



By Glenn McGillivray

# Severe Weather and New Home Construction

*Small, inexpensive changes can prevent significant damage.*

Each year, natural disasters in Canada result in hundreds of millions—often billions—of dollars in loss and disruption. And while the risk of death or injury due to natural hazards is low and falling, property damage continues to increase.

Indeed, when considering all the loss events over \$25 million (how insurers define a catastrophe), Canadian insurers paid out a staggering \$14.7 billion in property claims from 2009 to 2016. This doesn't include events that fall under the \$25 million threshold or other day-to-day weather-related losses that pile up each year.

Recent events around the world provide unequivocal evidence that much direct disaster damage to homes and other structures occurs when current knowledge about resilient design and construction practices were not used. The evidence shows that newer structures are more resilient than older structures,

and countries with modern building codes have a lower risk of fatalities and property damage than those without modern codes.

Canada is fortunate to have sound, modern, evidence-based building codes—some of the best in the world. What's more, Canadian homebuilders are also some of the best in the world. Canadian homes consistently rank high both in customer satisfaction and

in their ability to withstand some of the worst that nature can throw at them.

But homes still get damaged from extreme weather and one of the more acute causes is extreme wind.

The Institute for Catastrophic Loss Reduction (ICLR) affiliated investigators at Western University are world leaders in severe wind research, and conduct their work at several of the world's leading wind research facilities including the Boundary Layer Wind Tunnel, the Insurance Research Lab for Better Homes (IRLBH) and the WindEEE Dome. High quality wind engineering research provides a strong science foundation to guide best practices for the design of new homes and other structures.

## Damage Reduction Measures

In recent years, ICLR researchers have identified a few simple, inexpensive measures that can reduce damage to homes from severe wind, including improved roof-to-wall connections and better hold-down capacity of plywood roof sheathing.

Regarding improved roof-to-wall connections, the

simple addition of hurricane straps or clips to bolster toenailed connections between joists and walls will prevent roofs from being pulled upward and thrown in a severe wind event. For less than \$200 for an average house, total or partial roof loss can be prevented, which will then prevent walls from collapsing and pieces of building from entering the wind stream and killing or injuring people and causing damage to other structures from debris impact.

On the issue of improving the hold-down capacity of plywood roof decking, the solution is two-fold.

The first measure pertains to fastener type. Where most if not all provincial codes require a minimum two-inch nail to anchor plywood sheathing to roof joists, ICLR-affiliated researchers have found that a 2.5-inch nail will double the hold-down capacity. This would require no practice change as the larger nail can fit in a standard gun.

The second measure pertains to fastener pattern. Where most building codes in Canada require a 12x6 nail pattern for roof decking (i.e. nails spaced every six inches where two sheets share a joist and every 12 inches on the interior of the sheet), changing to a 6x6 pattern (nails spaced six inches apart for the entire sheet) also doubles the hold-down capacity of the sheathing. This amounts to an extra 12 nails per sheet, again, translating to negligible cost (ICLR was successful in getting this change in the last iteration of the Ontario Building Code).

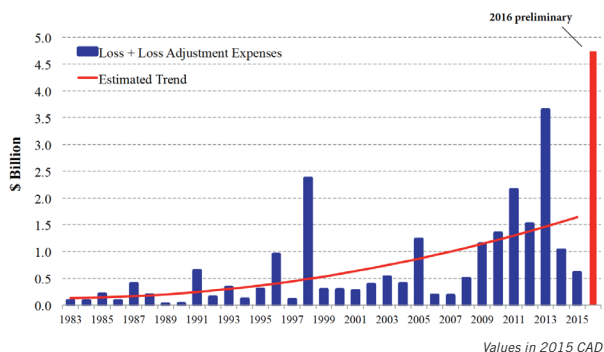
Lab work by ICLR-affiliated researchers has been invaluable in finding weaknesses in new home construction, particularly in the area of roof-to-wall connections and uplift capacity of plywood roof sheathing. ICLR field work, including forensic, immediate post-event analysis of tornadoes, has confirmed lab findings.

ICLR-affiliated researchers have found—and shared with government, the building industry, insurers and others—that small, low-cost measures can protect homes from the most common tornado, hurricane, microburst and flat-line wind damage. ICLR is currently working to move these findings into building codes and would be pleased to work with the home building industry to have them (as well as other resiliency features) incorporated into all new homes in Canada.

Weather-related damage to homes is becoming more commonplace in Canada. And while some maintain that wholesale changes to building codes are needed to address this, ICLR research indicates that much of the damage can be prevented by making small tweaks and filling gaps in current codes, at very little effort and expense.

As has often been said, the devil truly is in the details. ■

## Large Catastrophic Losses



SOURCE: IBC FACTS BOOK, PCS, CATIQ, SWISS RE, MUNICH RE & DELOITTE

Glenn McGillivray is Managing Director of the Institute for Catastrophic Loss Reduction. Prior to joining ICLR, he served as Assistant Vice President of Corporate Communications for Swiss Reinsurance Company Canada. Glenn has written more than 200 magazine and journal articles, publications and blog posts. Additionally, he speaks and lectures regularly on subjects related to the area of property and casualty insurance and reinsurance. Glenn can be reached at gmccgillivray@iclr.org.