

CATASTROPHES

e-newsletter of the Institute for Catastrophic Loss Reduction



Institute for Catastrophic Loss Reduction

Building resilient communities

Inside this issue

- How COVID-19 exposed the fragility of global supply chains 3
- Sluggish wildfire evacuation orders are resulting in needless deaths 5
- ICLR welcomes Dr. Keith Porter as chief engineer 6
- 'FireSmarted' B.C. community profiled by ICLR survives Tremont Creek fire 7

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ICLR to work with Barrie on tornado resilience

At an August 9, 2021 meeting of Barrie City Council's General Committee, Councillor Natalie Harris tabled a resolution that would have the City of Barrie work with the Institute for Catastrophic Loss Reduction on a trio of tornado-related risk reduction initiatives.

The resolution, which was passed unanimously, will see various departments in the City work with ICLR to: approach the Ontario Government to seek changes in the provincial building code to require hurricane straps in all new builds; develop a tornado risk reduction/safety awareness program to be directed at residents of Barrie; and, investigate the possible

creation of a City-run incentive program that would provide financial rebates to those who install hurricane straps or other similar devices in homes to prevent future damage from extreme wind.

On the afternoon of July 15, some six EF2 tornadoes tore through several communities in Southern Ontario, including Zephyr-Little Britain, Lorneville, Dwight, Lake Traverse, Sunbeam Lake and Barrie.

The tornado in Barrie, which had wind speeds of up to 210 km/h and left a damage path of about five kilometres in length, resulted in numerous injuries and damage to more than 100 homes. >



About 71 residences were deemed uninhabitable by the City and had to undergo engineering inspections before residents could re-enter. Numerous homes will have to be torn down. CatIQ has estimated preliminary insured damage from the tornadoes at \$75 million, the majority from the Barrie event.

At the time of the tornado, Councillor Harris was visiting a home that experienced catastrophic damage and will have to be razed. The home was located next to a residence that completely collapsed in the event.



Damage caused by the EF2 tornado that struck Barrie, Ontario, on July 15, 2021.
(Photo by Duckdave, Wikimedia)

Requirement for hurricane straps in new builds

WHEREAS on July 15, 2021, portions of the south-east quadrant of the City of Barrie were devastated by a tornado that caused substantial damage to public and private infrastructure, including homes, businesses and vehicles and previous tornadoes in the City of Barrie as well as across the province also warn of vulnerability to loss and damage from severe winds hazards; and

WHEREAS research conducted at the University of Western Ontario, the Institute for Catastrophic Loss Reduction and elsewhere finds that 95 percent of the tornadoes in Ontario are magnitude 0-2 and the risk of loss and damage from these tornadoes can largely be prevented through identified and inexpensive changes in current home construction practices; and

WHEREAS government, builders, insurance companies, researchers and others must work together to strengthen standards for building codes and construction practices to mitigate the expected damage from climate extremes, severe storms and natural disasters; and

WHEREAS a report by the National Institute of Buildings found that every \$1 spent on mitigation projects including tornado resilience measures in homes, reduces future costs by an average of \$6.00.

NOW THEREFORE BE IT RESOLVED as follows:

1. That staff in the Development Services, Legal Services and Building Services Departments partner with the Institute for Catastrophic Loss Reduction to:
 - a) Propose to the Ontario Government specific measures to modernize the Ontario Building Code with respect to severe wind protection for new homes, including the requirement for the use of straps, clips or other mechanisms to better connect the roof, wall and foundation of homes; and
 - b) Work in collaboration with other agencies to develop an awareness campaign to inform Barrie residents about the risk of destructive tornadoes, options to assess risk of damage to their home and identify risk reduction and best practices and report back to General Committee.
2. That in order to encourage installation of approved severe wind resilience features, staff in the Finance and Legal Services Departments investigate the feasibility of introducing a Rebate Program for homeowners that did not experience damage resulting from tornado damage on July 15, 2021 and financial incentives for those whose homes were damaged, and report back to General Committee. (Item for Discussion 8.8, August 9, 2021)

How COVID-19 exposed the fragility of global supply chains

By Glenn McGillivray, Managing Director, ICLR

COVID-19 has laid bare many uncomfortable truths regarding society's overall preparedness for low-probability but high-impact events, especially global ones. These range from issues pertaining exclusively to pandemic readiness (like our domestic capacity to produce personal protective equipment, ventilators, sanitizer and vaccines) to matters that are considerably less esoteric, like the ability of global supply chains to operate regardless of the various stresses put upon them.

