



*building resilient communities*

# **ICLR Strategic Plan 2006-2011**

Institute for Catastrophic Loss Reduction

October 2005

Contents

	Page
<b>Executive Summary</b> .....	1
Early Successes, 1998-2005 .....	1
Planned Activities for 2006-2011 .....	2
<b>The Institute for Catastrophic Loss Reduction</b>	
Mission .....	3
Principles .....	3
Planning .....	4
Partners .....	4
People .....	5
<b>Priorities for 2006-2011</b>	
<b>Community Management of Environmental Hazards</b>	
Quality research .....	8
Safety partnerships .....	9
Industry awareness .....	10
Consumer awareness .....	11
<b>Safer Design and Construction of Buildings</b>	
Quality research .....	13
Safety partnerships .....	14
Industry awareness .....	16
Consumer awareness .....	17
<b>Risk Management and Critical Infrastructure</b>	
Quality research .....	20
Safety partnerships .....	20
Industry awareness .....	21
Consumer awareness .....	22
<b>Conclusion</b> .....	23

## ICLR Strategic Plan 2006-2011

### Executive Summary

#### *Early Successes, 1998-2005*

- ICLR documented the impact of its efforts since 1997 to advance loss prevention research. We secured \$3 million from the insurance industry, \$44 million from other sources, established three research chairs, 350+ publications, 30 researchers, and 100 students.
- Mike Bartlett's team of ICLR researchers secured \$8 million to build a world-class facility for testing disaster safety on full-scale homes.
- ICLR hosted a major international conference (*Floods and Disaster*) in 2004, and numerous research workshops in Toronto, Kitchener and Halifax among others.
- We continued to build ICLR's relations with UWO researchers through regular ICLR seminars and meetings with engineering, social sciences, natural sciences, medicine and business.
- Through monthly *Friday Forums*, we facilitate the exchange of topical information between researchers, member insurers and other parties involved in emergency preparedness.
- ICLR successfully transitioned into a new Chair leading a very strong Board of Directors.
- A comprehensive, multi-year strategy was approved for sharing ICLR safety information.
- We began dialogue with Canadian home builders to lead to the construction of disaster resilient homes.
- We continue to work to bring the U.S. program *Designed ... for safer living* to Canada, leading to the construction of Canada's first disaster resilient home.
- We held news conferences at homes in Halifax, London and Vancouver and a childcare centre in Toronto that had been retrofitted using ICLR guidelines.
- Also, a number of other events brought considerable media attention to ICLR's disaster safety work.
- ICLR's electronic newsletter for member insurers (*Cat Tales*) was launched.
- ICLR issued several research publications including an Earthquake Hazard Zones paper, the 2003 Blackout paper and the study of driver behaviour during inclement weather.
- We will complete the year within budget for the eighth consecutive year.

## ICLR Strategic Plan 2006-2011

### *Planned Activities for 2006-2011*

Natural disasters have killed more than 650,000 people worldwide over the last ten years and have caused more than \$1 trillion (Cdn) in damage. Disaster losses have doubled every five to ten years since the 1950s, and last year exceeded C\$50 billion world wide. The frequency and severity of damaging storms is increasing. If this trend continues, insurers around the world will face a trillion dollars in damage claims over the next 15 years. While seismic risks are stable, more and more people are inhabiting vulnerable areas. Many disaster losses are entirely preventable. In order to help address this impending increase in natural disaster losses, Institute for Catastrophic Loss Reduction (ICLR) has developed a long-term communications strategy to enhance its messaging. The plan is centred around three themes:

- Community management of environmental hazards;
- Safer design and construction of buildings; and
- Risk management and critical infrastructure.

Working through ICLR, Canada's insurers are the only group in Canada providing comprehensive disaster loss prevention advice to homeowners. Actions have been identified to help homeowners reduce the risk of injury and damage due to severe wind, hail, earthquakes, flood, wild fire and a number of other hazards. ICLR is internationally recognized for its leadership in multi-disciplinary disaster prevention research.

Through ICLR, insurers have provided support to dozens of academic researchers who are working to identify best practices. Quality research provides the foundation for better public policy and disaster management. ICLR's research findings are used to help consumers better understand the hazards they face, and to identify simple steps they can take to better protect their families and homes.

ICLR is committed to reducing disaster deaths, injuries and property damage through the development of disaster prevention knowledge, and the broad dissemination of its research findings. This research deals with damage from wind, snow, ice, earthquakes, mould and a range of other hazards.

ICLR will seek to address the above three issues by achieving its objectives in four key result areas:

- Quality research;
- Effective partnerships;
- Industry education; and
- Consumer awareness.

Nature's extreme events can be relentless and unforgiving, but need not result in disasters. Hazards demand that individuals prepare, and that communities and businesses invest in resilience and continuity measures. Knowledgeable individuals and resilient communities are the best way to prevent hazards from becoming disasters. This paper outlines strategies to help ICLR enhance the resilience of homes, communities and businesses across Canada.

## **The Institute for Catastrophic Loss Reduction**

The Institute for Catastrophic Loss Reduction (ICLR) is a world-class centre for multi-disciplinary disaster prevention research and communications. ICLR was established by Canada's property and casualty (P&C) insurance industry as an independent, not-for-profit research institute affiliated with the University of Western Ontario. Institute staff and research associates are international leaders in wind and seismic engineering, atmospheric science, risk perception, hydrology, economics, geography, health sciences, public policy and a number of other disciplines.

### **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.

### **Principles**

- While the threat of severe weather and earthquakes is increasing, sustained action can reduce catastrophic losses.
- Hazard assessment and risk identification are the cornerstones of catastrophic loss mitigation.
- Solid, applied research provides an essential foundation for effective action to reduce future losses.
- Those who knowingly choose to assume greater risk must accept an increased degree of responsibility for their choice.
- Communication with the public before a peril strikes is an important means of reducing losses.
- Local and individual actions are the most effective means of reducing the loss of life and property.
- Partnership is the best approach to resolving shared problems, particularly public safety concerns.

## ICLR Strategic Plan 2006-2011

### Planning

ICLR's plan has three central themes: Community management of environmental hazards; Safer design and construction of buildings; and Risk management and critical infrastructure. ICLR will address the above three issues by achieving its objectives in four key result areas: quality research; safety partnerships; industry awareness; and consumer awareness. The ICLR Board of Directors regularly tracks performance in order to govern ICLR toward the realization of its mission and priorities. The Board oversees this process of planning, monitoring and evaluating performance by following an annual strategic planning cycle.

