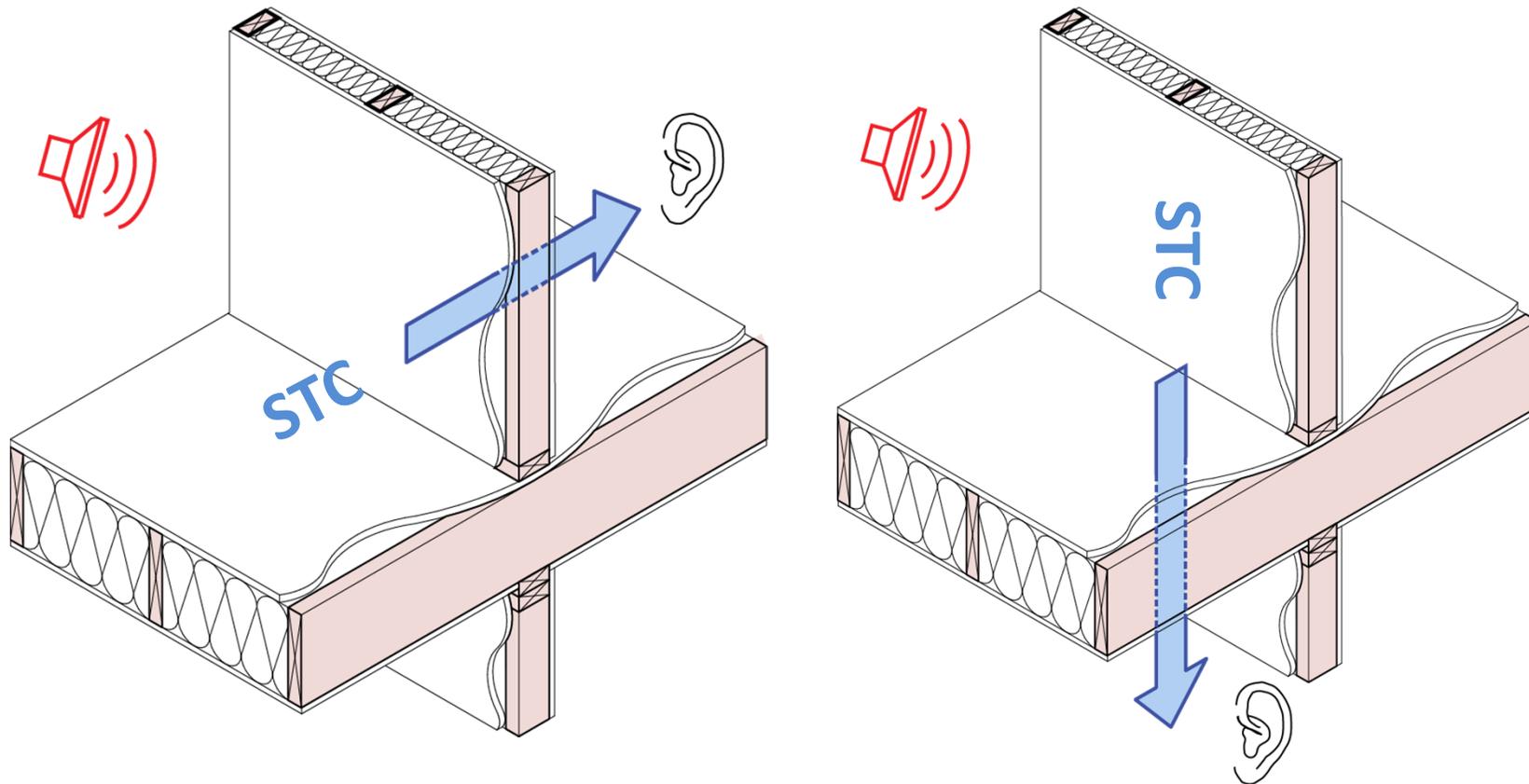


# Parts 5 and 9 joint changes

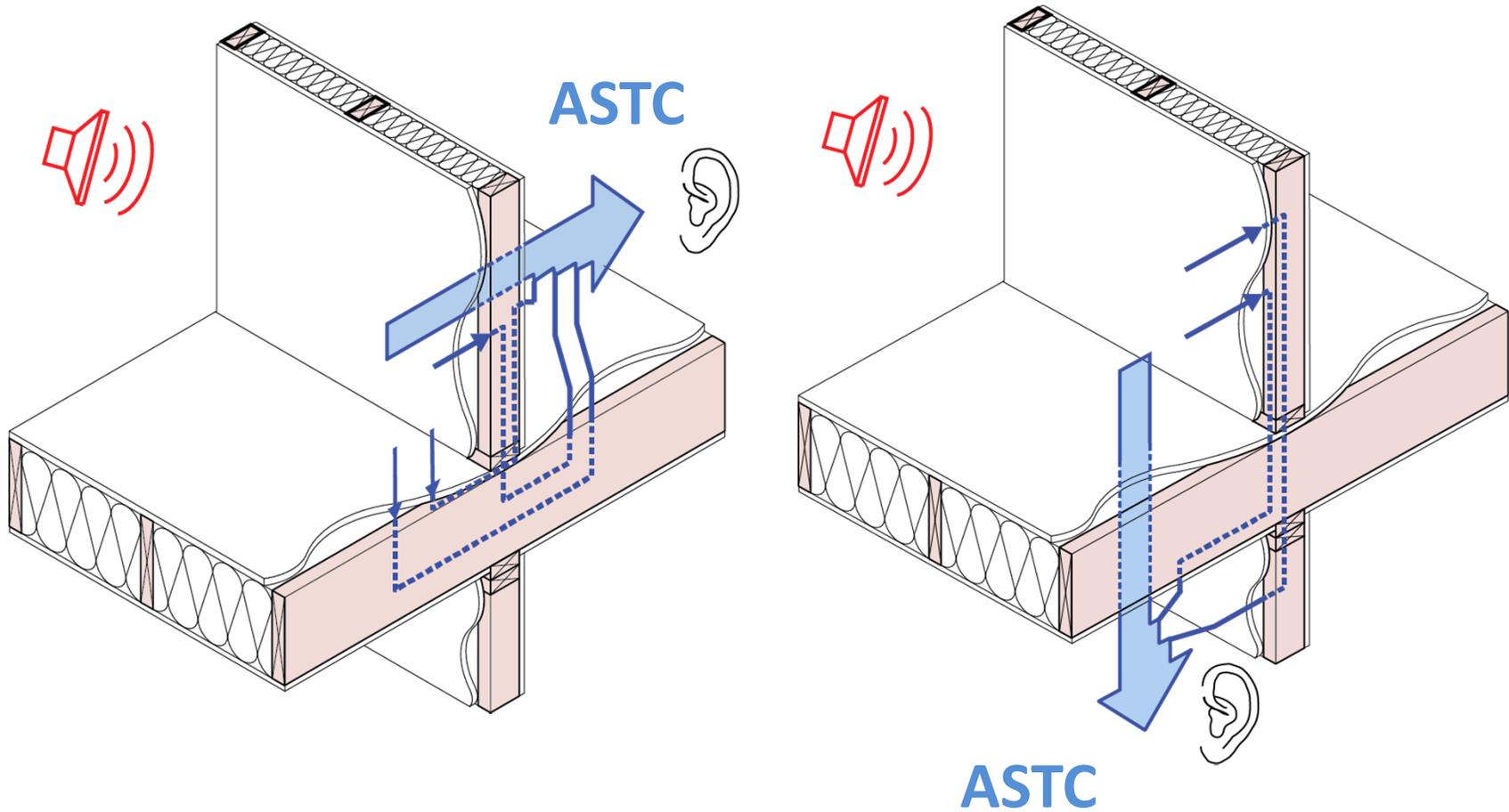
- Airborne sound transmission
- Roofing, dampproofing and waterproofing standards
- Exterior insulation finish systems (EIFS)



# Sound transmission class rating



# Apparent sound transmission class



# ASTC compliance options



Field Measurement

- › Tested “as built”
- ›  $ASTC \geq 47$



Design procedure

- › NRC Calculation Guide
- › Detailed or simplified method
- ›  $ASTC \geq 47$



Prescriptive procedure

- › Deemed-to-comply construction
- › Uses STC data in NBC

# Waterproofing and dampproofing

- Outdated **material** standards
  - **Deleted** obsolete standards
  - **New** standards where acceptable
  - **Kept** standards where no replacements were available
- Introduced performance requirements



