Institute for Catastrophic Loss Reduction
Building resilient communities

CATtales

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Inside this issue

ICLR moves into new on-campus home at Western University

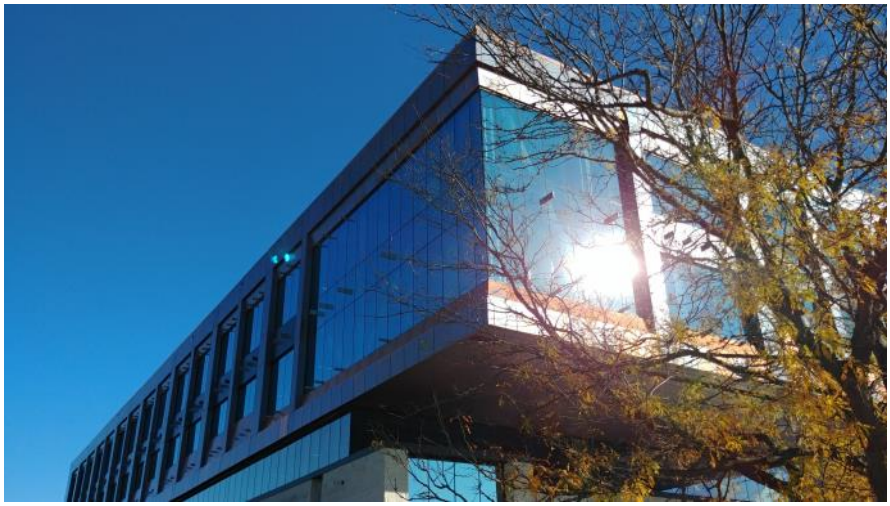
With completion of a new engineering building at London's Western University, ICLR has a new on-campus home.

Originally to be named the Three C+ Building (i.e. Connect, Collaborate and Create), a $5 million donation to support Western Engineering by University Chancellor Jack Cowin will see the building named after the university's 10th president, Amit Chakma. The surprise donation and building name-change was announced at the facility's grand opening October 12.

"I'm incredibly proud to support Western Engineering and honour my colleague and friend by naming this fantastic new building," said Cowin. "President Chakma's leadership in developing and implementing a focused international strategy has increased partnerships with educational and research institutions, attracted the best and the brightest students from all over the world, and developed innovative curriculum and research initiatives that prepared students to become global citizens. I've long been inspired by his hard work."

Designed by Perkins+Will with Cornerstone Architecture, building construction was managed by London's Norlon Builders.

According to a Western release "[T]he building offers a unique space that will inspire students and faculty to learn, innovate and advance. Designed in a collaborative process with input from students, faculty and staff, it has been built by engineers, for engineering students, and brings to life a vision set by Andrew Hrymak — former Engineering Dean and now Provost and Vice-President Academic." ►



"As a potential Platinum LEED (Leadership in Energy and Environmental Design) building, the Chakma Engineering Building's intelligent design is environmentally sustainable. Features include a rainwater collection/harvesting system, electric vehicle charging ports, and a renewable solar energy system. If certified, it will be only the third academic building in Canada to achieve Platinum LEED status.

The building also addresses the critical need for additional space. Engineering enrolment has grown from 1,500 in 2009 to 2,700 enrolled across undergraduate and graduate programs today. The building adds 100,000 sq. ft. of work spaces that integrate classroom theory with collaborative hands-on learning, so students can now design, build and test their concepts and ideas all under one roof."

ICLR inaugurated it's new on-campus home by holding its fall board meeting in the new space on October 16. Along with a number of insurance industry CEO's who sit on ICLR's board, the meeting was also attended by three board members appointed by the president of the university.

Currently the three university representatives on ICLR's board include Miriam Capretz, Professor (Engineering) and Associate Dean (Research); Katsu Goda, Associate Professor and Canada Research Chair in Multi-Hazard Risk Assessment; and, Dan Shrubsole, Professor (Geography) and Assistant Dean.

ICLR has been an Institute at Western University (nee University of Western Ontario) since 1999 and is currently the oldest university-based institute doing work in the area of disaster risk reduction and climate change adaptation in the country.

ICLR staff works closely with numerous researchers at Western, with strong linkages to the university's wind engineering, water resources, and earthquake research groups.

Currently, Dr. Gordon McBean, Professor Emeritus (cross appointed with political science and geography) at Western serves as Director of Policy Studies at ICLR.

Dr. Slobodan Simonovic, Professor of Civil and Environmental Engineering at Western serves as Director of Engineering Studies.

The Institute's main office continues to reside in downtown Toronto. **CT**

Western/ICLR's Simonovic accepts China/Canada collaboration award

In October, the China Institute of Water Resources and Hydropower Research (IWHR) celebrated its 60th birthday.

