Institute for Catastrophic Loss Reduction
Building resilient communities

CATtales

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Inside this issue

ICLR: Looking back, looking ahead

As the Institute wrapped up it's 20th year and rolled into the second year of its current five-year plan, ICLR will continue to focus on four priority research and outreach issues as set out by its Insurance Advisory Committee and Board of Directors:

- Guide actions to reduce the risk of basement flooding
- Champion the construction of disaster-resilient homes
- Support efforts to enhance the resilience of existing homes
- Promote the use of risk financing mechanisms like insurance

Basement flooding

ICLR is recognized as a centre of excellence in the area of basement flood risk reduction. The Institute's basement flood research and communication material is used by such cities as Toronto, Windsor, Mississauga, Peterborough and Kingston, Ontario, and Lethbridge, Alberta; Durham, Niagara and Peel Regions in Ontario; and the Province of New Brunswick to name but a few.

In 2017, ICLR published *Assessing local mandatory measures to reduce flood risk and Inflow & Infiltration in existing homes*, focusing on legal approaches adopted by local governments to reduce the risk of basement flooding requiring action by private property owners to better manage storm water and protect against flood risk. Throughout 2017, ICLR continued to work with building industry experts and municipalities to develop best practices in the design of new subdivisions to reduce urban flood risk.

In 2018, the Institute will further promote its new micro website www.backwatervalveinstallation.com, which provides information about how to install and maintain a backwater valve, and Institute staff will continue to work with Dr. Andy Binns, Engineering, University of Guelph, on the further development of a research centre for testing devices related to preventing sewer backup.

New homes

The year now passed marked a watershed annum toward the application of ICLR research to enhance building codes. ICLR provided codes and standards recommendations seeking to ►

reduce the risk of damage to new homes from extreme rainfall, severe wind, wildfire, and extreme heat. This advice was directed to homebuilders and governments at all levels—federal, provincial and local—through a number of initiatives.

In 2018 and beyond, ICLR will continue to seek to influence new home construction by working with Insurance Bureau of Canada to press for change in building codes and encourage local government bylaws to prevent water and wildfire damage.

Existing homes

The key to enhancing the resilience of existing homes centres around increasing awareness about risk, disseminating knowledge about specific measures and actions that homeowners and others can take to reduce the risk, and encouraging insurers and governments to incentivize these measures and actions.

In 2018, the Institute will publish a new homeowner safety brochure *Protect your home from hail*, the sixth booklet in the series. ICLR will also produce more loss control booklets in the *Focus on* series, with possible topics to include roofs and roofing, and flood maps. Additionally, the Institute will continue to work with its Insurance Advisory Committee to encourage member insurers to provide constituent advice to policyholders through the distribution of ICLR homeowner guides and other information, via insurance company mailers/ policy 'stuffers' and, where applicable, through municipal governments.

Insurance

The Institute's work in this area focuses on assessing the potential for a greater role for private insurance to support the management of disaster risk in Canada. Research here could include working to determine what information would be needed to extend emerging residential flood insurance coverage to also include coastal hazards, understanding why so few Canadians purchase earthquake insurance in Eastern Canada, exploring why governments do not insure public infrastructure, and a comparison of the role of private insurance for disaster management in Canada relative to that in other countries.

ICLR management and staff wish to thank members of our Board of Directors for their support and guidance: Board Chair Barbara Belissimo (Desjardins); Gail Atkinson (Western University); Steve Cohen; Joseph El-Sayegh (SCOR Canada); Louis Gagnon (Intact Insurance); Andrew N. Hrymak (Western University); Carol Jardine (Wawanesa Insurance); Sean Murphy (Lloyd's Canada); Veronica Scotti (Swiss Re); Heidi Sevcik (Gore Mutual Insurance); Dan Shrubsole (Western University); Philipp Wassenberg (Munich Re Canada); and, Rob Wesseling (The Co-operators). Their leadership and direction is critical to the Institue's success in providing a science foundation for insurers to champion reduction in the risk of disaster fatalities, injuries and property damage.

Thanks, also, to members of the Institute's Insurance Advisory Committee with Jocelyn Laflamme (Desjardins) and Kevin Smart (Aviva) as Co-chairs. More than 90 per cent of ICLR member insurers and senior researchers participate on the Committee as a primary opportunity to direct the Institute's ongoing work.

The Institute's research and outreach plans are ambitious but critical to confront the large losses that have become the 'new normal' in Canada. **CT**

A few realizations about natural disasters

By Glenn McGillivray, Managing Director, ICLR

If we expect to make any progress on the natural disaster risk reduction front, we are going to have to come to a few understandings.

