



Photo 1. Mould growth on fabric jacketing due to high relative humidity in the crawlspace. As the relative humidity increased, the moisture content of the fabric increased to a level where mould spores on the fabric could germinate and colonize.



Photo 2. Staining on pipe insulation jacketing indicates condensate dripping from above. Note also the staining on the foundation wall insulation resulting from corrosion of the piping.

When Crawlspaces Go Bad

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In the previous edition of *Crawlspaces Matter*, we looked at:

- Some of the Objectives that the National Building Code of Canada 2010 (NBC) is expected to achieve.
- Selected functions to be fulfilled by buildings and their constituent elements
- Examples of control measures that might be applied with respect to crawlspaces.

In this edition, we discuss what can happen when control measures are unsuitable or inadequate.

Impacts – NBC Perspective

When measures intended to control moisture in crawlspaces do not perform their functions to the extent required, NBC Objectives may not be achieved. The Objectives most likely to be un-met by an inability to control moisture in crawlspaces are:

- Safety – limiting the risk of injury.
- Health – limiting the risk of acute or chronic illness.

- Structural Protection – limiting the risk of structural failure or an unacceptable loss of structural integrity.

Impacts – Building Owners, Operators and Occupants

For building owners, operators, managers and occupants, failure to control moisture in crawlspaces may result in:

- Discomfort and decreased productivity of occupants
- Occupant lost time due to illness or symptoms attributed to building conditions
- Difficulty leasing or obtaining market rates for a space
- Loss of use of otherwise productive or revenue generating space
- Inability to conduct operations
- Relocation costs
- Repair costs
- Legal costs
- Public relations costs
- Loss of reputation
- Increased energy consumption

Symptoms and Signs

When measures intended to control moisture do not perform as required a variety of symptoms may be present. Some of these symptoms may be found in other parts of a building but may be caused by crawlspace issues. Conversely, some symptoms found in a crawlspace may be signs of problems elsewhere in or around a building. They may also be indicators that building systems that serve multiple spaces within a building create the desired conditions in some spaces but create risky conditions elsewhere.

And in some cases it is not moisture, per se, that is the issue but a failure to select materials and construct building assemblies that can accommodate the required indoor environmental conditions.

Symptoms and signs include:

- Visible mould and other types of fungi.
- Visible bacteria.
- Mould detected through analysis of air, dust and material samples.
- Earthy or musty odours – possibly due to release of metabolic by-products as mould grows.
- Sour or rank odours - potential indicators of bacterial growth.
- Corrosion of building elements – indicated by rust and flaking.
- Decay and rot of wood materials.
- Structural failures.
- Discoloration, blistering or lifting of floor and wall coverings.
- Extensive swelling, expansion and contraction of building materials.
- Condensate or frost formation on surfaces.
- Staining of materials.
- Changes in the shade of materials due to adsorption and absorption of moisture.
- Increased latent cooling load.
- Increased ventilation demand.
- Crumbling gypsum board panels.
- Sagging or stained ceiling tiles.
- Illness from indoor air quality issues.
- Occupant discomfort – itchiness, dry nasal passages.



Photo 3. Fungi growing on a concrete footing beneath polyethylene ground cover material. The ground cover is resisting the ingress of moisture into the crawlspace as intended by the National Building Code of Canada. In the absence of moisture the fungal spores would not germinate and colonize.

Next Edition

The next edition of *Crawlspaces Matter*, **Understanding Crawlspace Conditions**, looks at what attributes and variables might be observed, measured or calculated when diagnosing crawlspace issues.

Notice

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