#### *October*

In October, the ICLR Board establishes the plan (this document) and budget for the year ahead.

#### *January*

Each January, the ICLR Board evaluates the organization's performance of the past year against ICLR's longer-term goals.

#### *May*

In May, the ICLR Board reviews progress to date on key performance measures. Performance for the previous year is presented to the ICLR membership at the Annual General Meeting which is also held in May.

### Partners

Partnership is the best approach to resolving shared problems -- particularly public safety concerns. ICLR has established strong working relationships with numerous parties, including:

- The University of Western Ontario (UWO)
- Canadian Red Cross Society
- Disaster Prevention Research Institute, Kyoto
- Federation of Canadian Municipalities
- Geological Survey of Canada
- Health Canada
- Institute for Business and Home Safety, Tampa
- Insurance Bureau of Canada
- Meteorological Service of Canada
- National Research Council
- Public Safety and Emergency Preparedness Canada.
- Emergency Management Ontario
- Natural Resources Canada
- United Nation's Educational , Scientific and Cultural Organization (UNESCO)
- International Strategy for Disaster Reduction (ISDR)
- United Nations / World Meteorological Organization's International Panel on Climate Change (IPCC)
- International Council for Science Union (ICSU)

## People

**Paul Kovacs**, Executive Director and Founder. An economist specializing in insurance issues, natural disaster loss prevention, and public policy. He is President and CEO, PACICC and Adjunct Research Professor, Economics, UWO. He is an active participant with the UN/WMO Intergovernmental Panel on Climate Change.

**Dr. Alan Davenport**, Research Director. Founder of the UWO Boundary-Layer Wind Tunnel Laboratory. He is currently working with several Canadian companies in the development of high performance, low cost, prefabricated housing for use in post-disaster situations and other applications. Professor Davenport was Chair of the Canadian Committee for the International Decade of Natural Disaster Reduction (IDNDR) and continues as an active participant in the follow-up activities.

**Dr. Gordon McBean**, Research Chair, policy. Professor in the Departments of Geography and Political Science at UWO. He is a leading expert on climate change, their impacts and response strategies. He is the former Assistant Deputy Minister for the Meteorological Service of Canada and has worked with colleagues around the world on weather and climate. He is Chair of the Canadian Foundation for Climate and Atmospheric and Science, Chair at the International Council for Science Union (ICSU) and is a research lead with ArcticNet.

**Dr. Slobodan Simonovic**, Research Chair, engineering. Professor in the UWO Department of Civil and Environmental Engineering. He is a leading expert on flood prevention and management issues. He has been very involved in risk and adaptation strategies around the world. He was a member of the International Joint Commission's Red River Task Force and is serving as an officer for a number of national and international water organizations.

**Dr. Ron Stewart**, MSC/ICLR Industrial Research Chair, extreme weather. Professor in the Atmospheric and Ocean Sciences program at McGill University. His research focuses on storms and their precipitation, droughts, storm-climate interactions and future changes in these features. This includes surface weather conditions associated with winter storms, the nature of various forms of winter precipitation, the mesoscale structure of winter storms and generation of lightning in summer storms.

**Dr. Mike Bartlett**, Associate Chair and Associate Professor, Civil and Environmental Engineering Department, UWO. Registered Professional Engineer in British Columbia, Alberta, Yukon and Ontario. His research focuses on housing damage caused by natural hazards (snow loads, high winds and earthquakes), structural safety (resistance to heavy loads and stresses) and structural engineering (new construction materials and recycling in construction applications).

**Dr. Lindsay Anderson**, Assistant Professor, Civil and Environmental Engineering, UWO. Her research focuses on decision analysis and risk assessment for infrastructure systems. The development of comprehensive simulation models for infrastructure systems has the potential to assist in disaster risk assessment and management (development of objective risk indices and damage mitigation plans).

### ICLR Staff Members:

**Tracy Waddington** (Manager, Administration and Corporate Secretary) Tracy has been with the Institute for the past six years and has managed several projects for ICLR, including: the establishment of a committee to oversee the *Designed ... for Safer Living* program; retrofitting of a home in Vancouver for presentation to the media during Emergency Preparedness Week; and conducting a member review of ICLR's new *Open for Business Program* providing business continuity planning tools for small business). In 2004, Tracy completed a three-year course in association management sponsored by the Canadian Society of Association Executives and in 2005 she completed a Board Governance course.

## **ICLR Strategic Plan 2006-2011**

**Glenn McGillivray** (Managing Director) joined ICLR in November 2005 after more than 11 years with Swiss Re, most recently as assistant vice president of corporate communications and corporate secretary. He has more than 15 years of corporate communications experience in the property and casualty insurance industry. His main duties centre around “getting the word out” on major ICLR projects and initiatives. Since joining the Institute, he has negotiated the placement of five articles in two notable Canadian insurance publications, including four in Canadian Underwriter magazine (including the May statistical issue) and one in Pulse, the quarterly publication of the Ontario Risk and Insurance Management Society. Additionally, he was profiled in the February issue of Canadian Underwriter magazine. He is currently working on developing a second-generation Website for ICLR and publicizing major ICLR initiatives.

## ICLR Strategic Plan 2006-2011

Following is a list of Research Associates affiliated with ICLR:

**Jean Andrey** (Waterloo, Geography)  
**William Avison** (UWO, Sociology)  
**Luc Chouinard** (McGill, Engineering)  
**Jim Davies** (UWO, Economics)  
**David Eaton** (UWO, Earth Sciences)

**Hesham El Nagggar** (UWO, Engineering)  
**Ashraf El Damatty** (UWO, Engineering)  
**Greg Kopp** (UWO, Engineering)  
**Jon Galsworthy** (UWO, Engineering)  
**Horia Hangan** (UWO, Engineering)

**Hanping Hong** (UWO, Engineering)  
**Diana Inculet** (UWO, Engineering)  
**Jin Jiang** (UWO, Engineering)  
**Howard Kunreuther** (Wharton, Economics)  
**Robert Lannigan** (UWO, Medicine)

**Isaac Luginaah** (UWO, Geography)  
**Tara McGee** (Alberta, Earth & Atmospheric Sciences)  
**Craig Miller** (UWO, Engineering)  
**Brian Mills** (Waterloo, Geography)  
**Gerry Moschopoulos** (UWO, Engineering)