The latter goes far beyond the [toilet paper supply issue](#) experienced early in the pandemic. It expands to include a whole range of products like [lumber and other building materials, tools, foodstuffs, seeds, furniture, cleaning supplies, aluminum cans, jars, pools and pool equipment, chemicals, bicycles, camping gear, household appliances and replacement parts of all kinds](#).

In many cases supply chains have been simultaneously squeezed on both ends – supply and demand.

Production and distribution disruptions

While unscheduled closures of manufacturing and distribution facilities, bottlenecks at borders and sick workers have caused choke points in supply lines, people being cooped up in their homes for months on end have driven up demand for a host of products.

There has also been a simultaneous shortage of labour, particularly in the [licensed trades](#).



The container ship *Ever Given* stuck in the Suez Canal in Egypt, viewed from ISS. (Photo by NASA JSC ISS image library)

Throw in other disruptors, like the massive [winter storm in Texas](#) in February, the six-day [blockage of the Suez Canal](#) due to the grounded ship *Ever Given* in March and the six-day closure of the [Colonial gasoline pipeline](#) in the United States after a cyberattack in early May.

Also include the fact that shipping containers are being lost in record amounts for various reasons, with more than [3,000 going overboard in 2020](#) and the 2021 number already hitting [1,000 by the end of April](#).

The pandemic has shown us that global supply chains are a huge house of cards: fragile enough on a good day, but prone to come tumbling down when there's an unexpected breeze.

This has been particularly apparent with the manufacturing of computer chips.

The demand for microchips

Prior to COVID-19, [there was already great pressure on the production of microprocessors](#), microcontrollers, motherboards and the like due to limited global production capacity and greater calls for product. The pandemic has placed additional pressure on an already pressed segment, as production and distribution bottlenecks have been met with increased pandemic-driven demand.

Not so long ago, disruptions in the production of microchips tended to impact only the manufacture of smart phones, tablets, computers, external hard drives and, more recently, flat screen televisions.

Today, however, such disruptions also impact the production of automobiles, as chips are increasingly being used in >



(Photo by Famartin, Wikimedia)

power steering and braking systems, car infotainment systems and other components. Indeed, both [General Motors](#) and [Ford Motor Company](#) have idled a number of plants in North America due to the global semiconductor shortage. And being relative newcomers to the microprocessor market, automakers don't have the clout that other buyers have, often leaving them out in the cold when supplies dry up.

The situation for automakers is only expected to get worse as more and more consumer goods get smart via wifi or Bluetooth connectivity.

The growing list of items that require microchips is disconcerting, as these components are almost solely manufactured in some of the riskiest places in the world from a natural disaster perspective: China, Japan, Taiwan, South Korea, Malaysia, Thailand, the Philippines and California.

This has to change. We need more manufacturing facilities for microchips and these must be located in places with low risk to natural and other hazards.

Securing supply chains

But whether we are talking about microchips, wood chips or potato chips, corporations need to get intimately familiar with their supply chains if they aren't already: What they get, how often, in what quantities, from whom, from where, how and why. Business continuity, contingency plans and workarounds must be put in place ahead of time to deal with what-if scenarios. Risk managers – either

in-house or third-party consultants – need to be in on these discussions, as do boards of directors.

Corporate insurance buyers and risk managers must understand the differences in key insurance coverages, like standard [business interruption and contingent business interruption](#), and ensure that they have proper financial protection in place.

Finally, and from a big picture perspective, society needs to get a better idea of where choke points exist (both at the manufacturing and distribution levels and in the physical world) so these can be addressed, eased or even eradicated. Further, we need to do more [research into understanding how consumers behave in the face of crises](#). The emerging fields of behavioural economics and decision science have much to contribute to this discussion.

It's a different world out there, a more interconnected, and a more dangerous one. And we are currently learning the hard way that global supply chains don't operate on auto pilot.

