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CAT TALES

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Institute for Catastrophic Loss Reduction

Building resilient communities

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New ICLR report

An examination of the Lytton, British Columbia wildland-urban fire destruction

In May 2022, ICLR and the British Columbia, FireSmart™ Committee released *An examination of the Lytton, British Columbia wildland-urban fire destruction*, a forensic examination of the June 30, 2021 wildfire that razed a large portion of the community of Lytton in southwestern British Columbia. The study was prepared by Jack D. Cohen, PhD., Research Physical Scientist, Missoula, MT and Alan Westhaver, M.Sc., ForestWise Environmental Consulting Ltd., Salmon Arm, B.C.

The British Columbia FireSmart Committee initiated the examination of the Lytton Wildland-Urban (WU) fire disaster for the purpose of:

- Understanding the relationship between the wildfire conditions and how homes and businesses ignited and burned to total destruction resulting in the Lytton WU fire disaster on June 30, 2021.
- Communicating understanding and awareness specifically related to the Lytton WU fire disaster examination revealing fundamental principles >

of all WU fires that can be generally applied by residents, municipal and emergency managers such that all communities can choose to become more wildfire resilient and more likely to avoid future disasters.

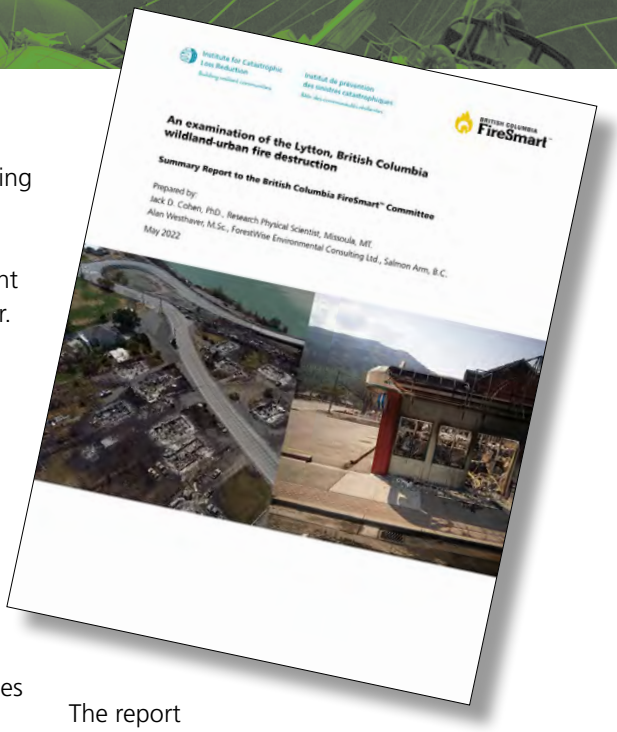
- Making recommendations for readily attainable ignition resistant materials and designs, and best practices for rebuilding and maintenance of fire-resistant communities at the Village of Lytton and Lytton First Nations, Klahkamich (IR 17) and Klickkumcheen (IR 18).

The Lytton WU fire disaster site examination was conducted August 10-14, 2021.

The Lytton Creek Fire started the afternoon of June 30, 2021 just south of the Village of Lytton. Although the wildfire burned until contained in early August at over 83,000 hectares, the Lytton community was involved in the first several hours of the first afternoon leading to the disastrous community destruction. Nearly all the totally destroyed primary structures were in the three Lytton communities of the Village of Lytton (112 homes and businesses), Klickkumcheen (IR 18, 34 homes), and Klahkamich (IR 17, 5 homes) totaling 151 totally destroyed homes and businesses.

The extreme wildfire behavior at the Lytton community was a rapidly spreading surface fire due to high wind speed, high temperature and low relative humidity in fine dead fuels of grass, light shrubs and understory pine needle litter. The wildfire remained a surface fire without producing the large flames of a crown fire. Thus, the Lytton community was not exposed to a broad scale shower of wildfire burning embers. The uncontrollable extreme wildfire behavior was from high rates of fire spread that quickly developed into four separate paths that simultaneously spread along or spread to the boundaries of all three Lytton communities in less than one hour.

Wildland-urban fire disasters are a structure ignition problem and an ignition resistance approach within the Home Ignition Zone (HIZ) is how potential structure ignition vulnerabilities (fuel) and potential burning objects (heat) within 30 metres can be eliminated or reduced to create significant ignition resistance during extreme wildfire conditions. In a community of overlapping HIZs such as the Lytton community, the collective ignition resistant HIZs create an ignition resistant community resulting in low risk of destruction during extreme wildfires.



The report provides nine key findings.

Based on the examination, the nine findings and accepted science, the researchers close the report with recommendations for recovery, rebuilding and maintenance of wildfire-resilient Lytton communities. These have equal application to all other communities in wildfire-prone regions of Canada, whether they are existing or planned.