# Waterproofing and dampproofing

- Outdated **installation** standards
  - Part 5 – **Deleted** without replacement
  - Part 9 – **Replaced** with Code requirements
    - Surface preparation
    - Service conditions
    - Application methods



# Roofing

- Outdated **material and installation** standards
  - **Replaced** and **deleted**
  - Reorganized in Tables by material type



# Exterior insulation finish systems



Courtesy of: Dryvit Systems Canada



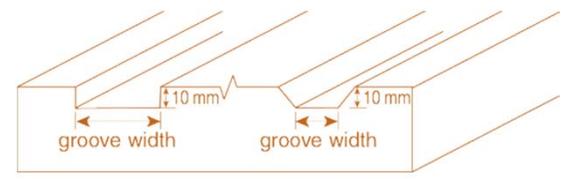
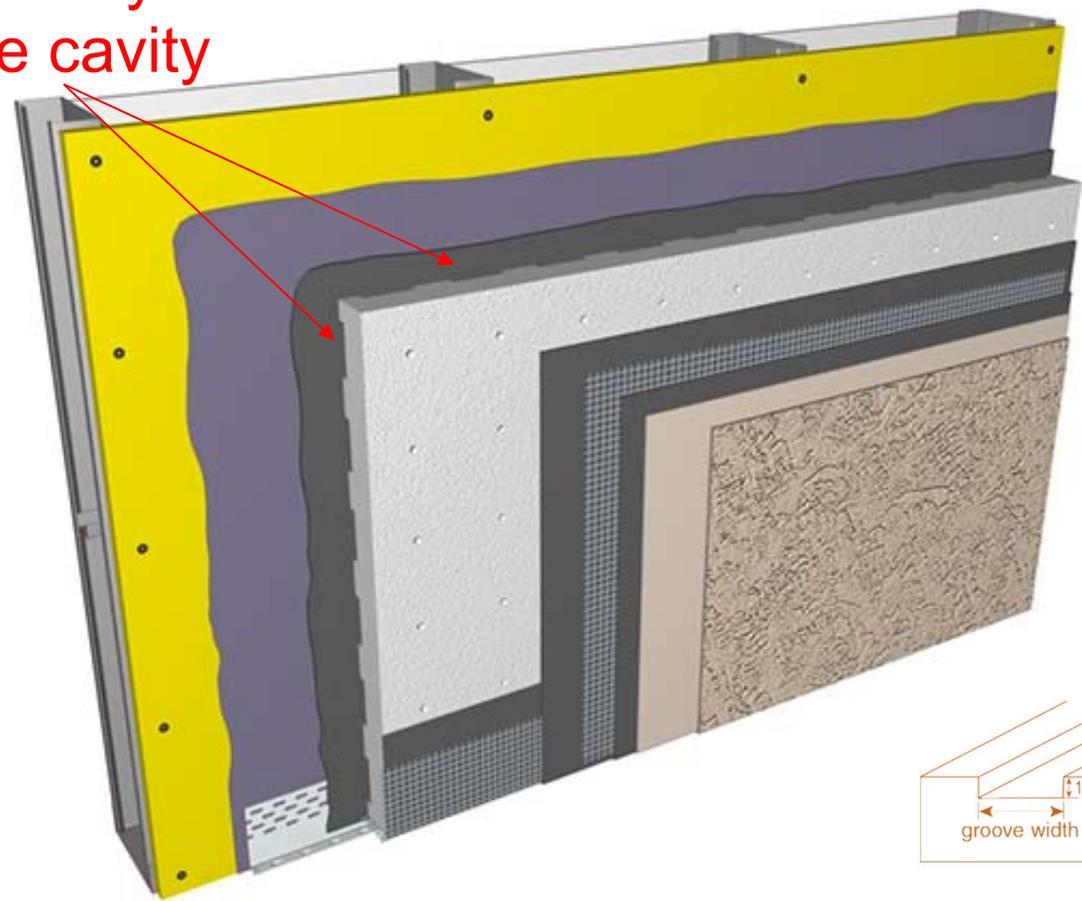
# EIFS - Standards

› Three ULC standards:

- ULC S716.1, “Exterior Insulation and Finish Systems (EIFS) - **Materials and Systems**”
- ULC S716.2, “Exterior Insulation and Finish Systems (EIFS) - **Installation of EIFS Components and Water Resistive Barrier**”
- ULC S716.3, “Exterior Insulation and Finish Systems (EIFS) - **Design Application**”