Here are just a few of the things we will have to make peace with:

Natural disasters aren't natural

The term 'natural disaster' (losses associated with an earthquake, windstorm, flood etc) is meant to differentiate an event from being 'manmade' or 'technical' (losses from a plane crash, derailment, chemical release etc). But with natural disasters, it's important to distinguish between the hazard (the rain falling, the wind blowing, the earth shaking), and the disaster (when natural phenomenon intersect with and negatively impact the built environment). A hazard only becomes a disaster when an un-natural vulnerability is exploited by a natural phenomenon. Without the vulnerability (eg. where we build, how we build, lack of preparedness etc), the disaster wouldn't be. Hence the belief by some that all disasters are, in effect, man-made.

When a natural disaster strikes, it's all too common for people to wring their hands and bemoan the ruthlessness of Mother Nature. But natural hazards do not have to result in losses. Only the first part of the equation is Mother Nature, the rest is us.

Disasters are happening now and they are costing Canadian society dearly

Large and impactful natural disasters are not a far-off problem that we will have to come to terms with and plan for. They are happening now, and they are costing the country a great deal. The experience in Canada is essentially the same as in most every western developed nation: While deaths and injuries from natural disasters are going down, property damage and interruption (to economies, for example) are going up.

In the Canadian property and casualty insurance industry, we define a catastrophe as an event costing $25 million or more in insured losses, spread reasonably across the industry. When one adds up all such events from 2009 to 2016 the total is a whopping $14.2 billion. This does not include all the events that fall under $25 million, all the other day-to-day weather-related claims that are filed, uninsured damage, and all those things that are difficult to put a price on – like mental health and ecological damage.

The natural disaster problem in Canada is here, now.

There are a lot of myths and misconceptions about natural disasters

Sewer backup is always due to failure of public infrastructure and, thus, is always the city's fault. Houses are lost in wildfires due to direct contact with flames from the forest; build away from the forest and you won't get losses. Tornadoes can't happen in cities. Overland floods only occur near bodies of water. Canada is at low risk for earthquakes. The list of fallacies goes on (and on, and on).

We won't make any progress on reducing disaster-related losses if our intellectual foundation rests on a bed of misinformation and misconceptions.

The 'return period fallacy' isn't helping

You can have three 1 in 100 year events three years in a row, or all in the same year, even the same month. Such an event does not mean that once it has occurred the clock is reset and you're good for another 99 years. This fallacy gets repeated all too many times by the media and by politicians. It's no wonder the average citizen has no idea what a return period is and what it means.

A return period is a measure of probability, not time. We need to educate people about what a return period is. Better yet, we need to come up with a better way of communicating probabilities of loss occurrences to people.

We need to get a better handle on where the risk is

At least two large loss events that occurred in the U.S. this year unfolded in surprising ways and resulted in losses that were not really contemplated before. In the case of Hurricane Harvey, the massive flooding that hit Houston was inland – related to about five days of nearly non-stop heavy rainfall – and not coastal storm surge, which is common with strong hurricanes. In the case of the Tubbs wildfire in Northern California in October, a large number of the homes destroyed in Santa Rosa were located in the city's 'low wildfire risk' area, a fair distance away from wildlands. Both of these events, each of which triggered multi-billion-dollar insured losses, underscored the point that we often don't have a good handle on where real risk is. In Canada, for instance, most overland flood losses occur away from rivers, streams and other bodies of water. Many homes lost in the Fort McMurray wildfire were located a piece away from the forest edge.

It is clear that we need a new understanding of risk and better tools in which to analyze, judge, map and rate risk, else we will continue to be surprised ►

by things we never thought possible.

Governments can't and shouldn't bear all the blame

Government inaction or misaction certainly plays a role in the magnification of disaster losses. However lack of action on private property by homeowners is equally, if not more, significant.

Homeowners must realize that not only can they do things on their properties to prevent at best, or mitigate at the very least, the impact of natural hazards; but a feature of their home or property may actually be the cause of damage. Indeed, some sources maintain that at least 60 per cent of all basement floods are caused by a problem on the private lot and have nothing to do with public systems.

Governments can do everything possible to prevent or mitigate the impact of natural hazards on society, but if nothing is done on the private property level, we won't get anywhere.

Reducing property damage and preventing disruption to economies must become a goal of disaster risk reduction

Right now, the primary stated goal of disaster risk reduction programs is to save lives and prevent injuries. Fair enough. But we need to take these formal objectives and expand them to include reducing property damage and disruption.

As noted, loss of life and injuries from natural disasters are going down in most every industrialized country, but property damage and interruption are going up.

If we look at the Canadian National Model Building Code, for instance, the first goal is life safety. Again, no one can argue the validity of this goal. However reducing property damage is not included among the several other goals of the code.

It should be.

We have to stop making the same mistakes over and over (and over)

Recent headlines include reports that a developer wants to build a new subdivision in a flood hazard zone in Houston and news that the Quebec government has decided to allow reconstruction of homes in the most flood-prone part of Gatineau. In the case of the Fort McMurray wildfire, about 10 per cent of damaged structures have been rebuilt to date, with a large number of them having vinyl siding.