**Brenda Murphy** (Laurier, Geography)  
**Claus Rerup** (UWO, Business School)  
**David Rosowsky** (Oregon State, Engineering)  
**Andy Sancton** (UWO, Political Science)  
**Eric Savory** (UWO, Engineering)

**James Scott** (Toronto, Engineering)  
**J.Q. Shang** (UWO, Engineering)  
**Dan Shrubsole** (UWO, Geography)  
**Tarlochan Sidhu** (UWO, Engineering)  
**Kevin Simmons** (Austin College, Economics)

**Al Slivinski** (UWO, Economics)  
**Dan Sutter** (Oklahoma, Economics)  
**Keith Thompson** (Dalhousie, Oceanography)  
**Kristy Tiampo** (UWO, Earth Sciences)  
**Rajiv Varma** (UWO, Engineering)

**Peter Vickery** (UWO, Engineering)  
**Ernest Yanful** (UWO, Engineering)  
**Robert Young** (UWO, Political Science)  
**Maged Youssef** (UWO, Engineering)  
**Greg Zaric** (UWO, Business School)

**Priorities for 2006-2011**

ICLR will remain effective by demonstrating progress on three issues (community management of environmental hazards; safer design and construction of buildings; and risk management and critical infrastructure) -- each with four key result areas (quality research, effective partnerships, industry education and consumer awareness).

**1. Community Management of Environmental Hazards**

a) **Quality Research**

**i) Loss Prevention and Warnings Research**

- *Effective warning systems*, Gordon McBean, UWO
- *The role of government*, Gordon McBean, UWO & Dan Henstra, UWO
- *Disaster management policy*, Dan Henstra, UWO & Andrew Sancton, UWO
- *The media and public trust*, Kate White, United Nations Assoc. of Canada
- *Local emergency planning*, Joe Gordon, retired
  
- *Driving in severe weather*, Jean Andrey, Waterloo
- *Managing hazards*, Paul Kovacs, UWO & Howard Kunreuther, Wharton
- *Knowledge of insurance coverage*, Paul Kovacs, UWO
- *Insurance coverage*, Paul Kovacs, UWO
- *B.C. earthquake loss prevention*, Charles Scawthorne, EQE
  
- *B.C. wildfire risk management*, Paul Kovacs, UWO
- *Langford BC – community best practices for wildfire management*, Paul Kovacs, UWO
- *B.C./Alberta – community actions to wildfire risk*, Tara McGee, Alberta
- *Edmonton – wildfire risk management*, Tara McGee, Alberta
- *Alberta/Ontario tornado risk*, Brenda Murphy, Laurier & Gordon McBean, UWO
  
- *Alberta/Ontario tornado incentives to invest in mitigation*, Kevin Simmons, Austin
- *Alberta/Ontario tornado incentives to invest in mitigation*, Dan Sutter, Oklahoma
- *Ontario cottage country wildfire exposure*, Paul Kovacs, UWO
- *London's land use planning to reduce hazard damage*, Dan Shrubsole, UWO
- *Ontario flood policy – history and best practices*, Dan Shrubsole, UWO
  
- *Ontario municipal loss prevention practices*, Paul Kovacs, UWO
- *Atlantic municipal loss prevention practices*, Paul Kovacs, UWO

**ii) Hazard Identification Research**

- *B.C. earthquake forecast*, Kristy Tiampo, UWO
- *B.C. earthquake risk by postal code*, Paul Kovacs, UWO (with EQE)
- *Prairie drought*, Ron Stewart, McGill
- *Prairie hail risk by postal code*, David Eaton, York
- *Barrie tornado*, David Eaton, York

## ICLR Strategic Plan 2006-2011

- *Ontario wildfire risk, Paul Kovacs, UWO*
- *Ontario earthquake analysis, David Eaton, UWO*
- *Ontario community hazard identification assessment, Paul Kovacs, UWO*
- *Toronto earthquake risk, H. El Nagggar, UWO & D. Eaton, UWO*
- *Toronto hurricane Hazel, Harold Belore, Cumming Cockburn*
  
- *Quebec earthquake risk by postal code, Paul Kovacs, UWO (with EQE)*
- *Montreal earthquake, Luc Chouinard, McGill*
- *Montreal ice storm, Ron Stewart, McGill*
- *Atlantic hurricane & storm surge, Keith Thompson, Dalhousie*

### b) **Safety Partnerships**

Partnership is the best approach to resolving shared problems, particularly public safety concerns. More than a dozen national and international organizations have committed to partnering with ICLR to reduce disaster fatalities, injuries and property damage, including joint research, sharing of information and communications.

#### *Canadian Association of Emergency Management Professionals*

Leading community experts will partner with ICLR to ensure that our community research is relevant and timely.

#### *Emergency Management Ontario*

ICLR staff participates on two advisory committees - the Emergency Management and Doctrine Standards Committee and the Prevention and Mitigation Working Group- dealing with community risk assessment and loss prevention and mitigation. ICLR also reviews and offers input on some EMO documents such as their Hazard Incidence and Risk Assessment report. ICLR will continue to work with EMO on disaster preparedness initiatives.

#### *Public Safety and Emergency Preparedness Canada*

ICLR continues to advise about the importance of establishing a national disaster loss prevention strategy.

#### *Health Canada*

ICLR manages the Health and Natural Disasters Network, guiding and co-ordinating national research efforts. This information will empower all levels of government and health stakeholders to work collaboratively to build effective Canadian public health policies aimed at assisting communities to adapt successfully to climate change.

#### *Meteorological Service of Canada*

Contributes support for ICLR's road safety research and partners for the ICLR/MSM announcement of the beginning of winter and spring storm seasons.

#### *Natural Resources Canada*

Provides funds for ICLR's study of climate, hospital admissions and actions that will improve health care management. The results of the study will ultimately be used to provide assessments of possible long-term planning strategies to enhance adaptive capacity at Canadian hospitals, and the roles which weather-health prediction capability could play.

## ICLR Strategic Plan 2006-2011

### *United Nations*

ICLR staff provides leadership to the UNESCO flood initiative, International Strategy for Disaster Reduction warnings program, Intergovernmental Panel on Climate Change assessment of community adaptation, and International Council for Science Union hazards program.

### c) **Industry Awareness**

ICLR provides a forum for business leaders to work directly with researchers, disaster management professionals and government officials to share ideas and establish a new understanding of how to prevent natural hazards from becoming disasters. This includes an active publications program and workshop program. Insurance participants in ICLR will gain access to our research findings through a variety of mechanisms including: Friday Forums, CIP seminars, *Cat Tales* newsletter, ICLR research publications and articles in the industry media.