# EIFS – Part 9

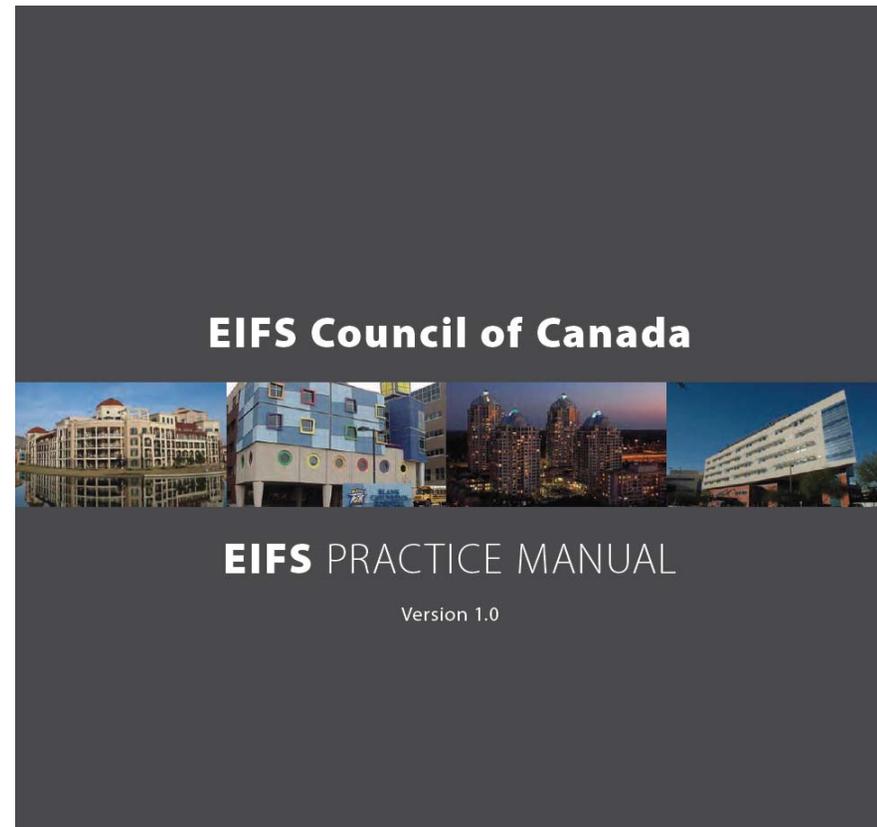
geometrically defined drainage cavity



Courtesy of: DuROCK Alfacing International Ltd.

# EIFS – Part 5

- Part 5 guidance
  - Options
  - Considerations
  - Drainage cavity
- Thermal impact study

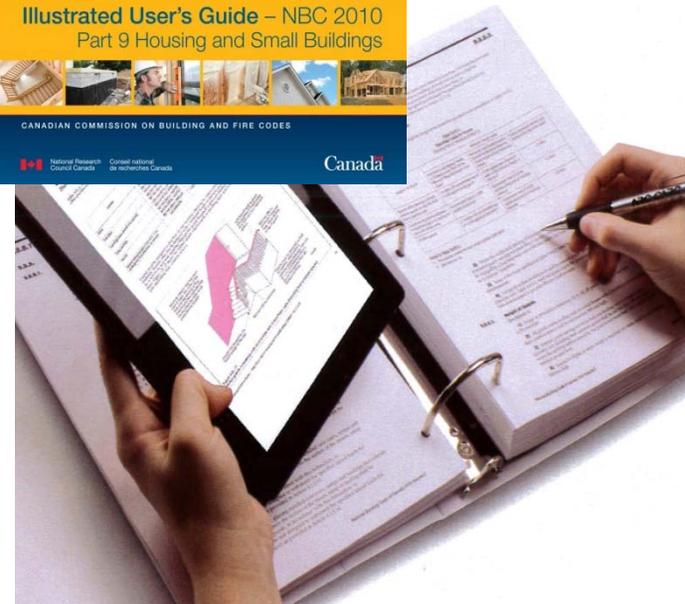
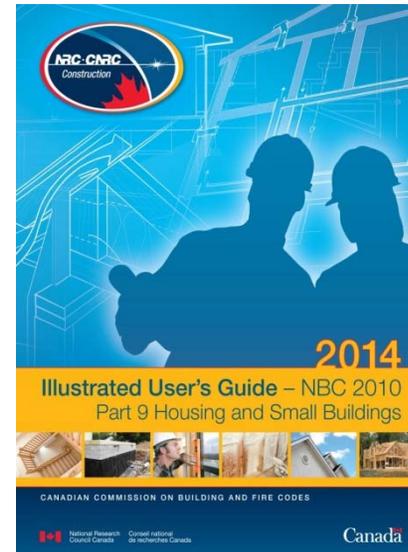