Four strategic recommendations point to the need for re-framing the fundamental WU fire problem (to one of structural ignition, rather than wildfire itself); and to shifting the focal point of individual and collective community efforts onto pro-active mitigation activities which will directly reduce the ignition vulnerability and exposure of homes, businesses and critical infrastructure. These are followed by more specific categorical recommendations addressing recognized "FireSmart" disciplines (e.g., vegetation management, building criteria, regulations, infrastructure, fire response capability and planned re-introduction of wildland fire to the surrounding landscape).

The report can be downloaded at www.iclr.org.

The cheaper we build our buildings, the more they cost after an earthquake, wildfire or tornado

A tornado cut a 270-kilometre path through Kentucky in mid-December 2021, killing 80 people, many in their homes or workplaces, and rendering thousands homeless. The incident prompted David Prevatt, a professor of structural engineering at the University of Florida, to write an opinion piece for the *Washington Post*, reminding Americans that new buildings could be tornado proof, but are not.

We are learning similar truths in Canada. Barrie, Ont., struck by a set of tornadoes on July 15, 2021, is still recovering. So too, are those who survived the fires in Fort McMurray, Alta., in 2016, and in Lytton, B.C., in June 2021. It's the same story following the floods in British Columbia in November 2021 and the derecho that struck Southwestern Ontario in late May, lifting roofs off some buildings and destroying others.

Engineers, architects and builders can design and construct affordable new buildings that can resist tornadoes, floods and wildfires without making the buildings into bunkers. We could also design earthquake-resilient buildings, but do not.

I am a structural engineer and an expert in performance-based engineering and catastrophe risk management. I believe the only way to make that happen is to require our building code to minimize society's total cost to own new buildings. We have always been free to make that happen, but have a rare window now to shape that future, as the nation and code developers urgently respond to the climate crisis.

Why don't we build resilient buildings?

Building-code writers, engineers and others frequently tout the benefits of modern building codes. But new buildings only keep us relatively safe; they're not disaster proof. Why don't we build better buildings? Because it would cost a little more.

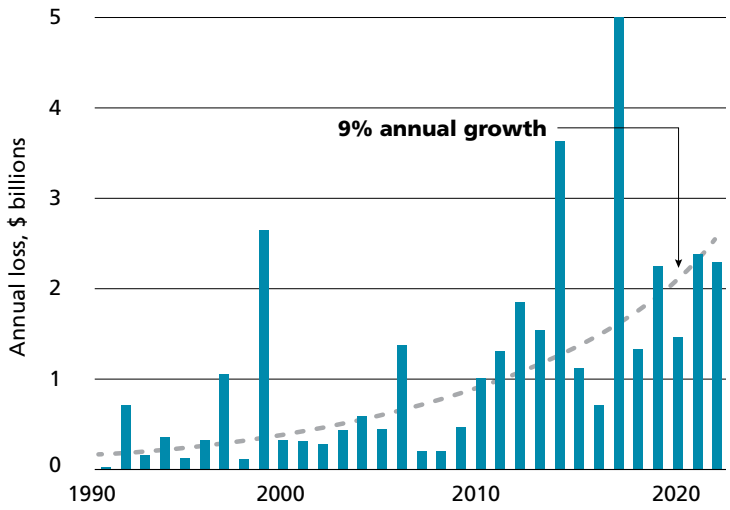
We build to minimize initial construction costs while maintaining a reasonable degree of safety and avoiding damage where practical, a strategy known as "least-first-cost" construction. We save a small amount on initial construction costs and call the savings "affordability."

But that kind of affordability is an illusion, like a tantalizingly low sticker price on a flimsy car. Wise car buyers know that the low cost is just the beginning of a series of bills.

In new construction, every dollar saved weaves in $4 or more of future costs to pay for unpredictable catastrophes: severe storms, massive earthquakes and catastrophic wildfires. That future cost is not an if, but a when – or rather a sequence of whens made more frequent and severe by the climate crisis.

In research for the U.S. Federal Emergency Management Agency and others, my colleagues and I applied simple methods to design buildings to be stronger, stiffer, or above the flood plain than the U.S. building code currently requires. >

Canada's annual disaster losses have grown about nine percent annually, 10 times faster than population growth



(Canada's National Building Code is similar.) We found that society would initially pay about one per cent more for new construction, but avoid future losses many times greater, minimising society's long-term ownership cost.

Engineers could have used these ideas long ago. If we had, Canada wouldn't be losing over $2 billion annually to natural catastrophes, equivalent to the cost of four days of new construction.

Our losses grow nine per cent every year, like a credit card that gets charged more each month than is repaid. But unlike a credit card bill, nature demands an unpredictable, enormous payment any time it wants, from anywhere in the country. No Canadian community is immune.