### *Friday Forums*

This highly popular program brings senior scientists together with industry members to present the latest findings in a particular area of expertise related to natural disaster mitigation. The forums are held 10 times per year, and the topics and speaker profiles are posted on ICLR's website.

### *Newsletter (Cat Tales)*

*Cat Tales* is ICLR's electronic newsletter. It is published three times per year and offers the most up-to-date information about ICLR researchers and events through a number of short informative articles. *Cat Tales* is also posted on ICLR's website, for easy access.

### *Industry conferences and seminars*

ICLR works with industry members to develop opportunities to participate in industry-sponsored seminars and workshops. The Insurance Institute of Ontario's Chartered Insurance Professionals' (CIP) Society provides a unique opportunity for ICLR to showcase its expertise with members of the industry who are seeking special designation. ICLR conducts day long seminars and participates in CIP symposiums.

### *Trade publication articles*

The Institute has well-established relationships with the insurance trade press. ICLR is working with the two major trade monthlies Canadian Insurance and Canadian Underwriter to secure opportunities to write and place articles aimed at informing and educating industry professionals as to current practices in mitigation and disaster preparedness. ICLR news is often covered in Thompson's World Insurance News a weekly trade publication.

### *Web site (www.ICLR.org)*

ICLR's website provides up-to-the-minute news about ICLR research, media activity, and conferences as well as hazard-specific information for industry and consumers. It is an invaluable tool for member insurers to want to update their knowledge about specific natural disasters, and preparedness as well as stay on top of leading edge research. Many member insurers incorporate ICLR's disaster preparedness information into their own company brochures and/or websites to share this knowledge with their clients. Others mail it to customers with annual policy renewal information.

## ICLR Strategic Plan 2006-2011

### *University of Western Ontario Annual Loss Prevention Conference*

Every year, ICLR develops and partners with the University of Western Ontario, the United Nations, and UNESCO to sponsor an international conference for industry and stakeholders in emergency preparedness. The annual conference represents ICLR's most significant industry event of the year, and draws experts from dozens of countries around the world.

### *Showcase Communities*

In this new program ICLR identifies and works with communities that are taking proactive steps to reduce the potential for damage and injury from a natural disaster. Langford British Columbia is ICLR's first showcase community. The city has designed and implemented Fire Smart development guidelines for all new housing construction that ensure the best protection against interface fires. ICLR will profile Langford as a model by facilitating tours for industry and other communities. The City of Peterborough has shown leadership in its response to the recent torrential flooding of the city. It has developed a Flood Reduction Master Plan that maps out the broad steps that the city needs to follow to reduce flooding damage in the future and identifies short-term activities that are required to begin the process. ICLR has met with officials of city and will continue to work with them in this endeavour.

### *Speaking engagements*

ICLR's partnerships provide potential information sharing opportunities within the industry. ICLR speakers are highly sought after for speaking engagements and information forums.

#### d) **Consumer Awareness**

Local and individual actions are the most effective means of reducing the loss of life, injuries and property due to disasters. Best practices for individuals to protect their families and homes are published on ICLR's website ([www.ICLR.org](http://www.ICLR.org)). ICLR also works with the media and our partners to promote awareness about actions that reduce the threat of disasters.

### *News media -- proactive media relations and media/press conferences*

ICLR has established a media contact program which involves issuing press releases to announce ICLR achievements and events, comment on government policy, release new research results and mark the anniversary of significant damaging weather events from the past. This proactive media relations activity has helped to make ICLR front of mind with local, regional and national media. ICLR has been covered on Canada AM, CBC TV, CBC Radio and Radio Canada International. Another plank of ICLR's media contact program is the press conference. It is the most successful vehicle for ICLR to disseminate disaster safety information, and spreads the word quickly on a national scale.

### *Member Loss Prevention Brochures*

Canada's insurers are committed to informing homeowners about disaster loss prevention. Through ICLR, Canada's insurers are the only group in Canada providing comprehensive disaster loss prevention advice to homeowners. ICLR has developed eight specific brochures which identify actions that homeowners should take to reduce the risk of injury and damage due to severe wind, hail, earthquakes, flood, wild fire and a number of other hazards. Member insurers send this safety information to their policyholders. Since almost every homeowner in Canada has insurance, this is a powerful means of sharing safety knowledge with millions of homeowners across Canada. The Institute also makes this information available on its website. Some member insurers have loaded this information onto their websites or they have linked to ICLR's website to enhance the distribution of information.

## ICLR Strategic Plan 2006-2011

### *Web site (www.ICLR.org)*

ICLR's website is a valuable resource for people to learn about disaster safety and provides valuable links for those interested in other stakeholders in disaster preparedness and emergency management. The website lists each natural hazard and provides comprehensive information about the hazard and what can be done to protect home and life. The website is constantly updated to include the latest information, research and ICLR events.

### *Severe weather announcement in fall and spring*

In 2005, ICLR will launch a new partnership with Environment Canada's Meteorological Service to mark the beginning of the winter storm season and the summer storm season. It is proposed that this initiative be annual with two public awareness events to take place each year. Details regarding the events are being finalized by both parties with the first event to take place in the fall of 2005. Raising public knowledge about the beginning of these important seasons is new in Canada. The intent is to make each occasion as familiar to the public as the beginning of the each of the four seasons.

### *Research papers*

ICLR actively supports leading edge research that is conducted by some of the best Canadian and international researchers. ICLR researchers are engaged in research that encompasses many aspects of home safety, as well as research that allows us to better understand consumer behaviour. ICLR packages selected papers in a public friendly manner that could impart useful disaster loss safety information to communities.

## 2. Safer Design and Construction of Buildings

### a) Quality Research

Through ICLR, member insurers have begun to invest in a long-term, science-based research program that identifies best practices for the design and construction of new homes. Insurers have provided support to dozens of academic researchers who are investigating damage from wind, snow, ice, earthquakes, mould and a range of other hazards.

#### *Three Little Pigs Project at UWO*

Civil engineers have the challenge and obligation to develop resilient and affordable housing stock and to constantly improve house performance under extreme and normal environmental actions for an enhanced quality of living. Through experimental studies and numerical modelling, we must seek to understand the fundamental behaviour of houses under severe wind and rain loads, including interactions among building envelope, air/moisture flow and microenvironmental conditions that could lead to health risk and material biodeterioration. Potential beneficiaries of this research include anyone who lives in, owns, builds, supplies materials for, or insures a home.