We continue to thumb our nose at natural hazards, even after experiencing major losses.

Remember Einstein's definition of insanity.

Mitigation often doesn't cost that much

Sure, mitigation can be costly, especially when doing earthquake and some major wind retrofits to existing buildings. But some mitigation measures are very low cost, and others are largely free.

First, it is less expensive to put mitigation measures into new builds at the time of construction. Hurricane straps are very easy to install and very cheap (about $150 to $200 for an average house) when a roof is first going on a structure. Backwater valves cost little more than the price of the valve itself (about $150 retail, less wholesale) when being put in at the time of construction. Backup sump pumps are not that much money, and battery backup power sources for sump systems only run about $300 or so. There are many other examples.

For existing homes, the cost of retrofits are generally higher, but many municipalities (about 25 by our count) have rebate programs to help homeowners pay for the cost of installing backwater valves, sump pump systems and to rehabilitate old sewer laterals.

From a wildfire perspective, many of the measures that homeowners can take to reduce the risk to their homes involves nothing more than a little elbow grease. Clearing the perimeters of houses of flammable materials is highly effective, yet has virtually no cost associated with it.

Governments need to incentivize disaster risk reduction

While about 25 local governments in Canada offer rebate programs for backwater valves and such, that leaves thousands that don't (there are 444 municipalities in Ontario alone).

It is crucial that governments offer incentive programs for mitigation, as insurance premium discounts aren't significant enough to drive practice change. Governments have access to tools that insurers and others don't have access to, like sales tax and income tax rebates. These can be powerful movers.

Both the federal government and many provincial governments have, at one time or another, offered rebates for energy efficiency improvements. It would be a positive step to offer something similar for resiliency.

If the carrot doesn't work, use the stick

Incentives are the carrot. Laws and bylaws, including building code changes and such, are the stick. We need both.

Even when people know the risk, they don't always do the right thing. These people may include developers, home ►

Preliminary sigma estimates for 2017: global insured losses of USD 136b are third highest on sigma records

- Total economic losses from natural and man-made disasters in 2017 are estimated to be USD 306 billion, up from USD 188 billion in 2016
- Global insured losses from catastrophes in 2017 are estimated to be USD 136 billion, the third highest on *sigma* records
- The U.S. was hardest hit, including by hurricanes Harvey, Irma and Maria, which have made 2017 the second costliest hurricane season on *sigma* records after 2005
- Disaster events claimed more than 11,000 victims in 2017

Preliminary *sigma* estimates for global insured losses resulting from natural and man-made disasters in 2017 are around USD 136 billion, well-above the annual average of the previous 10 years, and the third highest since *sigma* records began in 1970. Total economic losses soared in 2017 to USD 306 billion from USD 188 billion in 2016. The accumulation of economic and insured losses ramped up in the second half of the year, due primarily to the three hurricanes – Harvey, Irma and Maria – that hit the U.S. and the Caribbean, and wildfires in California. Globally, more than 11,000 people have died or gone missing in disaster events in 2017, similar to 2016.

Total economic losses from natural catastrophes and man-made disasters are estimated to be USD 306 billion in 2017, up from USD 188 billion in 2016 and much more than the annual average of the previous 10 years (USD 190 billion). Global insured losses from disaster events in 2017 were around USD 136 billion, up from USD 65 billion in 2016, well above the previous 10-year annual average (USD 58 billion), and the third highest on *sigma* records. Natural catastrophes accounted for USD 131 billion of the year's insured losses[1], and man-made disasters for the remaining USD 5 billion.

"In recent years, annual insurance losses from disaster events have exceeded USD 100 billion a few times", says Martin Bertogg, Head of Catastrophe Perils at Swiss Re. "The insurance industry has demonstrated that it can cope very well with such high losses. However, significant protection gaps remain and if the industry is able to extend its reach, many more people and businesses can become better equipped to withstand the fallout from disaster events."

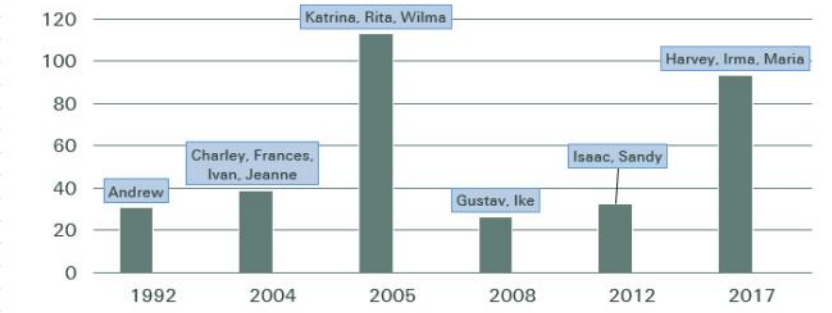
A year of two halves

Extreme weather in the U.S. in the second half of 2017 has been the main cause of the high number of full-year insured losses. In the first half, the losses resulting from disaster events were lower than in the same period of 2016, and well below the annual six-month average of the previous 10 years.