# Takeaways

- ASTC - New metric for airborne sound transmission
- New calculation/design method for sound transmission
- Updated standards for roofing, dampproofing and waterproofing reduce liabilities for contractors
- Many new acceptable materials in Part 9
- EIFS Standards and prescriptive req's for EIFS in Part 9
- EIFS Design guidance for Part 5

# Illustrated User's Guide Part 9 Housing & Small Buildings

- › Understand and apply the provisions in Part 9
- › A companion document
- › Informational
- › No legal status
- › Not intended for formal adoption

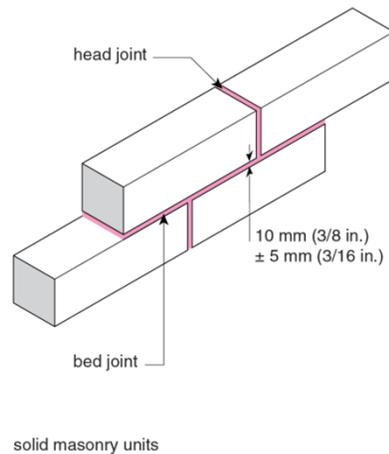
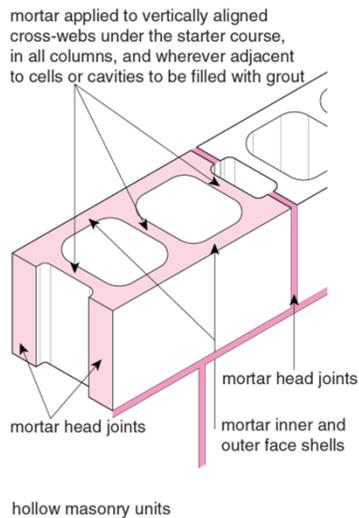


# Illustrated User's Guide

## Part 9 Housing & Small Buildings

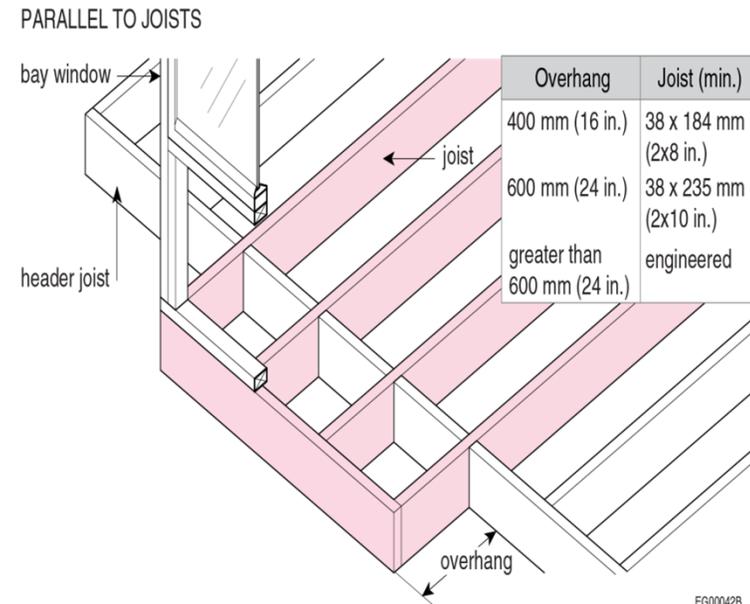
### Use of illustrations

- Explain general concepts
- Key features
- Construction methods



EG00278C

### 9.20.4.3. Laying of Masonry Units



### 9.23.9.9. Cantilevered Floor Joists

# NRC Construction Client Services

## CONTACT

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<http://www.nrc-cnrc.gc.ca/codescanada/index.html>  
**Codes Canada**



<http://www.nrc-cnrc.gc.ca/ci-ic/>  
**Construction Innovation**

**Nedjma Belrechid**

**Thank You!**