We can fix the problem

Prime Minister Trudeau has committed to bold, fast action on climate change and its associated disasters, and better building codes can be a part of it. We could install sewer backflow valves in homes and workplaces, use non-combustible siding rather than vinyl in the wildland-urban interface (where the built environment mingles with nature) and install impact-resistant asphalt shingle roofs in hail country. Engineers have long lists of ready-made solutions both for new buildings and the ones we already have.

Building codes created those problems. They aim for safe and maximally affordable construction, and ignore long-term ownership cost. We build cheaply but not efficiently.

Three fatal tornadoes in 15 years convinced city officials in Moore, Okla., that the national building codes weren't protecting them. So, they enacted an ordinance to make new buildings resistant to all but the most severe tornadoes.

Developers warned that the stricter requirements would drive up home prices and that development would dry up or move outside Moore. Neither thing happened. A few years after the ordinance passed, researchers found no impacts on home prices or development.

Other jurisdictions could do better too, just like Florida did after Hurricane Andrew in 1992. The state leapt ahead of U.S. building codes with its own stricter, more cost-effective code. The Insurance Institute for Business and Home Safety developed a voluntary standard, called "Fortified," that reduces future losses and more than pays for itself in higher resale value.

Disaster-resilient buildings that also cost less

The climate crisis is forcing major energy-efficiency changes to the building code, offering a rare opportunity to fix our growing disaster liability and minimize long-term ownership cost. The update might include these three steps:

- Enact a building code objective to minimize society's total ownership cost of new buildings. The Canadian Commission on Building and Fire Codes could formalize the principle in the National Building Code of Canada.
- Require code-change requests (proposals people make to the Canadian Commission on Building and Fire Codes for inclusion in the National Building Code) to be accompanied by estimates of added construction costs and benefits in terms of reduced energy use, future repair costs, improved health and life safety outcomes, and other economic effects whose monetary value can be reasonably estimated.
- Limit the freedom of code committees to reject cost-effective code-change requests.

Such changes will eventually shrink Canada's disaster credit card balance. While Canada rethinks energy efficiency, it can also tackle the false economy of least-first-cost construction. With slightly greater initial costs, our buildings will be better able to survive disasters and cost less to own in the long run.

With a wiser code, we can have better, safer, more efficient buildings for ourselves, our neighbours, our children and all future Canadians.

This article originally appeared in the Conversation, June 16, 2022

Author

Keith Porter, PE, PhD
Chief engineer, Institute for Catastrophic Loss Reduction

The derecho storm in Ontario and Quebec shows why we have to get better at anticipating and preparing for disasters

One of the major challenges presented by disasters is that, in quite short order, they begin to pile up. We aren't able to work through the challenges presented by one and recover before we can move on to the next. Instead, response and recovery for several disasters overlap, often over the course of several months or even years.

This has been particularly evident in Canada in just the last while. In the last few weeks alone, Canadians have had to contend with both extensive flooding in southern Manitoba and a massive storm known as a derecho in Southern Ontario and Quebec, an event that's expected to rank in the top 10 largest Canadian insured disaster losses of all time.

Many homes hit by hail in the northeast of Calgary in June 2020 are still boarded up waiting for repair, as are homes in Barrie, Ont., that were hit by a powerful tornado in July, 2021. Widespread rebuilding of the village of Lytton, B.C., razed by wildfire in June 2021, has yet to begin and many residents of Abbotsford, Merritt, Sumas Prairie and other B.C. communities are still out of their homes as a result of the November 2021 atmospheric river event. The list goes on.

These days, there is no time to catch our breath as the impacts of disasters, fueled by climate change, continue to hit much of the country. And, it appears, no one is immune. While some years it seems that Alberta is ground zero for these events, over time, other provinces get a go at it, as B.C. did last year. This year, it appears to be Manitoba, Ontario and Quebec's turn.

Yet, even in the face of this seemingly back to back to back to back chaos, as a society we still insist on treating these events as rarities, as unforeseeable shocks for which we have no uniform approach.

Storm damage on Merivale Road at Viewmount Drive caused by the May 2022 Derecho that struck the City of Ottawa. CREDIT: JOSH ROBILLARD

We continue to go at them in ad hoc ways, like we re-set the system after each one.

It's clear that we must change our thinking about "natural" disasters ("natural" is in quotes because there is no such thing as a natural disaster. While the peril is natural, whether we let it become a disaster is our choice). We must work to put into place better plans, processes and procedures before, during and in the aftermath of these events. This so that we can avoid disaster when possible, mitigate the impacts of events when we can't entirely avoid them, recover more quickly and build back better so that we don't go through it all again at some point in the future.

The ongoing flooding in Manitoba and the Ontario/Quebec derecho of last month are just the latest examples of why we must get better at managing catastrophic events in Canada.

