



Built to a New Code

Grant Kelly
Director,
Climate Change
Adaptation Projects,
Institute for
Catastrophic Loss
Reduction (ICLR)

The Institute for Catastrophic Loss Reduction (ICLR) has called for changes to the Ontario Building Code to help prevent water and wind damage.

Insurers have a long and proud record of promoting public policy changes that improve public safety. Continuing in this tradition, the Institute for Catastrophic Loss Reduction (ICLR) recently made three submissions to Ontario's Ministry of Municipal Affairs and Housing to strengthen the Ontario Building Code.

ICLR's submissions represented its contribution to the Ontario Ministry of Environment's Regional Adaptation Collaborative (RAC). The RAC's objective is to help integrate climate change adaptation considerations into decision-making at the community level. One goal of ICLR's project is to provide information to support future updates of the National and Ontario Building Codes and related standards, rules, regulations and practices. This would help aid Canadian communities to adapt to more frequent and more severe extreme weather events.

ICLR's three initial proposals to strengthen the Ontario Building Code are requiring sewer backflow

valves on all new homes built in Ontario; using more nails to hold down roof panels; and tying down garage roofs to walls.

Require sewer backflow valves on all new homes built in Ontario

Every new home is at risk of flooding and needs a sewer backflow valve. These valves significantly reduce the risk of sewer backup damage and basement flooding. The cost of adding a backflow valve is less than \$200 if it is part of the initial construction of a home. Backflow valves should be installed when the home is initially constructed: it costs significantly more for homeowners to retrofit their home with a sewer backwater valve than it does to have a builder install it. A retrofit requires breaking basement floors and removing sections of sewer connections. This costs thousands of dollars. During new construction, a plumber is already onsite and has open access to install the valve properly. This reduces costs significantly.

All available scientific evidence suggests extreme rain events will become more frequent over the next 40 years. The Ontario Building Code should address the risks of severe flooding caused by sewer back-ups. To illustrate the point, a severe rainstorm on Aug. 19, 2005 dumped 153 mm of precipitation in the City of Toronto in a three-hour period. It resulted in insurance losses of more than \$500 million

dollars; sewer back-up flooding of basements accounted for approximately half of these losses.

Assume the average cost is between \$10,000 and \$50,000 to repair the damage caused by a sewer backwater flood in a basement: these potential losses make a backflow valve a cost-effective investment even if the valve were to prevent just one sewer backflow in the lifetime of the home. It is, in fact, less than the deductible homeowners are required to pay under the terms of their insurance policy following a flood. A sewer backwater valve is cost-effective if one valve out of every 100 installed actually prevented a flood. Some communities, like Toronto and Edmonton, require backflow valves in all new homes; we propose this should be required in all jurisdictions.

More nails to hold down roof panels

The Building Code currently requires roof panels to be nailed down every six inches on the end and 12 inches across the middle of the panels. This translates to 33 nails in a typical size of 1.22 m x 2.44 m

ICLR recommends nailing all sides of the roof panel every six inches. Research shows that extra nails will increase a roof's capacity to handle wind risks (like tornadoes) by 50%.

(i.e., 4'x8') roof panel. ICLR recommends nailing all sides of the roof panel every six inches.

Research at the University of Western Ontario estimates these extra nails will increase the roof's capacity to handle wind risks (like tornadoes) by 50%. A strong roof is essential to ensure the safety of inhabitants and prevent excessive damages to the light-frame wood structures. Disaster literature suggests the majority of damage to property and contents are caused by roof panel failure. The ingress of rain could also cause health hazard due to possible mould growth.

Requiring more nails will also help minimize the impact of nails that are improperly fastened or simply missed. For example, for each typical roof-sheathing panel at the Insurance Research Lab for Better Homes test house, at least one nail is missing or improperly fastened. The quality of construction of the test house is similar to those found in practice according to surveys conducted by building inspectors. Missing nails can mean roofs people believe to be built to code are actually not; thus, less intense winds could cause preventable damage.

Tied down roof to walls in garages

ICLR's final recommendation is to require hurricane straps to connect the roof and walls of any garage that is not integral to the home. (This means the garage sits in front



of or beside the house.) After the 2009 tornadoes in Vaughn, Ontario, researchers learned garage roofs were particularly vulnerable to damage. The wind blew down garage doors, creating tremendous internal pressure that lifted the roofs. The airborne roof became debris that damaged other homes. Loss of roof structure is usually the precursor to wall collapses; these wall collapses often lead to death or injury in windstorms. Therefore, it is critical to keep the roof structure stable.

Note ICLR's recommendation does not apply when there is an integral (to the

house) second-floor structure above the garage. The weight of the second-floor structure is sufficient to mitigate the elevated internal pressures in the garage.

ICLR also considered requiring stronger garage doors to address this problem. However, stronger garage doors are very expensive (thousands of dollars) relative to the cost of hurricane straps (approximately \$200 per home).

BUILDING TO CODE

Many hurdles must be crossed before ICLR's submissions become part of the Ontario Building Code. As a next step, a technical advisory committee comprised of building

ICLR recommends requiring hurricane straps to connect the roof and walls of any garage that is not integral to the home. (This means the garage sits in front of or beside the house.)

regulators, builders, contractors and building owners and managers will assess ICLR's submissions. This committee will approve changes that will subsequently be released for two rounds of public consultations beginning in the fall of 2010. The goal is to have a new Ontario Building Code in 2012.

ICLR will make similar suggestions to the National Building Code Commission and to other provinces. We are working with our insurance advisory committee to develop a long-run strategy to allow insurers to provide more input into the building code development process. In order to be successful, we are looking for industry volunteers from all parts of Canada to participate by joining one of the National Building Code Commission's many Task Groups. We also welcome members of the industry making suggestions about building code changes that we should be seeking. Changes to the National Building Code of Canada take a long time to happen. Every long journey begins with taking that first step, and ICLR just took our first three. ≡