This article was originally published in The Conversation (July 30, 2021)



(Photo by Buonasera, Wikimedia)

Sluggish wildfire evacuation orders are resulting in needless deaths

Much is being written about the village of Lytton, B.C., almost completely obliterated by wildfire the evening of June 30 after handily breaking the Canadian high temperature record the day prior. A neighbourhood in Kamloops, B.C., came very close to experiencing a similar fate the evening of July 1, after a lightning-sparked fire forced homes in the Juniper area to be evacuated twice in one night. At 1 a.m. on July 2, the City issued an evacuation order to some 336 residents of 126 homes just one hour after rescinding an earlier such order. That order was withdrawn after a timely thunderstorm appeared to knock down the blaze, though the relief proved only temporary.

The scene of roads in Juniper choked by rushed evacuees was not unlike what was witnessed during the Camp Fire in Paradise, Calif., in November, 2018. An eleventh-hour evacuation order led to people being incinerated in their vehicles as they frantically attempted to get out of town, only to get stuck in bumper-to-bumper traffic on overloaded roads.

In June of that year, 60 people were killed in Portugal during severe wildfires, including 30 burned to death in their vehicles while trying to escape.

Sometimes, fires are sparked so rapidly that even when evacuation notices are issued quickly and area residents take immediate action, they still only get out by the skin of their teeth. [Lytton](#) burned in just 15 minutes.

However, more often than not, there is time to issue orderly evacuation notices and start to get people out in a measured, non-frantic way. Yet, it appears that these opportunities are seldom taken.

But hoping that it rains or that the wind changes direction at the last minute is not



View of wildfire near Highway 63 in south Fort McMurray on May 3, 2016. (Photo by DarrenRD, Wikimedia)

a strategy. This is particularly true of the wildfires we will experience in the years ahead due to climate change – the ones we are also actually experiencing now.

Time and time again, we see that a lack of imagination – the inability to see the worst-case scenario ahead of time – leads to very dangerous predicaments. Yet we keep getting caught with our pants down.

In the case of the Camp Fire, officials with the California Department of Forestry and Fire Protection (known as CalFire) appeared confident that a wildland fire outside the town of Paradise would not jump a canyon and put the area at risk. Even when residents of Paradise began phoning in reports of thick smoke, and ash falling on the town, CalFire dispatchers assured them they were safe. When fire did enter the community and the evacuation notice was issued by local authorities, no one appeared to be more surprised than CalFire dispatchers, with one recorded as saying, “Are you serious?” The fire was the deadliest in California history, with 86 killed – seven in their cars.

In the early hours of what would become Canada’s costliest wildfire disaster, the May, 2016, event in Fort McMurray, Alta., the thinking was that the community was safe because the Athabasca River ran between the fire and the city. But with ultra-dry conditions and high winds, those assumptions soon proved wrong as embers carried over the river, igniting numerous structures in town. About 2,400 buildings were lost, leading to insured damage of \$3.64-billion.

Roads out of neighbourhoods throughout the city were choked with evacuees in standstill traffic as embers rained down. Two were killed in a vehicular accident during the evacuation.

And this is the thing: All-too-many remote Canadian communities that are exposed to wildfire have but one way out – sometimes two ways when a single highway runs through town.

A scene similar to Fort McMurray played out in Slave Lake, Alta., in May, 2011, with news coverage stating the fires “took everyone by surprise.” >

It was later reported by The Globe and Mail that an evacuation order from the province was never issued and that the mayor “unilaterally issued the order much later in the evening – because [she had to wait](#) for the province to reopen the highway out of town.”

Meanwhile, following the recent fires, Kamloops residents signed a petition urging the city to improve evacuation plans for Juniper, including construction of a second paved road out of the area. Within days of the petition, the city announced plans to fast-track the road.

This opinion piece was originally published in The Globe and Mail (July 19, 2021)

Fort McMurray, on the other hand, received \$5-million in 2017 to study a second highway out of the city – but there’s still no word yet on the status of that study or whether the road will be built.

As these types of wildfire events increase across the globe, we must be thinking farther out on this issue than we have been – because, as we have clearly seen, the disaster caused by such blazes can happen right here.

Authors



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ICLR welcomes Dr. Keith Porter as chief engineer

ICLR is pleased to announce the appointment of Dr. Keith Porter, PE, PhD, FSEI, FASCE, as the Institute’s first-ever chief engineer. Dr. Porter’s career has centred around the application of pure and applied research to measure and reduce the adverse effects of natural disasters on the built environment and society. He works with engineers, economists, sociologists, earth scientists, geographers, and others with similar interests.