To be sure, the mantra that there is no such thing as a "natural disaster" is not a question of semantics. Disasters are, in fact, purely optional. They come when a hazard intersects with societal vulnerability – or bad decision-making, as I heard one disaster researcher put it. Mother Nature may have caused the lightning-induced wildfire, but she didn't place the (flammable) community in its way – we did.

So it is important that we understand that "natural" disasters are far from being out of our hands. Indeed, many factors exacerbate the impacts of natural hazards and virtually all are completely under our control.

And while some of these factors are more obvious, like building codes, land-use planning and other standards and policies that affect the built environment, others appear not to be connected to disasters, at least at first glance. These include addressing poverty and the housing >

crisis so that individuals, families and the broader community are less vulnerable to severe storms like the derecho.

Changing our thinking will assist in shifting how we approach the aftermath of catastrophic events as well. We need to move from reproducing the status quo and shrugging our collective shoulders – accepting the derecho and other "natural" disasters as simply Mother Nature's wrath – to understanding that the outcomes of these events are by our own design.

If we want to reduce the impacts of the next catastrophic event (which, recent history tells us, isn't that far off) we must shift our thinking and take the steps necessary to better prepare for and manage catastrophic events.

Understanding that "natural" disasters aren't natural is the first step in limiting the damage of the inevitable next event.

This article original appeared in the Globe and Mail, June 4, 2022

Authors

Glenn McGillivray
Managing Director, Institute for Catastrophic Loss Reduction and adjunct professor of disaster and emergency management at York University

Korey Pasch
PhD candidate in the department of political studies at Queen's University

New guidance for commercial risk loss control

As the result of increased loss experience generated by severe weather on commercial operations, ICLR was asked by several of its member insurers about commercial risk loss control, so the Institute has decided to extend the reach of is research and outreach into loss control for smaller, nonengineered, non-complex risks. This is with the view of possibly extending that work into larger, more complex risks in the years ahead.

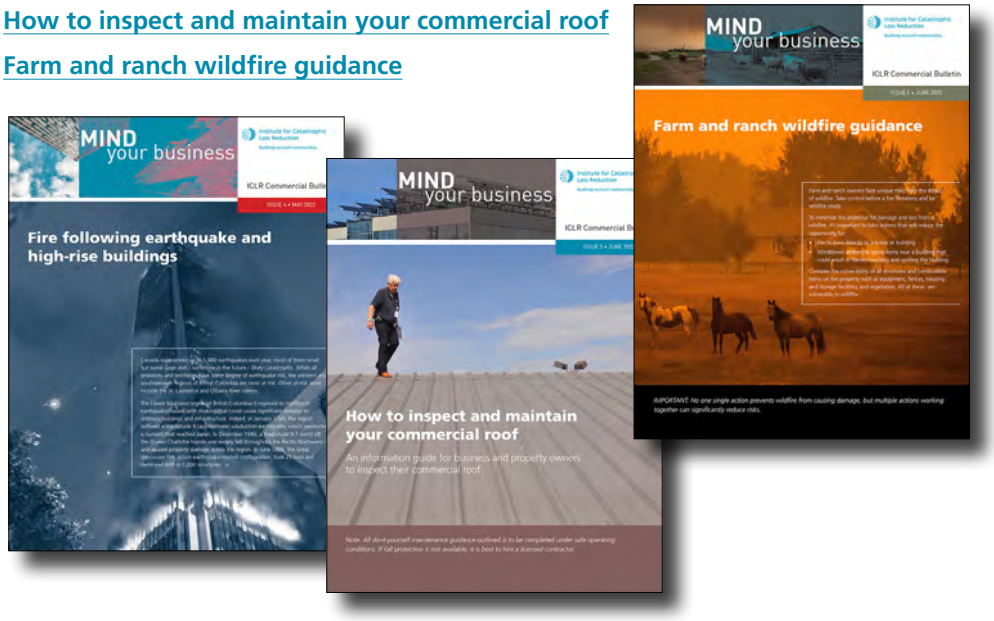
Under this new initiative, ICLR has already issued three loss control bulletins under the "Mind your business" title. These include: *Questions every condo owner should ask*, *Protection of vehicle floorplans and fleets against hail* and *Make your business wildfire ready*).

ICLR has now issued three more titles. These include:

Fire following earthquake and high-rise buildings

How to inspect and maintain your commercial roof

Farm and ranch wildfire guidance



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.

20 Richmond Street East
Suite 210
Toronto, Ontario
M5C 2R9
T 416-364-8677
F 416-364-5889
www.iclr.org
www.PIEVC.ca

Western University
Amit Chakma Building, Suite 4405
1151 Richmond Street
London, Ontario, Canada
N6A 5B9
T 519-661-3234
F 519-661-4273
www.iclr.org