The industry's largest investment has been to support the *Three Little Pigs Project*. Coupled with the Boundary Layer Wind Tunnel, UWO has established a world-class research team and facility capable of testing full-scale wood-framed houses under extreme loading. Dr. Mike Bartlett and his research team has turned seed money from ICLR into \$8 million to construct a state-of-the-art research facility. They will test scale model homes in the wind tunnel, then test identical extreme load events on full-scale homes. These research facilities are unique in the world today, exploiting a network of collaborators in the construction, insurance and risk management industries. The facility will permit, for the first time anywhere, the controlled application of simulated "natural" wind and snow loads to full-scale houses up to failure. It will allow the investigation of the structural integrity of the house at load levels up to failure, the assessment of rain and moisture penetration through the building envelope and its consequences such as the growth of mould under realistic environmental conditions, and the examination of the impact of human error and partial damage on the optimum design criteria and quality control requirements.

Research themes include:

- applying simulated wind pressure to various full-scale tests by an innovative pneumatic loading system using "pressure boxes";
- assessing the structural responses of components and systems using full-scale and wind tunnel test results in conjunction with numerical modelling;
- investigating the ingress of rain and moisture through the building envelope and their consequences including mould growth; and
- assessing the impact of human error in construction on the structural performance, evaluating the consequences of damage to houses due to strong wind and rain and developing optimal design criteria.

Long-term objectives of this research initiative include:

- develop mitigating strategies for a sustained, resilient and affordable housing stock;
- understand the behaviour and retain the integrity of building envelope for enhanced quality of living;
- investigate the impact of extreme environmental loads and their effects on houses and low-rise buildings for improved design practice; and
- search for the optimal design and quality of construction through benefit-cost assessment, quality control, insurance and social welfare.

## ICLR Strategic Plan 2006-2011

The research team includes parties with combined expertise in full-scale and model testing, wind loads and fluid mechanics, structural engineering, codified design, wind-driven rain, mycology of mould growth and risk assessment. They include:

- *Dr. Mike Bartlett* (Civil and Environmental Engineering, UWO)
- *Dr. Ashraf El Damatty* (Civil and Environmental Engineering, UWO)
- *Dr. Hanping Hong* (Civil and Environmental Engineering, UWO)
- *Dr. Diana Inculet* (Boundary Layer Wind Tunnel Laboratory, UWO)
- *Dr. Greg Kopp* (Boundary Layer Wind Tunnel Laboratory, UWO)
- *Dr. David Rosowsky* (Oregon State University)
- *Dr. Eric Savory* (Mechanical & Materials Engineering, UWO)
- *Dr. James Scott* (Public Health Sciences, University of Toronto)
- *Dr. Peter Vickery* (Applied Research Associates Inc., Raleigh, North Carolina)

It is expected that the research team will identify aspects of over-engineering in current home construction practices -- areas where savings are possible without any compromise in safety. At the same time, we also expect that they will identify additional design and structural elements that go beyond the current building code -- that would significantly enhance safety at minimal cost.

This loss prevention research program will provide a science-based foundation for the construction of disaster resilient homes. It is expected that the research team will be operational in the new *Three Little Pigs* research facility by September 2005. The insurance industry will use the research developed at this site to shape the details of a new ICLR program, ***Designed...for safer living***. ICLR will share these findings with the U.S. insurance industry, so the information will also influence their safer living program with American home builders. We will also share it with Canadian government agencies that are developing policies to deal with climate change, as the ***Designed...for safer living*** program represents an adaptive strategy to deal with the increasing frequency and severity of extreme weather events.

### Other research initiatives

- *Dr. Horia Hangan* (Engineering Science, University of Western Ontario) -- According to recent, unpublished reports, more than 66 per cent of all high-intensity wind events in North Eastern U.S. and Canada involving damaging effects on buildings and structures are associated with tornadoes or downbursts. Dr. Hangan's research focuses on fundamental physical and applied numerical simulations of high Reynolds number shear flows such as wakes, boundary layers and jets with applications to wind engineering.

### b) Safety Partnerships

Partnershiping is the best approach to resolving shared problems, particularly public safety concerns. More than a dozen national and international organizations have committed to partnering with ICLR to reduce disaster fatalities, injuries and property damage. Initiatives include joint research, sharing of information and communications.

Partnerships...

*Canadian Home Builders Association / Provincial Home Builders Associations*

ICLR has begun to work with the national branch of the Canadian Home Builders Association to join with the insurance industry and build disaster-resilient homes. The London Home Builders Association has toured the *Three Little Pigs Project* facility at UWO. This dialogue opens the door to further interaction with the national wing, as well as provincial and municipal home builders associations via speaking engagements and/or regional meetings.

## ICLR Strategic Plan 2006-2011

ICLR expects that home builders, the manufactured home industry, manufacturers and others in the home construction industry will want to be active participants in the *Three Little Pigs Project*.

### *Monarch Homes*

Monarch Homes, one of the top volume home builders in the GTA, fully supports the *Three Little Pigs Project* research. They have made a financial contribution and have challenged the industry to support the project. Their partnership is a significant because it is creating awareness in Canada's largest housing market of the need to conduct research into building safer and better homes.

### *Genesis*

ICLR efforts with the Canadian Home Builders Association introduced Genesis to the *Three Little Pigs Project*. Genesis is a world leading Canadian company that specializes in the engineering, manufacturing and installation of fully-integrated light-steel framed homes. Each structure is custom engineered and manufactured into large simplified wall panels, floor panels and roof trusses. The framing panels integrate mechanical & electrical holes, exact window and door openings, built-in structural supports, and a wide variety of sub-sheathing products and insulation systems. Currently used to build residential and commercial structures throughout the world, Genesis features structural-grade, galvanized steel framing materials, in lieu of traditional softwood lumber, concrete or masonry block construction. The company has entered into discussion with Dr. Mike Bartlett to provide funds and a steel-framed home to test in the *Three Little Pigs* facility this year. The results of this research will be made available to the industry over the coming months.

### *The Canadian Institute of Steel Construction Ontario Region*

The Canadian Institute of Steel Construction the national industry association representing the structural steel, open web steel joist and steel platework fabricating industries is another financial backer of *Three Little Pigs Project*.

### *3M Canada*

3M Canada has partnered with ICLR to provide window film for ICLR's home retrofit program as part of Emergency Preparedness Week. ICLR plans to continue this working relationship with 3M Canada for its yearly retrofit program. Partnering with a national manufacturer affords potential for Canada-wide publicity within the industry and the general public.

