Cat tales

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Alan G. Davenport (1932-2009)

By Gordon McBean, CM, FRSC

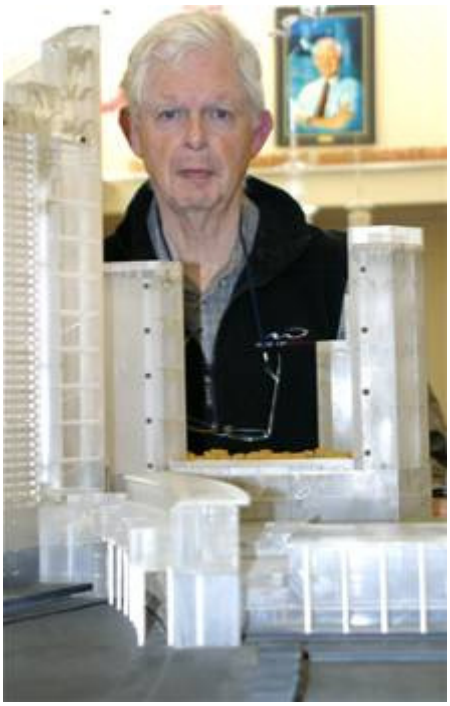
It is with sadness that I write a personal note on the passing of Alan Davenport, a friend, colleague, noted wind engineer and ICLR's Director of Research. Alan passed away due to complications from Parkinson's disease on July 19, 2009 in London at the age of 76.

Alan Garnett Davenport was born on September 19, 1932, in Madras, India, now known as Chennai, where his father was a manager of a tea plantation. He went on to live much of his youth in South Africa and then studied at Cambridge University where he obtained both Bachelor's and Master's degrees in mechanical sciences. Then, much to our future benefit in Canada, he travelled to Toronto where he earned a master's degree in civil engineering from the University of Toronto. He returned to the United Kingdom to obtain a PhD degree from the University of Bristol. His thesis was titled: "The Treatment of Wind Loads on Tall Towers and Long Span Bridges in the Turbulent Wind" and laid the foundations for his great scientific contributions in the decades to follow.

Alan's research and advice on the proper construction of buildings including most of the world's tallest buildings and longest bridges have been the topic of many articles and reviews. On July 26, 2009 a New York Times column by Douglas Martin with the title: "Alan G. Davenport, Noted Wind Engineer, Dies at 76" summarized many of these achievements.

Alan was a consultant in the construction of the World Trade Center in New York. His research on ways to stabilize the towers in heavy winds probably also contributed to their staying erect as well as they did during the 9/11 terrorist attack and saved lives. Leslie Robertson, a leading engineer on the World Trade Center project and close personal friend of Alan described him as a "genius."

As one walks through the Alan G. Davenport Wind Engineering Group's Boundary-Layer Wind Tunnel at The University of Western Ontario, the evidence of Alan and his research group's influence on building and bridge design around the world is very evident. Along the ►



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walls on display and, in one case, hanging from the ceiling, are scale models of many of the tall buildings and big bridges that have been tested and had their designs improved there. In fact, if you travel around the world and see a tall building, odds are that it was tested at UWO.

Alan has been the worthy recipient of many honours including the Order of Canada, Fellow of the Royal Society of Canada and many honourary degrees and medals from international and national societies and organizations. His publication record is outstanding with many papers being considered as classics in the field.

Alan has been an inspiration to many and to me personally, from the time of our first meeting over 30 years ago to our working together on disaster risk reduction over the last 15 years. I first met Alan in the 1970s at, I think, one of the micrometeorology-boundary layer flow meetings that Ted Munn organized. I knew of his reputation from many. In the middle 1990s, I became a member of the Canadian National Committee for the International Decade for Natural Disaster Reduction of which Alan was the Chair. Because of his inspiration and his working with Paul Kovacs and others, the Institute of Catastrophic Loss Reduction was created at The University of Western Ontario in 1999. Alan made a trip to Toronto in early 2000 and his persuasion convinced me to move to ICLR and Western.

Alan was very proud of his beloved family, his wife, the former Sheila Rand Smith, his children, Thomas, Andrew, Anna and Clare and nine grandchildren and often spoke lovingly of what they were doing and their accomplishments.

Alan not only had a great mind – he was a great person. He cared not only about the building codes for a huge skyscraper but also about ways to protect from the ravishes of wind, rain and other hazards, on homes in the poorest villages around the world. A scholarship in his honour for students from developing countries to study engineering is especially appropriate.