During the occasion, IWHR organized an Academic Week which included several symposiums, meetings, forums and cultural events. The celebration was widely recognized by China's Ministry of Water Resources (with the Minister and Vice Minister attending) and several water related agencies and organizations represented by senior officials at the federal, regional and local levels).

Professor Slobodan Simonovic, director of engineering studies at ICLR and Professor at Western University, was an honorable guest at the IWHR celebrations.

Dr, Simonovic was one of the leaders of the Round-Table Meeting of Leaders of Water-Related International Organizations (representing the International Conference on Flood Management – figure 1). In this capacity he was a signatory of the Beijing Declaration (figure 2).

During the main celebration Professor Simonovic was presented with an award for his contributions to collaboration between China and Canada (figure 3). He also presented a key note lecture at the International Forum on Flood Management (figure 4).

One of the highest honours he received during the trip was a private audience with China's Minister of Water Resources (Mr. E. Jingjing) and the President of IWHR (Professor K. Shangfu) who proudly pointed at China's results, over the last five years, in reducing average annual flood-related loss of life from 1,200 to below 80 (figure 5).

During his stay, Professor Simonovic gave interviews for two local newspapers (figure 6).CT

Could an EF5 tornado hit a major Canadian centre?

By Glenn McGillivray, Managing Director, ICLR

One of the biggest challenges of educating people about natural hazard risk is having to first cut through the myths and misconceptions that envelope essentially every hazard, from earthquake to flood and – yes – tornado.

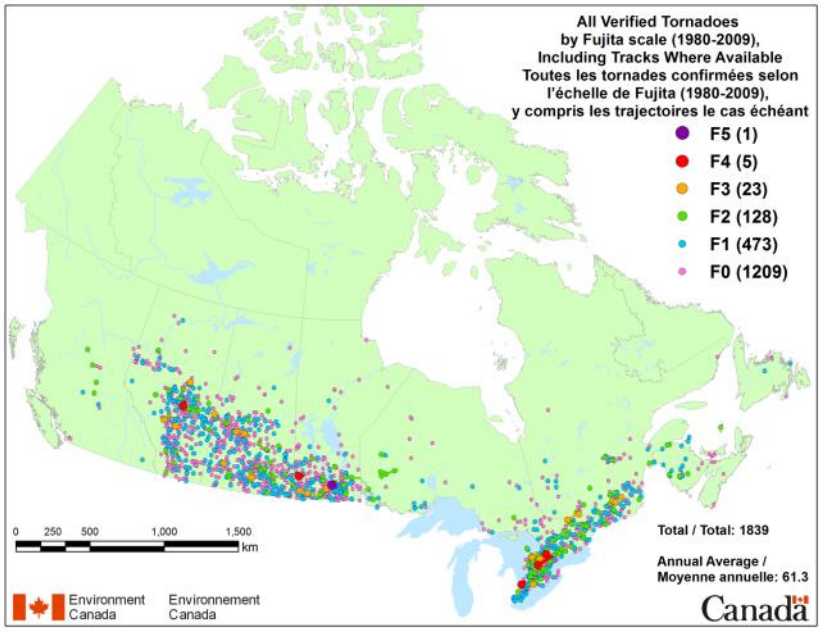
Stop me if you've heard any of these before:

- Tornadoes can't happen in cities due to the heat that cities emit
- Tornadoes only happen on hot summer days
- Tornadoes only happen in very specific places
- The sky will turn green just prior to a tornado
- You will always see the vortex
- If you open the windows of a home prior to a tornado, you will equalize the pressure in the home and prevent damage
- While in a car, the best place to be is under an overpass.

There is certainly no shortage of skewed and dangerous misinformation about tornadoes (I'm not even going to get into how people confuse tornadoes and hurricanes!).

But the truth is, we have had tornadoes in Canada in every province, including Prince Edward Island and Newfoundland, and in every month, including January and December. We have had tornadoes in cities (like Regina and Edmonton). We have even had them close to such places as Yellowknife, NWT. And, no, Mother Nature isn't always so kind as to give advance notice of an impending strike.

This doesn't mean that there is equal probability of experiencing a tornado in every province and in every month, as there are clearly peak times of the year when tornadoes are most common and areas of the country where they are more prevalent.



Recent events in the Ottawa/Gatineau region have gotten some in the industry talking about the risk once again (it is not all that often that we see tornadoes 'get into town' in Canada. The uncorroborated anecdotal return period for such events, I once heard, is about 10 years). Of particular interest is the fact that one of the six tornadoes that struck the area on September 21 was an EF3*, quite a powerful twister for the time of year (the last F3 to strike in Canada in the month of September was in Merritton, Ontario – now know as St. Catharines – in 1898).

