



# **Fire Protection Engineering Solutions To Upgrading Existing Buildings**

## **Challenges And Approaches For Existing Buildings**

Robert (Bob) Heikkila, P.Eng., CP, MBA, FEC  
Director – Western Canada, Jensen Hughes

# Fire Protection Engineering Solutions To Upgrading Existing Buildings

## What Is The Issue?

- Value of building permits in Canada  $\approx$  \$135B in 2023 (Statistics Canada)
- Value of renovations, additions, alterations not clearly defined but  $\approx$  30% - 40% of total
  - => a BIG number
- What requirements are applicable when an existing building is modified?  
What needs to be upgraded? How is this regulated?

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- NBC provides minimal guidance for upgrading of existing buildings
- From the NBC 2020 [A-1.1.1.1.(1)]:

This Code is most often applied to existing or relocated buildings when an owner wishes to rehabilitate a building, change its use, or build an addition, or when an enforcement authority decrees that a building or class of buildings be altered for reasons of public safety. It is not intended that the NBC be used to enforce the retrospective application of new requirements to existing buildings or existing portions of relocated buildings, unless specifically required by local regulations or bylaws.

The successful application of Code requirements to existing construction becomes a matter of balancing the cost of implementing a requirement with the relative importance of that requirement to the overall Code objectives. The degree to which any particular requirement can be relaxed without affecting the intended level of safety of the Code requires considerable judgment on the part of both the designer and the authority having jurisdiction.

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- Local or regional jurisdictions may develop their own requirements for existing buildings
- BC Building Code 2024 and NBC-Alberta Edition 2023 requirements can be paraphrased as “don’t make the existing condition worse”
- Vancouver Building By-Law 2019 has a detailed Part 11 (Existing Buildings) in Division B, using the Upgrade Mechanism Model
  - Type of project is categorized as Rehabilitation, Change of Major Occupancy, or Addition.
  - Upgrade Levels 1 through 4 for each of:
    - Fire & Life Safety,
    - Structural,
    - Non-Structural Seismic, and
    - Accessibility



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- Ontario Building Code 2024 has Division B Part 10 (Change of Use) and Part 11 (Renovation)

Varying requirements depending on the existing conditions and the proposed work, eg.,  
Type of existing building, type of change of use, basic renovation or extensive renovation

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## Typical Issues:

- Should this exiting be retained? Improved? What extent of work in the building should be required to trigger any upgrading?





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Typical Issues (cont.):

- Deficient interior fire separations
- Non-conforming combustible construction
- Interconnected floor spaces



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## Typical Issues (cont.):

- Exit stairs not fire-separated from adjacent floor areas
- Excessive travel distances to exits
- Unrecorded work, or work done without a permit
- Out-of-date, non-functional or non-existent fire and life safety systems





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Sometimes complete upgrading may be required



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## Problems in Achieving Code Compliance:

- Existing buildings may have unique challenges that do not fit well with current building code requirements
- Alternative Solutions are permitted by NBC 2020 Div. C Section 2.3
- Alternative Solutions are required to “...achieve at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the applicable acceptable solutions”  
[NBC Div. A 1.2.1.1.1.(B)]
- What if:
  - The “applicable acceptable solutions” are not clear, or
  - The level of performance in the areas defined by the objectives and functional statements can’t feasibly be met, for an existing condition?