Alan always wanted to do things – make things happen and push the limits. Despite his deteriorating health, he did not just stop and lay back. He continued to live life to the fullest he could and his beloved Sheila fully supported him. He has made us all better people and he leaves behind a world much better because of his contributions and that is want he most wanted.

UWO engineering team releases damage report on Vaughan tornadoes

Within hours of the 17 tornadoes that tore through southern and central Ontario August 20, researchers from the University of Western Ontario's faculty of engineering where on scene in Vaughan initiating damage site assessments in partnership with Environment Canada.

The team members who arrived that evening first worked to determine the locations of touchdown, damage paths, and where the twisters likely dissipated. By morning, the entire team was on site, completing the initial mapping work, then moving on to analyzing individual structures in an attempt to isolate design and construction faults with an ultimate view to building better, more resilient homes. The team has issued a full report of its findings.

The report provides track information for the two tornadoes that touched down in Vaughan (one in Woodbridge, the other in Maple); an overview of damage indicators including discussions on observed damage, and on debris impacts and internal pressurization.

The 16-page report, rich with photographs of the storms' aftermath, can be downloaded at www.iclr.org under the publications section located on the homepage.

ICLR retrofits Toronto home against basement flooding

On August 19, the Institute for Catastrophic Loss Reduction (ICLR), with support from the City of Toronto, unveiled a Toronto home retrofitted to reduce the risk of basement flooding.

On August 19, 2005, a major rainstorm in the Greater Toronto Area caused more than $500 million in insured damage - the costliest natural catastrophe in Ontario history and the second most expensive on record for the country. Since then, there have been numerous severe storms causing basement flooding. Armed with knowledge of the practical tips used in the retrofit, homeowners can protect themselves and reduce the chance of flooding.

"Basement flooding, caused by overland water flows, infiltration and sewer backup, is a major concern for many urban municipalities in Canada," said ICLR's Executive Director Paul Kovacs. "With the increase in the frequency and intensity of rainfall events, along with urbanization and aging infrastructure, more homeowners are experiencing basement flooding. Effective management of flood risks requires investment and upgrading of municipal sewer infrastructure -- along with educated homeowners who take action to prevent flooding."

"Protecting properties from flooding is a shared responsibility. This retrofit demonstrates a number of ways that property owners can help guard against it," said Toronto Water's Director of Infrastructure Management Michael D'Andrea. "The City of Toronto has resources and a subsidy program to help homeowners be proactive and protect their homes against flooding."

The City's *Basement Flooding Protection Subsidy Program* provides subsidies for the installation of a number of devices including a backwater valve and sump pump. For information about how to apply, and other resources, visit www.toronto.ca/water/sewers/basement_flooding.htm

ICLR has issued its "*Handbook for Reducing Basement Flooding*," a new publication that addresses the concerns of homeowners, local governments and insurance companies of the increasing instances of basement flooding, by providing comprehensive information on how to mitigate flood risk for individuals and communities. The handbook contains 20 measures that homeowners can take to reduce their risks and their neighbourhoods' risk of basement flooding. Many of the measures are simple and relatively inexpensive -- for example, downspout disconnection, and sealing any cracks in foundation walls and basement floors.

Downspouts were extended to convey rainwater away from the foundation.

Previous to the retrofit, one downspout drained directly onto the driveway, preventing water from being absorbed by vegetation and causing icing in the winter. A French drain was installed to correct the problem.

A sump-pump was installed to convey rainwater out of the weeping tiles, bring it to the surface of the lot, and pump it onto the lawn (away from the foundation) in order to keep excess water out of the municipal system.

A backwater valve was installed to prevent sewage surcharging into the basement.

Citizen participation in flood reduction planning: Lessons from Peterborough after five years

By Greg Oulahen, MA
Research Associate, ICLR

The people of Peterborough, Ontario would prefer to be less familiar with flooded basements, property and roads. The city has suffered a number of floods throughout its history, and in recent years was hit by two significant flood events within 25 months. As a result, a lot has changed in how decisions are made in the city, not least of all the processes of making planning, emergency management and public works decisions.