Dr. Porter is a licensed professional engineer, principal of the Colorado Springs applied research firm SPA Risk LLC, and adjunct professor at University of Colorado Boulder. His work has involved helping nations, communities, and corporations improve their disaster resilience. Dr. Porter led the *Natural Hazard Mitigation Saves* studies for the Federal Emergency Management Agency (FEMA) and others that found that disaster mitigation avoids up to \$13 in losses per \$1 of cost. He led the US Geological Survey’s (USGS) engineering research on four groundbreaking disaster planning scenarios: ShakeOut, ARkStorm,

Tsunami, and HayWired. He also led the safety assessment of San Francisco’s soft-story residential buildings for the Community Action Plan for Seismic Safety (CAPSS).

These projects make a difference. Thanks to ShakeOut, 1% of the world’s population annually prepares for earthquakes. The Los Angeles Department of Water and Power is making its water transmission and distribution system far more resilient. And much of Los Angeles’ critical infrastructure and most dangerous buildings are being improved. Partly because of HayWired, several water districts are better addressing risk from brittle pipe. California is considering code improvements that will make its new buildings substantially stronger, stiffer, and more likely to be functional immediately after an earthquake. Colorado is increasing its corps of trained post-disaster building safety evaluators. And thanks to CAPSS, 2,000 vulnerable woodframe buildings in San Francisco are being strengthened against an inevitable future earthquake. His doctoral research led the way for FEMA’s revolutionary



performance-based seismic design guideline

FEMA P-58, which has become the engineering profession’s new paradigm for performance-based engineering.

Dr. Porter regularly contributes to the engineering profession and to engineering scholarship. He is a fellow of the Structural Engineering Institute and of the American Society of Civil Engineers. He has written or co-authored 225 scholarly and professional works on natural-hazard risk management. He holds engineering degrees from UC Davis, UC Berkeley, and Stanford. Clients have included the National Research Council of Canada, FEMA, the California Governor’s Office of Emergency Services, USGS, Southern California Earthquake Center, California Earthquake Authority, Global 1000 corporations, and insurance companies.

Dr. Porter currently resides in London, Ontario with his wife and youngest child, and will be based out of ICLR’s office at Western University.

'FireSmarted' B.C. community profiled by ICLR survives Tremont Creek fire



Logan Lake, B.C., a small community of about 2,000 located 60 kilometres southwest of Kamloops, survived the Tremont Creek wildfire with no structures lost.

According to one report, the fire came "frighteningly close to the Logan Lake area before moving beyond it."

But Logan Lake was ready.

According to Logan Lake Fire Chief Doug Wilson in the Vancouver Sun, "We built an above-ground water system."

The article explains: "Working together, public works and structural engineers boosted water pressure in pumps, added

sprinklers and placed giant bladders with capacity for up to 2,500 gallons of water in strategic street locations, but also in cul-de-sacs so that upwards of 10 homes could be sprayed at once."

"It was years of working on putting sprinklers on residential rooftops and fighting hard to clear deadfall, beetle wood, and ridding the fuel load" Wilson said.

Logan Lake has one of the first neighbourhoods in the country that was formally recognized by FireSmart® where residents have an established plan to reduce vulnerability to wildfires. FireSmart® is Canada's premiere national program to reduce the risk of wildfire-related losses. The program leads in the development of resources and programs designed to empower the public and increase neighbourhood resilience to wildfire across Canada.

British Columbia leads the country in use of FireSmart® plans and programs. The province has the most neighbourhoods in the national program of any province, with 50 per cent of the 150 being First Nations communities.



Logan Lake was profiled in ICLR's latest *Cities Adapt* book *Cities Adapt to Extreme Wildfires: Celebrating Local Leadership*. As with the three other books in the *Cities Adapt* series, the publication profiles 20 Canadian communities that have taken action to reduce the risk of a particular peril – in this case, wildfire. Several cases involve the FireSmart® program.

ICLR's *Cities Adapt* series of climate change adaptation case studies can be found [here](#).

The chapter on Logan Lake can be found [here](#).

Institute for Catastrophic Loss Reduction

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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