### *Retrofitters/renovators/contractors*

ICLR works with suppliers from many aspects of the home reconstruction industry during the Emergency Preparedness Week initiative. Community based expertise is used to provide and install hazard-specific safety material for the home. Engaging community home supply manufacturers further expands disaster home-safety knowledge within the industry and builds on ICLR's commitment to inform homeowners about disaster safety.

### *Institute for Business and Home Safety*

The Institute for Business and Home Safety is a sister organization to ICLR that is based in Florida. ICLR participates in an annual meeting at IBHS in December each year and has worked with IBHS to create the *Designed...for Safer Living* program in Canada. Through the program, ICLR will encourage and assist Canadian home builders in constructing new disaster-resilient homes. ICLR can count on the success of the program in the U.S. to build a solid base for the construction of new homes that are disaster resilient.

## ICLR Strategic Plan 2006-2011

### *Housing safety initiative with insurance industry*

Canada's insurance industry is leading the way to ensure that Canadians build better, disaster-resilient homes. A major plank of the ***Designed ...for safer living*** program, ICLR will work to bring together home builders and the insurance industry in a formal relationship in the construction of new homes that are disaster resilient. The Institute will first identify cost-effective design and structural elements that must be included in a new home in a specific location. It will then conduct an independent inspection of the build. Some member insurers have decided to take the lead by agreeing to fund the construction of Canada's first disaster-resilient home. These insurers are actively looking for a home where the claim shows it has suffered catastrophic damage and must be completely rebuilt. The first ***Designed ...for safer living*** home will be launched in 2005, with several more to be rolled out across the country over the next few years.

### *Public Safety and Emergency Preparedness Canada / Showcase Homes*

ICLR continues to advise about the importance of establishing a national disaster loss prevention strategy. ICLR partners with Public Safety and Emergency Preparedness Canada (PSEPC) as a participant in the PSEPC Emergency Preparedness Week public education campaign. ICLR uses the campaign to make an existing home resilient to a natural hazard, and to publicize the home in the media. ICLR launched this initiative in 2003 by retrofitting a home in London to make it more resilient to damage from tornadoes, followed by a hurricane-resilient home in Halifax in 2004, and in 2005 made a home in Vancouver more resilient to earthquakes. In 2006, ICLR will undertake a multi-hazard retrofit in Ottawa. In 2007, ICLR has chosen Edmonton for a tornado retrofit, followed by an ice storm retrofit in Montreal in 2008. In 2009, ICLR will make a home more resilient to a heat wave in Toronto, followed by flood in Winnipeg in 2010, hail in Calgary in 2011 and earthquake in Victoria in 2012. ICLR will repeat the cycle in cities across Canada beginning in 2013 -- rotating each successive year.

### *Heritage Canada*

ICLR will undertake a multi-hazard retrofit of a heritage home in Ottawa in 2006 as part of Emergency Preparedness Week. This new partnership with Heritage Canada offers a national stage for showcasing the retrofit and addresses a new angle – how to fortify a heritage or older home.

## c) **Industry Awareness**

ICLR provides a forum for business leaders to work directly with researchers, disaster management professionals and government officials to share ideas and establish a new understanding of how to prevent natural hazards from becoming disasters. This includes an active publications program and workshop program. Insurance participants in ICLR will gain access to our research findings through a variety of mechanisms including: Friday Forums, CIP seminars, *Cat Tales* newsletter, ICLR research publications and articles in the industry media.

### *Friday Forums*

This highly popular program brings senior scientists together with industry members to present the latest findings in a particular area of expertise related to natural disaster mitigation. The forums are held 10 times per year, and the topics and speaker profiles are posted on ICLR's website.

### *Newsletter (Cat Tales)*

*Cat Tales* is ICLR's electronic newsletter. It is published three times per year and offers the most up-to-date information about ICLR researchers and events through a number of short informative articles. *Cat Tales* is also posted on ICLR's website, for easy access.

## ICLR Strategic Plan 2006-2011

### *Industry conferences and seminars*

ICLR works with industry members to develop opportunities to participate in industry-sponsored seminars and workshops. The Insurance Institute of Ontario's Chartered Insurance Professionals' (CIP) Society provides a unique opportunity for ICLR to showcase its expertise with members of the industry who are seeking special designation. ICLR conducts day long seminars and participates in CIP symposiums.

### *Trade publication articles*

The Institute has well-established relationships with the insurance trade press. ICLR is working with the two major trade monthlies Canadian Insurance and Canadian Underwriter to secure opportunities to write and place articles aimed at informing and educating industry professionals as to current practices in mitigation and disaster preparedness. ICLR news is often covered in Thompson's World Insurance News a weekly trade publication.

### *Web site (www.ICLR.org)*

ICLR's web site provides up-to-the-minute news about ICLR research, media activity, and conferences as well as hazard-specific information for industry and consumers. It is an invaluable tool for member insurers to want to update their knowledge about specific natural disasters, and preparedness as well as stay on top of leading edge research. Many member insurers incorporate ICLR's disaster preparedness information into their own company brochures and/or web sites to share this knowledge with their clients. Others mail it out to customers with annual policy renewal information.

### *University of Western Ontario Annual Loss Prevention Conference*

Every year, ICLR develops and partners with the University of Western Ontario, the United Nations, and UNESCO to sponsor an international conference for industry and stakeholders in emergency preparedness. The international conference represents ICLR's most significant industry event of the year, and draws experts from dozens of countries around the world.

### *Housing safety initiative with insurance industry*

Canada's insurance industry is leading the way to ensure that Canadians build better, disaster-resilient homes. A major plank of the ***Designed ...for safer living*** program, ICLR will work to bring together home builders and the insurance industry in a formal relationship in the construction of new homes that are disaster resilient. The Institute will first identify cost-effective design and structural elements that must be included in a new home in a specific location. It will then conduct an independent inspection of the build. Some member insurers have decided to take the lead by agreeing to fund the construction of Canada's first disaster-resilient home. These insurers are actively looking for a home where the claim shows it has suffered catastrophic damage and must be completely rebuilt. The first ***Designed ...for safer living*** home will be launched in 2005, with several more to be rolled out across the country over the next few years.

### *Speaking engagements*

ICLR's partnerships provide potential information sharing opportunities within the industry. ICLR speakers are highly sought after for speaking engagements and information forums.