It has now been five years since Peterborough's latest major flood event, and it is worth looking back on the extensive planning efforts that have since been made by the City of Peterborough to reduce future flood losses. Citizen participation has been emphasized as an important element of these model efforts, and many strengths and a few weaknesses can be found upon examination of how the public has been involved in the planning process. Valuable lessons can be taken from these experiences that may well be applied to other emergency management decision making processes. Planners and emergency managers can mutually benefit by sharing their first-hand knowledge of how to most effectively incorporate valuable citizen input into all stages of disaster management.

Heavy summer rainfall events

On June 11, 2002, Peterborough was struck by a severe summer storm that generated more than 70 mm of rain in a 24-hour period. The rainfall caused extensive flooding in low-lying areas of the city, damaging several residential and commercial properties due to overland flooding and sewer backup. In the months after the storm, the heavy rainfall was estimated to be a 1 in 100 year event, and perhaps with this long return period in mind, nothing much was done to increase the city's resilience to flooding.

Exactly 25 months later, a thunderstorm pounded Edmonton on July 11, 2004. The storm brought large hailstones and 150 mm of rain down on the city, causing extensive property damage and forcing a rare evacuation of the West Edmonton Mall. As the rest of the country looked on, citizens of Peterborough and other places that have experienced flooding could sympathize with the residents of the western Canadian city. Just three days later, however, the same weather system moved eastward across the country and turned bad memories into a new reality for the people of Peterborough.

On July 14, 2004, this weather system stalled above Peterborough and produced a severe storm that generated 230 mm of rain in 24 hours. An astounding 87 mm of rain fell in one hour during the peak of the storm. Many Peterborough residents awoke the next morning to find their streets, yards, and basements flooded. An estimated 6,000 to 8,000 properties were affected by flood damage. Direct physical damages to private and public property exceeded $100 million. A state of emergency was declared by the City of Peterborough in the days after the storm and stayed in effect for 15 days. This heavy rainfall event was estimated by some to be a 1 in 290 year event.

Citizens in Peterborough were devastated by the enormous impact of this second flood in just 25 months. Many residents and business owners had just recovered from damages caused by the 2002 event, and they considered it unacceptable to be subject to more flood damages. The days and weeks after the July 2004 flood were a difficult and emotional time for many members of the community, and the desire to assign blame for the damages suffered was strong. Many people directed their anger and frustration at the City for not being adequately prepared for such an event, despite experiencing similar consequences of heavy rainfall just two years prior. Citizens demanded that the City take action to reduce future flood losses.

Flood reduction planning

The City of Peterborough responded to the demands of the community by initiating efforts to discover the causes of the July 2004 flood damage and the steps that should be taken to reduce future potential flood damage. The City commissioned a private consulting firm, UMA Engineering, to conduct a study and create a master plan that would address these issues. UMA commenced the study in August 2004 and eight months later released the Flood Reduction Master Plan (FRMP), which was to serve as a master plan to guide decision making for flood reduction in the future. Citizen participation was emphasized as an important element of the study and planning processes. The local knowledge, experience and interest to reduce future flood losses that existed within the Peterborough community were used to inform the study and influence planning and decision making.

The value of citizen participation in planning and disaster management is widely ►

acknowledged by academics and practitioners alike. The inclusion of citizen participation demands greater time and resources dedicated to the planning process but results in better plans and decisions that are more reflective of the needs of the community. Some minimum of participation is required for most municipal planning exercises in Canada but the flood reduction planning process in Peterborough exceeded that minimum to the benefit of the final plan.

Citizen participation was integrated into the FRMP process in several ways. The most intensive method of incorporating public input was achieved by inviting residents to share their experiences and opinions at public information meetings hosted by UMA and City staff. Two rounds of meetings were held in each of the City's five municipal wards, for a total of ten public meetings. The first round of meetings was held in late September 2004, approximately two months after the flood. This turnaround time from the date of the flood to the beginning of a formal comprehensive planning process was important for satisfying citizen demand for action and for extracting valuable information held by citizens with intimate, first-hand knowledge of the flood. Each of the ten public information meetings used a variety of participation techniques in order to cater to different preferences and personalities in the community and maximize the amount of information gained. These techniques included a drop-in time for one-on-one education and sharing of personal experiences with project team members, completion of a basement flooding survey, a formal presentation by UMA staff, and a formal question and answer period. An impressive 600 citizens participated in the first round of five public meetings. During the second round of meetings, UMA presented the findings of the study and proposed to the public the Flood Reduction Master Plan.