Generally speaking, claims costs from tornadoes in this country tend not to be as high as scenes of the damage may imply. What I mean is that while the carnage may seem very dramatic – even spectacular at times – insured damage has thus far tended to be quite manageable from an industry perspective.

To date, the costliest tornado in modern Canadian history is the July 1987 Edmonton event, which sits at $148.4 million insured (1987 dollars, or $278.1 million 2016 dollars).

More recently, the June 2014 tornado in Angus, Ontario caused insured damage of about $48 million, the August 2011 Goderich, Ontario event caused insured damage of roughly $110 million, and the August 20, 2009 outbreak in Southern Ontario caused insured damage of close to $100 million.**

This compares against Canada's costliest wildfire (about $4 billion insured), its costliest riverine flood (about $1.7 billion), its costliest urban flood (about $1 billion), and its costliest hailstorm (about $570 million).

Spread over several companies and with some reinsurance programs responding, these events aren't very substantial from an industry perspective, certainly nothing like the 1999 Moore, Oklahoma tornado (USD1 billion insured), the May 2011 Joplin, Missouri tornado (~USD2.16 billion insured) or the 2013 Moore, Oklahoma event (USD2 billion insured). ►

Could an EF5 tornado hit a major Canadian centre? *cont*...

All three of these tornadoes rated EF5, which leads to the question: Should Canadian insurers be concerned about an EF5 hitting a major centre in Canada?

For a hint, let's look at the climatology of tornadoes in Canada.

From the period 1980 to 2009, 1,843 tornadoes were recorded in Canada. The breakdown of these are as follows:

F0 or F1
1,217 + 478 = 1,695 (91.9% of tornadoes)

F2
119 (6.5% of tornadoes)

F3
24 (1.3% of tornadoes)

F4
5 (0.27% of tornadoes)

F5
1 (0.0054% of tornadoes)

The only F5 ever recorded in Canada occurred in Elie, Manitoba on June 22, 2007. The twister destroyed or damaged several homes, totalled several vehicles, but took no lives. Insured damage came in at about $20.5 million (IBC Facts Book 2018).

According to work conducted by David Sills of Environment and Climate Change Canada, the country likely gets more tornadoes that are actually officially recorded each year (an average of 62), owing for those that occur in remote areas and go unseen. Most of these would likely fall in the EF0 to EF1 range, though it is possible that more powerful tornadoes have occurred but went unreported. Canada, therefore, may have had more than one EF5 in its history, though the probability is quite low.

So should insurers worry about the potential for an EF 5 strike on a major population centre in Canada?

Maybe not (though, of course, they are free to worry if they want to).

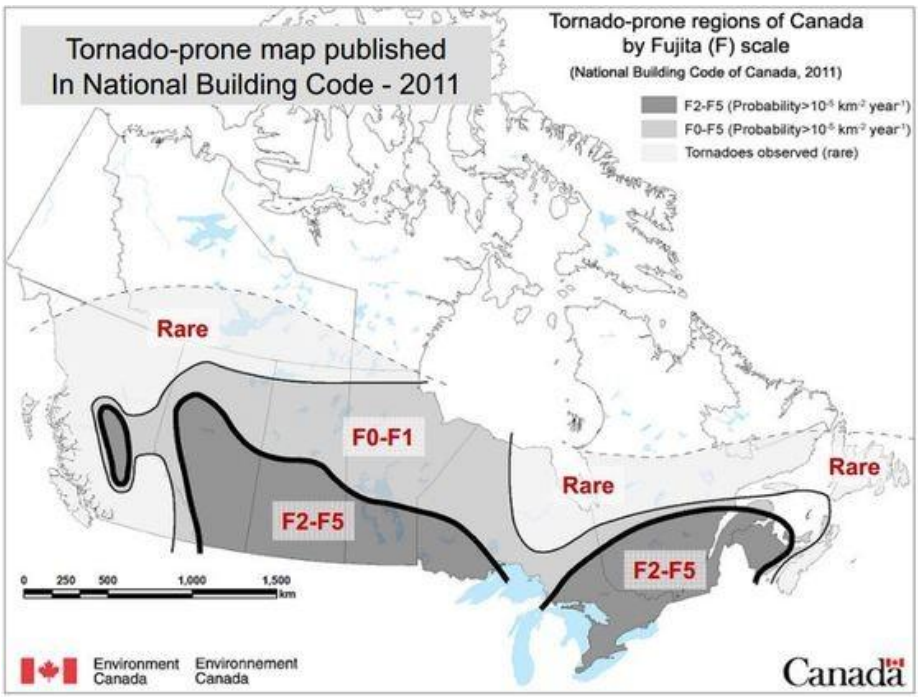
Should they be concerned about tornadic storms in major centres at all?