#### d) **Consumer Awareness**

Local and individual actions are the most effective means of reducing the loss of life, injuries and property due to disasters.

## ICLR Strategic Plan 2006-2011

### *News media -- proactive media relations and media/press conferences*

ICLR has established a media contact program which involves issuing press releases to announce ICLR achievements and events, comment on government policy, release new research results and mark the anniversary of significant damaging weather events from the past. This proactive media relations activity (promoting awareness of actions that reduce the threat of disasters) has helped to make ICLR front of mind with local, regional and national media. ICLR has been covered on Canada AM, CBC TV, CBC Radio and Radio Canada International. Another plank of ICLR's media contact program is the press conference. It is the most successful vehicle for ICLR to disseminate disaster safety information, and spreads the word quickly on a national scale.

### *Showcase Home (Emergency Preparedness Week initiatives)*

The Emergency Preparedness Week retrofitted home provides a showcase for the media to tour and photograph. Although these private homes are not open to the public, media coverage provides specific information about the retrofit and directs people to local contractors, ICLR's website and other resources. They open the door to creating awareness of the importance of preparedness and the simple cost effective actions that a homeowner can take today to protect against tomorrow's perils. ICLR launched this initiative in 2003 by retrofitting a home in London to make it more resilient to damage from tornadoes, followed by a hurricane-resilient home in Halifax in 2004, and in 2005 made a home in Vancouver more resilient to earthquakes. In 2006, ICLR will undertake a multi-hazard retrofit in Ottawa. In 2007, ICLR has chosen Edmonton for a tornado retrofit, followed by an ice storm retrofit in Montreal in 2008. In 2009, ICLR will make a home more resilient to a heat wave in Toronto, followed by flood in Winnipeg in 2010, hail in Calgary in 2011 and earthquake in Victoria in 2012.

### *Member Loss Prevention Brochures*

Canada's insurers are committed to informing homeowners about disaster loss prevention. Through ICLR, Canada's insurers are the only group in Canada providing comprehensive disaster loss prevention advice to homeowners. ICLR has developed eight specific brochures which identify actions that homeowners should take to reduce the risk of injury and damage due to severe wind, hail, earthquakes, flood, wild fire and a number of other hazards. Member insurers send this safety information to their policyholders. Since almost every homeowner in Canada has insurance, this is a powerful means of sharing safety knowledge with millions of homeowners across Canada. The Institute also makes this information available on its website. Some member insurers have loaded this information onto their web sites or they have linked to ICLR's web site to enhance the distribution of information.

### *The **Designed...for safer living** program*

This program has a consumer component designed to educate homeowners regarding the potential damage of natural disasters and how they can protect their home and life through brochures that provide instructions that are easy to understand and implement.

### *Web site ([www.ICLR.org](http://www.ICLR.org))*

ICLR's website is a valuable resource for people to learn about disaster safety and provides valuable links for those interested in other stakeholders in disaster preparedness and emergency management. Best practices for individuals to protect their families and homes are published on ICLR's website. It is constantly updated to include the latest information, research and ICLR events.

### *Conferences and seminars*

ICLR continues to work with partners and potential partners to bring disaster safety message to the public through industry, academic and public seminars and conferences. These events provide an opportunity to showcase ICLR experts and their research.

## ICLR Strategic Plan 2006-2011

### *Speaking engagements*

ICLR researchers, senior staff and board members travel to many corners of the world as invited speakers. They relay disaster safety information and research findings to various national and international audiences. Several of ICLR's senior staff are renowned internationally, and are frequently sought after for such appearances.

### *Research papers*

ICLR actively supports leading edge research that is conducted by some of the best Canadian and international researchers. ICLR researchers are engaged in research that encompasses many aspects of home safety, as well as research that allows us to better understand consumer behaviour. ICLR packages selected papers in a public friendly manner that could impart useful disaster loss safety information to homeowners.

### 3. Risk Management and Critical Infrastructure

#### a) Quality Research

##### **Loss Prevention Research**

- *Flood management – Red River case study*, Slobodan Simonovic, UWO
- *Decision support tools for managing complex systems*, Slobodan Simonovic, UWO
- *Disaster risk assessment for infrastructure systems*, Lindsay Anderson, UWO
- *Continuity planning for small business*, Paul Kovacs, UWO
- *Underground urban infrastructure & natural disasters*, Erez Allouche, UWO
  
- *B.C. earthquake and tuned dampers for tall buildings*, Ashraf El Damatty, UWO
- *B.C. earthquake and underground structures in tall buildings*, Hesham El Naggar, UWO
- *B.C. earthquake loss management for critical infrastructure*, Kristy Tiampo, UWO
- *B.C. earthquake loss prevention*, Charles Scawthorne, EQE
- *B.C. earthquake and hydroelectric dam safety*, Robin Charlewood, Acres
  
- *Ontario hospital admissions & climate*, Denis Bourque, MSC
- *Ontario earthquake loss management for critical infrastructure*, David Eaton, UWO
- *Atlantic hurricane and storm surge loss management*, Keith Thompson, Dalhousie

#### b) Safety Partnerships

Partnership is the best approach to resolving shared problems, particularly public safety concerns. More than a dozen national and international organizations have committed to partnering with ICLR to reduce disaster fatalities, injuries and property damage, including joint research, sharing of information and communications.

Partnerships...

##### *Emergency Preparedness Industry and Commerce Council*

ICLR and the Emergency Preparedness for Industry and Commerce Council (EPICC) have jointly developed a continuity and preparedness guide (*Earthquake planning for business*) to help coordinate earthquake preparedness efforts in B.C. EPICC unites B.C. Hydro, B.C. Gas, Telus, government officials and the insurance industry. ICLR will try to actively support their annual conference.

##### *Emergency Management Ontario*

ICLR staff participates on two advisory committees - the Emergency Management and Doctrine Standards Committee and the Prevention and Mitigation Working Group- dealing with community risk assessment and loss prevention and mitigation. ICLR also reviews and offers input on some EMO documents such as their Hazard Incidence and Risk Assessment report. ICLR will continue to work with EMO on disaster preparedness initiatives.

##### *Public Security and Emergency Preparedness Canada*

ICLR continues to advise about the importance of establishing a national disaster loss prevention strategy.

##### *Health Canada*

ICLR manages the Health and Natural Disasters Network guiding and co-ordinating national research efforts. This information will empower all levels of government and health stakeholders to work collaboratively to build effective Canadian public health policies aimed at assisting communities to adapt successfully to climate change.