Lessons learned

Given the clarity that hindsight affords, a number of observations can be made about citizen participation in flood reduction planning efforts in Peterborough. The FRMP process was a very strong planning process in terms of involving public input. A detailed review finds that the planning process had many strengths when compared to the standards set in the hazards literature and to planning programs undertaken in other cities. These strengths included: involving citizen participation very early in the planning process; contracting a private consulting firm and granting it freedom in creating the plan, which depoliticized the planning process; hiring additional specialized facilitation and media relations consultants; and, employing several different participation techniques within the public information meetings. However, the planning process had at least two apparent weaknesses, and we can learn at least as much from such shortcomings as we can from the successes.

First, in the months following the 2004 flood, many citizens were eligible to receive financial assistance in recovering from property damage caused by flooding and sewer backup by the City of Peterborough's Flood Relief Committee. This committee distributed financial assistance provided by fundraising efforts and Ontario's Disaster Relief Assistance Program (ODRAP) to those citizens who qualified for the program. ODRAP, and other forms of financial assistance in other provinces, provides an opportunity for the provincial government to be involved in helping citizens recover from a disaster by giving them a portion of the monetary value of their damaged essential items (up to 90% in Ontario).

Each stage throughout the process of distributing this financial assistance required that eligible citizens have direct contact with members of the Flood Relief Committee. However, citizens receiving ODRAP payments were not asked for their input on the Flood Reduction Master Plan study. Indeed, there was no link between the work of the Flood Relief Committee and the FRMP project team. This should be considered a missed opportunity. Although it may be asking a lot of flood victims to be concerned about planning issues when more pressing challenges obviously exist, these citizens hold valuable information and have a vested interest in planning decisions. They have been through unknown hardship, but as a result have an intimate knowledge of the flood event, and may have some unique ideas for preventing losses in the future. Taking advantage of the person-to-person interaction necessary to distribute and receive government financial assistance to garner citizen participation in a planning program can benefit decision making by injecting valuable knowledge and personal experience.

A second shortcoming of the Peterborough FRMP process is that "targeting" was not used to its maximum potential as a strategy to generate citizen participation. Targeting in this case refers to actively seeking out citizen participation in the planning process. The FRMP process employed one type of targeting, called geographic targeting, very effectively by holding two public meetings in each political ward in the city. This strategy helped the planning process by allowing location-specific information to be gathered from participants ►

who knew each area best and by limiting attendance to a reasonable level at each meeting, but may not have allowed for a complete reflection of needs within the community.

The planning process did not adequately target specific sectors of the population, such as those with special interests or specific needs. This type of targeting is known as "social" targeting, and is at least as important as geographic targeting. It is well documented in academic planning literature that the interests of all members of a community should be represented in decision making, regardless of economic or social stature. Groups of citizens with interests and needs that differ from the rest of the population may represent a relatively large portion of the community. Neglecting to use social targeting as a participation strategy should be considered a weakness in the planning program.

In Peterborough, those living in rental housing units were some of the citizens most severely affected by flood damage. As lower-income members of a community are often those who live in rented housing, community groups that represent the low-income population in Peterborough would have been able to provide a renter's perspective on flood reduction decisions if consulted during the planning process. Utilizing social targeting in the FRMP process would have taken more time and resources, both of which are always limited, but would have allowed decision making to be more completely informed.

Looking forward

The fact that Peterborough sustained extensive flood damage, even twice in just over two years, is not unique. Other Canadian cities have suffered urban flooding that is much worse. The August 2005 storm that struck the Greater Toronto Area caused extensive flooding that resulted in over $500 million in insurance claims and stands as the most costly storm event in Ontario's history. Also in 2005, southern Alberta suffered flooding that totaled $306 million in insured damages. The earlier mentioned July 2004 storm in Edmonton resulted in $143 million in insurance claims for sewer backup alone. Hamilton, Ottawa, Saskatoon, Winnipeg, Montreal, Thunder Bay, Moncton and Sarnia have all dealt with urban flash flooding problems. Urban flooding has also occurred in many smaller municipalities across the country, including Prince George and Port Alberni, B.C. and Stratford, Ontario.

Many communities are regularly affected by flooding, and will continue to experience flooding in the future. A 2002 study by Allouche and Freure of the University of Western Ontario found that of 26 municipalities surveyed across the country, 42% reported that basement flooding occurred several times per year and 92% reported that basement flooding occurred at least once every several years. Climate change is expected to increase the frequency and severity of heavy rainfall events in the future. We can expect these increases to exacerbate the flood problem in Canada, causing a rise in both urban flash flooding and riverine flooding. Lehner and other experts estimated in the journal Climatic Change in 2006 that what we now regard as a 1 in 100 year event may actually be closer to a 1 in 50 year event, and may occur as often as once every 10 to 15 years by 2070.