In August and September, three category 4+ hurricanes – Harvey, Irma, and Maria (HIM) – made landfall in the U.S. Destruction from the three hurricanes stretched from the Texas coast (Harvey) through West Florida to the Caribbean (Irma and Maria), together causing insured losses estimated to be almost USD 93 billion[2]. Given the vast geographic footprint of the hurricanes, which affected multiple locations in quick succession and impacted multiple lines of business, a full assessment of the insured losses is still ongoing. The economic losses from the three events will be much higher given the significant flood damage – often uninsured – from hurricane Harvey in densely populated Houston, Texas, an extended power outage in Puerto Rico after hurricane Maria, and post-event loss amplification.

After 12 years with no major hurricane[3] making U.S. landfall, HIM have made 2017 the second costliest hurricane season on *sigma* records after 2005. "There has been a lull in hurricane activity in the U.S. for several years", says Kurt Karl, Swiss Re's Group Chief Economist. "Irrespective, there has been a significant rise in the number of residents and new homes in coastal communities since Katrina, Rita and Wilma in 2005, so when a hurricane strikes, the loss potential in some places is now much higher than it was previously." ►

Figure 1: Insured losses from selected North American hurricane seasons, in USD billion at 2017 prices



Source: Swiss Re Institute

A few realizations about natural disasters *cont*...

builders, politicians, homeowners, insurers and others.

Codifying things helps to ensure that everyone is on the same page, and also that laws, rules, codes and guidelines reflect current knowledge about risk and mitigation.

Such things as building codes work.

Disasters are not inevitable

As noted, natural hazards are more or less inevitable (save for such things as human-caused wildfires and resource extraction-related earthquakes, aka fracking). Generally speaking, we can't stop the wind from blowing, the rain from falling or the earth from shaking.

We can, however, remove some vulnerabilities and reduce others. And while we can't completely prevent hazards from becoming catastrophes, we can take a big bite out of the damage and disruption caused by them.

We often see the catastrophic impact of disasters in developing countries, where loss of life, injury and economic impacts tend to be far greater than they are in industrialized countries. This is not because the hazards are worse, but because vulnerability is greater (for various reasons). Thus, we have already shown that the impact of natural hazards can be greatly tempered.

We just have to take it further, a fair bit further. **CT**

Preliminary sigma estimates for 2017 *cont*...

Wildfires and thunderstorms add to the losses in the U.S.

Also in the second half of 2017, hot and dry weather in California created favourable conditions for wildfires to ignite and spread to urban areas. There were three major fire events in October in Northern California: Tubbs, Atlas and Mendocino Lake. Both residential and commercial property (including vineyards) were impacted. According to preliminary estimates from Property Claims Services, the major fire events triggered combined insured property losses of USD 7.3 billion. Fires are still raging in Southern California in December, and the as-yet undetermined full-year losses from wildfires will likely be higher.

Other extreme weather in the U.S. led to a high number of severe convective storms (thunderstorms). Five separate severe thunderstorm events from February to June caused insured losses of more than USD 1 billion each. The most intense and costly event was a four-day long storm in May with heavy damage to property inflicted by hail in Colorado and strong winds in other parts of southern and central states. The economic losses of this storm alone were USD 2.8 billion, with insured losses of USD 2.5 billion.

Other regions experience disasters

In mid-September, two powerful earthquakes in Tehuantepec and Puebla, Mexico, led to numerous building collapses, claiming a large number of victims and resulting in insured losses of more than USD 2 billion. Earlier in the year, in late March, the category 4 tropical Cyclone Debbie hit the northeastern coast of Australia. Wind gusts of up to 263 km/h and widespread flooding in central and southeast Queensland and northeast New South Wales led to insured losses of USD 1.3 billion.

And at the end of April, Europe suffered a cold snap, followed by a summer of heat waves and record temperatures in several locations, making 2017 a year of weather extremes. Further, severe floods in South East Asia caused large devastation and, sadly, a large number or victims. **CT**

1. In this release, estimated losses from wildfires are included in natural catastrophe losses.
2. This aggregate figure includes estimated losses incurred by the National Flood Insurance Program (NFIP).
3. A "major hurricane" is a Cat 3 and above on the Saffir-Simpson scale.

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Mission
To reduce the loss of life and property caused by severe weather and earthquakes through the identification and support of sustained actions that improve society's capacity to adapt to, anticipate, mitigate, withstand and recover from natural disasters.

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