## ICLR Strategic Plan 2006-2011

### *Meteorological Service of Canada*

ICLR is building on its working relationship with the Meteorological Service of Canada with a new initiative to launch in 2005 that will alert homeowners to the beginning of the summer storm season and the beginning of the winter storm season.

### *Natural Resources Canada*

NRCan is working with ICLR on a study of climate, hospital admissions and actions that will improve health care management. The results of the study will ultimately be used to provide assessments of possible long-term planning strategies to enhance adaptive capacity at Canadian hospitals, and the roles which weather-health prediction capability could play.

### *United Nation's Educational, Scientific and Cultural Organization (UNESCO) flood initiative*

Dr. Simonovic has a working relationship with UNESCO. He represented the organization at the World Conference on Disaster Reduction in Kobe, Japan and has delivered addresses regarding flood risk management and mitigation and the International Flood Initiative/Program.

### *International Strategy for Disaster Reduction warnings program*

The International Strategy for Disaster Reduction aims at building disaster resilient communities by promoting increased awareness of the importance of disaster reduction as an integral component of sustainable development, with the goal of reducing human, social, economic, and environmental losses due to natural hazards, and related technological and environmental disasters. ICLR will continue to build on its relationship with ISDR to raise awareness of the importance of early warning systems with respect to natural disasters.

### *Intergovernmental Panel on Climate Change (IPCC) assessment of community adaptation*

ICLR has been commissioned to research and contribute to the North American adaptation techniques and constraints section of IPCC's "Climate Change 2007: Impacts, Adaptation, and Vulnerability" text.

### *International Council for Science Union (ICSU) hazards program*

ICLR's Dr. Gordon McBean chairs an ad-hoc Scoping Group on Natural and Human-induced Environmental Hazards at ICSU, which could lead to a major international research program in this area.

## c) **Industry Awareness**

ICLR provides a forum for business leaders to work directly with researchers, disaster management professionals and government officials to share ideas and establish a new understanding of how to prevent natural hazards from becoming disasters. This includes an active publications program and workshop program. Insurance participants in ICLR will gain access to our research findings through a variety of mechanisms including: Friday Forums, CIP seminars, *Cat Tales* newsletter, ICLR research publications and articles in the industry media.

### *Friday Forums*

This highly popular program brings senior scientists together with industry members to present the latest findings in a particular area of expertise related to natural disaster mitigation. The forums are held 10 times per year, and the topics and speaker profiles are posted on ICLR's website.

## ICLR Strategic Plan 2006-2011

### *Newsletter (Cat Tales)*

*Cat Tales* is ICLR's electronic newsletter. It is published three times per year and offers the most up-to-date information about ICLR researchers and events through a number of short informative articles. *Cat Tales* is also posted on ICLR's website, for easy access.

### *Industry conferences and seminars*

ICLR works with industry members to develop opportunities to participate in industry-sponsored seminars and workshops. The Insurance Institute of Ontario's Chartered Insurance Professionals' (CIP) Society provides a unique opportunity for ICLR to showcase its expertise with members of the industry who are seeking special designation. ICLR conducts day long seminars and participates in CIP symposiums.

### *Trade publication articles*

The Institute has well-established relationships with the insurance trade press. ICLR is working with the two major trade monthlies Canadian Insurance and Canadian Underwriter to secure opportunities to write and place articles aimed at informing and educating industry professionals as to current practices in mitigation and disaster preparedness. ICLR news is often covered in Thompson's World Insurance News a weekly trade publication.

### *Web site (www.ICLR.org)*

ICLR's web site provides up-to-the-minute news about ICLR research, media activity, and conferences as well as hazard-specific information for industry and consumers. It is an invaluable tool for member insurers to want to update their knowledge about specific natural disasters, and preparedness as well as stay on top of leading edge research. Many member insurers incorporate ICLR's disaster preparedness information into their own company brochures and/or web sites to share this knowledge with their clients. Others mail it out to customers with annual policy renewal information.

### *University of Western Ontario Annual Loss Prevention Conference*

Every year, ICLR develops and partners with the University of Western Ontario, the United Nations, UNESCO to sponsor an international conference for industry and stakeholders in emergency preparedness. The international conference represents ICLR's most significant industry event of the year, and draws experts from dozens of countries around the world.

### *Speaking engagements*

ICLR's partnerships provide potential information sharing opportunities within the industry. ICLR speakers are highly sought after for speaking engagements and information forums.

#### d) **Consumer Awareness**

Local and individual actions are the most effective means of reducing the loss of life, injuries and property due to disasters. Best practices for individuals to protect their families and homes are published on ICLR's website ([www.ICLR.org](http://www.ICLR.org)). ICLR also works with the media and our partners to promote awareness about actions that reduce the threat of disasters. A special focus of our communications effort deals with the small business community.

Most large organizations have the resources and motivation to embrace disaster loss prevention, but most small enterprises need and welcome assistance. ICLR's loss prevention information for small business will be designed so it can be distributed by member insurance companies and other partners. *Open for Business* is a continuity planning tool for small business. More than 25 percent of the small businesses that are forced to close because of a natural disaster never reopen.

## ICLR Strategic Plan 2006-2011

The information package was developed by the insurance industry in the United States, through the Institute for Business and Home Safety. ICLR is modifying the information for the Canadian business environment, while the Organization for American States is planning to distribute this information throughout Latin America.

### *Small business showcase program*

We will consider staging public events to showcase loss prevention strategies for small business, similar to our efforts during Emergency Preparedness Week to promote loss prevention by homeowners. This could be designed as a co-operative effort between the insurance industry and a partner.

### *Member Loss Prevention Brochures*

Canada's insurers are committed to informing small business owners about disaster loss prevention. Through ICLR, Canada's insurers are the only group in Canada providing comprehensive disaster loss prevention advice to homeowners. ICLR will consider extending its brochure collection to include a disaster prevention and continuity planning tips for small business owners. Member insurers could send this safety information to their policyholders. Since many business owners in Canada have insurance, this is a powerful means of sharing safety knowledge with millions of small businesses across Canada. The Institute could also make this information available on its web site

## **Conclusion**

Nature's extreme events can be relentless and unforgiving, but need not result in disasters. Hazards demand that individuals prepare, and that communities invest in resilience. Knowledgeable individuals and resilient communities are the best way to prevent hazards from becoming disasters.

This paper outlines strategies to ensure that ICLR will continue to achieve its objectives in four key result areas -- quality research, effective partnerships, industry education and consumer awareness.