If flood return intervals are decreasing due to a changing climate, then flood maps in Canada must be updated to reflect our new climate. We depend on accurate flood maps for making appropriate decisions about development, infrastructure and emergency planning, among other local responsibilities. With a better understanding of flood risk and new flood maps, many municipal decision making tools will also have to be updated, including zoning regulations, water and wastewater infrastructure requirements, and emergency evacuation routes. Moreover, hazard risk analysis undertaken by many municipalities in Canada is inadequate to vastly improve local emergency planning. Despite a perpetual lack of resources available for this exercise, more comprehensive strategies for including citizen input and a better understanding of our changing risks will improve hazard risk analysis.

Using the opportunity of government disaster financial assistance distribution to seek citizen input in hazards mitigation planning efforts may become even more important in the future. As part of the consultation process to create a National Disaster Mitigation Strategy in Canada, the Canadian insurance industry successfully lobbied the federal government to increase disaster financial assistance payouts by a significant 15 percent. This additional money is to be spent on hazard mitigation measures in the disaster-affected community. Dedicating this money to hazard mitigation will provide great benefit to the community and is a wise investment of government funds. A recent FEMA study in the United States estimates that every $1 spent on mitigation saves $4 in disaster recovery costs.

The distribution of government financial assistance to the people of southern Manitoba affected by this spring's second largest flood event in a hundred years will provide another opportunity to engage flood victims in planning and decision making. It will be ►

Citizen participation in flood reduction planning *cont...*

interesting to watch whether this opportunity is capitalized on, if additional money for hazard mitigation is included and how that money is spent.

It has now been five years since the July 2004 flood event in Peterborough. The extensive damage sustained during the flood was devastating to the community, but is hardly unique in Canada. The flood reduction planning efforts that have been undertaken in Peterborough since the flood stand out, however, as a model of best practice for proactive planning to reduce future flood losses. The City of Peterborough continues to seek citizen input in ongoing flood reduction planning efforts and has completed many public infrastructure improvement projects to date.

We can take valuable lessons from both the many strengths and few weaknesses of the citizen participation element of Peterborough's flood reduction planning process, and apply these lessons to other planning and emergency management decision making processes in municipalities across Canada.

Using effective citizen participation strategies to maximize the value of public input, we can better understand the risks we face and improve planning and emergency management decisions to reflect them.

Greg Oulahen is a Research Associate at the Institute for Catastrophic Loss Reduction. Many of the findings for this article were taken from his Master's thesis research, funded by ICLR, at the University of Waterloo. Greg can be contacted at goulahen@iclr.org

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ICLR Friday Forum seminar series

Exploring Disturbances to Arctic Atmospheric Chemistry as a Major Cause of Accelerated Climate Change in this Region

The Institute for Catastrophic Loss Reduction is pleased to invite you to participate in a workshop with Brian Stocks of B.J. Stocks Wildfire Investigations Ltd.

The 2008 Arctic Research of the Composition of the Troposphere from Aircraft and Satellites (ARCTAS) mission was conducted in April (Alaska) and June-July (Canada) by NASA's Global Tropospheric Chemistry and Radiation Sciences Programs in support of the International Polar Year. Its objective was to better understand the factors driving rapid ongoing changes in Arctic atmospheric composition and climate. Boreal forest fires were identified as a major disturbance to summer air quality and climate in the Arctic. This presentation will focus on the ARCTAS deployment to Cold Lake Alberta in June/July 2008, the research methodologies undertaken while monitoring northern boreal fires during that period, and some preliminary science results. The frequency and severity of boreal fires is expected to increase significantly with ongoing climate change, making this a topical and important research program.

ICLR seeks to strengthen the insurance community's awareness of the risks associated with natural hazards. Each month we will host an informal discussion of current research and industry issues related to natural hazards. Attendance will be limited to ensure that participants can directly contribute to the discussion. The cost is $75 ($150 for non-members, if space permits) for each forum. Business casual dress.

Friday, October 16, 2009 from 10:00 a.m. to 11:30 a.m.
Where: ICLR, 20 Richmond Street East, Suite 210, Toronto
RSVP: Tracy Waddington (416) 364-8677

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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