



*Photo 1. Air supplied to this space exits through openings in the first storey floor assembly. The noncombustible construction, amongst other things, makes this a crawl space according to the NBC.*



*Photo 2. Air supplied to this space is returned to a furnace via a transfer duct in the first storey floor assembly. The combustible construction makes this a basement according to the NBC.*

## When is a Crawlspace Not a *Crawl Space*?

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This edition of *Crawlspaces Matter* looks at what the National Building Code of Canada 2010 (NBC)\* says about crawlspaces. This discussion forms the basis for subsequent articles.

### Crawl Space or Basement Space?

Articles 3.2.2.9 and 9.10.8.9 of the NBC, in a roundabout way, define a crawl space. Both articles essentially state that you are dealing with a basement (and not a crawl space) when any of the following exists:

- .1 The vertical distance between the lowest part of the floor assembly and the ground or other surface is greater than 1.8 m (5.9 ft).
- .2 The space is used for any occupancy.
- .3 Flue pipes pass through the space.
- .4 The space is used as a plenum in combustible construction.

\* The National Building Code of Canada is a model code that is available for use by Territories and Provinces. Through *The Uniform Building and Accessibility Standards Regulations*, the National Building Code of Canada 2010 is declared to be in force in Saskatchewan.

Thus, you are probably dealing with a crawl space when all of these conditions are met:

- .1 The distance between the lower edge of a wood floor joist, or the lower chord of an open web steel joist, that forms part of a first storey floor assembly, and the ground is less than 1.8 m.
- .2 People or animals do not reside, nor are sheltered, in the space.
- .3 No materials or property are stored in the space.
- .4 There are no pipes within the space that convey flue gases.
- .5 The space is not a chamber that forms part of an air duct system in a building of combustible construction.

### NBC Objectives

Application of the NBC is intended to achieve specific objectives. NBC Objectives<sup>±</sup> directly influenced by crawlspace design and performance include:

<sup>±</sup> Part 2 of Division A of the NBC defines the objectives to be achieved by the Code.

1. Limit the probability that a person in a building will be exposed to an unacceptable risk of illness due to indoor conditions caused by:
  - .1 Inadequate indoor air quality {Objective OH1.1}. The presence of mould or bacteria in indoor air may trigger allergic reactions or contribute to illness in people, for example.
  - .2 Inadequate thermal comfort {OH1.2}. Low relative humidity levels may favor transmission of viruses and can dry mucous surfaces which decreases their ability to trap potentially harmful substances.
2. Limit the probability that a person in or adjacent to the building will be exposed to an unacceptable risk of injury due to structural failure caused by:
  - .1 Damage to or deterioration of building elements {OS2.3}. Structural failure may result from deterioration of metal structural elements due to corrosion or from decay of wood structural elements due to fungal attack.
3. Limit the probability that the building or part thereof will be exposed to an unacceptable risk of loss of use due to structural failure or lack of structural serviceability caused by:
  - .1 Damage to or deterioration of building elements {OP2.3}. Deterioration of wood joists due to decay from fungal attack may render them unfit for service which could result in closing a portion of a building.

### NBC Functional Statements

NBC Objectives are achieved when a building or its constituent elements adequately perform specific functions. Functions that can be influenced by crawlspace design, construction, maintenance and operation include:

- To limit the level of contaminants (F40)<sup>#</sup>
- To minimize the risk of generation of contaminants (F41)
- To limit the spread of hazardous substances beyond their point of release (F44)
- To provide suitable air for breathing (F50)
- To maintain appropriate air and surface temperatures (F51)
- To maintain appropriate relative humidity (F52)
- To maintain appropriate indoor/outdoor air pressure differences (F53)
- To resist the transfer of air through environmental separators (F55)

- To control the accumulation and pressure of water on and in the ground (F60)
- To resist the ingress of precipitation, water or moisture from the exterior or from the ground (F61)
- To facilitate the dissipation of water and moisture from the building (F62)
- To limit moisture condensation (F63)
- To resist deterioration resulting from expected service conditions (F80)

### Control Measures

For a building and its elements to perform the functions required, suitable and adequate control measures must be applied – such as those described by the acceptable solutions found in Division B of the Code. Implementation of alternative solutions that limit the probability of exposure to unacceptable risks, to at least the same extent as the acceptable solutions, may also result in achievement of the NBC Objectives.

In the Division B Attribution Tables of the Code, Acceptable Solutions are cross-referenced to their corresponding Functional Statements and Objectives. For example, the Acceptable Solution described in Article 9.18.6.2 (Ground Cover in Heated Crawl Spaces) is intended to resist the ingress of moisture from the ground (F61) which supports preventing: 1) inadequate indoor air quality {Objective OH1.1}, 2) inadequate thermal comfort {Objective OH1.2}, and 3) damage or deterioration of building elements {Objective OS2.3}.

The performance of a crawlspace and, therefore, its potential impact on overall building performance, can be influenced by measures such as:

- Types, properties and configuration of materials
- Space heating
- Ground cover
- Space ventilation
- Exterior and interior drainage
- Insulation
- Air barrier systems
- Vapour barriers
- Site grading
- Landscaping and irrigation practices
- Site maintenance
- Operational practices
- Occupant activities and behaviors

When control measures are not suitable, adequate, effectively implemented or maintained, the required functions are not performed and objectives are not met. Subsequent editions of *Crawlspaces Matter* will discuss selected aspects of the design and performance of crawlspaces from a Saskatchewan perspective.

<sup>#</sup> Section 3.2 of Division A of the NBC lists the functions to be performed by a building and its elements.

## Next Edition

The next edition of *Crawlspaces Matter*, **When Crawlspaces Go Bad**, looks at the signs and symptoms associated with hygrothermal<sup>¶</sup> issues in crawlspaces.

## Notice

This commentary (which does not contain professional engineering advice or recommendations) is published by EMS Croscan, a consulting engineering firm licensed to practice in Saskatchewan and Northwest Territories and Nunavut. This publication is intended to raise awareness, facilitate discussion and improve crawlspace performance in Saskatchewan

If you would like to receive future editions of this newsletter, please contact Dan Kishchuk at [dan@emscroscan.ca](mailto:dan@emscroscan.ca) or 306 665-9098.

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<sup>¶</sup> Hygrothermics is concerned with how materials and assemblies perform under various moisture (hygric) and heat energy (thermal) conditions.