Certainly they should, but not necessarily for EF4s or EF5s (which would be considered as extremely low probability but high to very high impact events).

In my view, insurers should be more concerned about a strike from a well-placed lesser tornado which, statistically, is more likely and which could have fairly serious consequences. Such an event could be of particular concern to a small local/regional writer that may have concentration issues in a given area and a cat reinsurance program that may not be up to the job.

What needs to be reinforced here is that you do not need an EF4 or EF5 to incur total losses of homes and other structures. As was illustrated in Vaughan, Ontario in August 2009 (where two F2s struck, one in Woodbridge and one in Maple) and Angus, Ontario in June 2014 (also an EF2), all you require for a total loss is to lose the roof. When this happens, the home loses it's structural integrity and must be razed and rebuilt.

Of the roughly 500 homes damaged in the pair of Vaughan tornadoes about 25 had to be bulldozed. In Angus, ten of 100 homes had to be razed due to roof loss. A roof torn from a house is a good as the entire home being wiped from its foundation. There are no degrees of death.



It is important to note that the age of a structure, lack of maintenance and poor building practices can magnify damage (several construction deficiencies were discovered in the Angus homes, for example). Therefore, it is common to get EF3 or EF4 damage from an EF1 or EF2 storm, for example.

Further, an EF2 or EF3 wedge tornado will have a substantially wider damage track than an equal or stronger rope tornado.►

Could an EF5 tornado hit a major Canadian centre? *cont...*

So while insurers must always be cognizant of the potential for extremely low probability/high impact events and plan for their eventuality, they cannot and should not lose site of the fact that a lesser event with a higher probability of occurrence but lower impact could, in some circumstances, be almost as painful. **CT**

Notes

* Up until the 2012 tornado season, Environment Canada used the Fujita Scale to measure tornadoes. It switched to the Enhanced Fujita Scale on April 1, 2013. The new scale is considered to be a more modern and improved version of the original Fujita Scale. The U.S. has been using the EF scale since 2007. The April 18, 2013 tornado in Shelburne, Ontario was the first Canadian twister to be measured under the new system.

F-SCALE			EF-SCALE	
RATING	WIND SPEED	DAMAGE	RATING	WIND SPEED
F0	60-110 km/h	Light Damage	EF0	90-130 km/h
F1	120-170 km/h	Moderate Damage	EF1	135-175 km/h
F2	180-240 km/h	Significant Damage	EF2	180-220 km/h
F3	250-320 km/h	Severe Damage	EF3	225-265 km/h
F4	330-410 km/h	Devastating Damage	EF4	270-310 km/h
F5	420-510 km/h	Incredible Damage	EF5	> 315 km/h

** Since first publication of this piece in Insblogs October 2, a preliminary insured damage figure was released for the September 21 tornado sequence in the National Capital Region. CatIQ has put preliminary insured damage at $300 million.

ICLR participates in summer SHAD program at Western

ICLR staff participated in the summer SHAD program at Western University by providing three guest lecturers and a scholarship.

SHAD is "[A]n award-winning enrichment and entrepreneurship program and network that empowers exceptional high school students to recognize their own capabilities and envision their extraordinary potential as tomorrow's leaders and change makers."

Each year, SHAD provides the opportunity for more than 900 students across Canada and internationally to attend STEAM-based (science, technology, engineering, arts and math) month-long programs in-residence at one of SHAD's 17 Canadian host universities.

Shad 'graduates' include 32 Rhodes Scholars, 56 Schulich Leaders, 88 Loran Scholars as well as prominent entrepreneurs, industry leaders and accomplished professionals.

Each year, SHAD participants are tasked with solving a problem that has both economic and social implications through a 'Design-Engineering Challenge'.

This year, SHAD participants were asked to devise a solution to help Canadian communities be more resilient in a natural disaster. The theme was announced by Canadian astronaut Drew Feustel from the International Space Station. This year's lead theme sponsor was the Insurance Bureau of Canada.

Winning 'Find me' team members: Vivek Patil, Navjot Khaira, Joey Liu, Tess Macdonald, Malika Bhambra, Carter Woolvett.

The 76 Western 'SHADs" were broken into 12 teams. The students spent a good part of July collaborating to design and engineer a new solution that addressed the given problem. As part of the challenge, the teams conducted market research, wrote business and marketing plans, and designed/built digital prototypes.

The winning team proposed the development of an app called 'Find me", a software solution designed to assist earthquake first responders with a more efficient and effective way to locate survivors. **CT**

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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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