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## **Disasters in the Infrastructure: Response and Assessment**

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**CIP Initiative Workshop at Dalhousie University, Halifax, Nova Scotia**

**October 28-29, 2010**

**Chaired by  
Kevin Quigley, School of Public Administration  
and Ronald Pelot, Department of Industrial Engineering**

## Executive Summary

### **Keynote: Professor Louise Comfort, University of Pittsburgh**

We see emerging threats in the 21st century—interacting threats that create larger consequences. The primary challenge is figuring out what the government should do in the absence of knowing what the next major threat will be. We are facing challenges such as aging infrastructure, changing demographics and language barriers. At the same time, there is a deepening vulnerability to new unintended hazards such as technical breakdowns, and intended ones such as terrorist attacks. How do we use the scarce resources, time and attention in public institutions?

There is a need to build the capacity to assess the changing situation, integrate the information and disseminate it to people who need it. Building on the work of Elinor Ostrom, we need to create a ‘knowledge commons’: computer infrastructure that allows organizations of different types to use an interactive knowledge base where the people using it are updating and validating the information.

The major resource we need is the knowledge of our region and the capacity to move across distances and integrate knowledge; a lack of knowledge exacerbates local risk. We can never stop hurricanes and earthquakes, but understanding when, where and how they will happen can inform how we build communities.

The fundamental resource in any community is the capacity of its people to learn. The mission of universities is to develop the capacity, train the personnel and build the knowledge bases to reduce the effects of catastrophes.

### **Lunchtime Speaker: Dr. Robert Strang, Nova Scotia’s Chief Public Health Officer**

Human, pig and chicken illnesses came together in Mexico to form H1N1, a totally new strain of influenza. With no underlying immunity in the human population, the virus had the potential to spread widely and quickly. Our response to H1N1 was the largest-ever vaccination campaign in Canada.

Learning from the experience with H1N1 and in preparing for a range of future emergencies, we need to focus on (1) scalability and adaptability; (2) communication and information; and (3) interconnectedness.

The real issue is maintaining public confidence and trust. We need to use 21st century communication tools to get information out in a timely manner. Although 20-40 year olds routinely use electronic communication tools, they are generally hard to reach.

We plan to look at how to create an all-hazards approach, examining everything from strikes to mass casualties, by building capacities and relationships.

### **Workshop Plenary One and Associated Breakout Sessions**

The panel considered systematic and analytical approaches to examining and prioritizing risk to CI. Colleagues from Taiwan outlined a quantitative system of measurement for analysing risk for four factors: economic loss, affected population, public and private sector loss, and public morale and confidence. Major reforms underway in Taiwan aim to enhance information sharing and resource integration through the establishment of a new department responsible for coordinating CIP. It is expected to begin operating in 2011.

The panel also discussed a framework for assessing capability needs and vulnerabilities along an event horizon continuum representing pre-event prevention and protection missions, and post-event response and recovery missions.

Panelists also discussed the need for scalability—responders must be able to “ramp up” and “ramp down” capability to ensure that resources are allocated in a way that aligns with demands for response.

Breakout sessions included discussions on (1) trade-offs and tensions in bottom-up/top-down approaches to CIP; (2) the conditions necessary for effective ramping up and ramping down of operations, and the cost and public perception challenges in this area; and (3) the challenges and opportunities associated with capability-based planning.

### **Workshop Plenary Two and Associated Breakout Sessions**

The plenary examined new research of media coverage of CI events. While natural disasters receive the most media attention, the coverage of industrial accidents tends to last longer, indicating that less coverage does not necessarily indicate lesser concern.

Results from comparisons across countries revealed that Canada and Australia were comparable in amounts of coverage across all types of events, while events in the United States received the least amount of coverage. The United Kingdom was found to have a greater number of alarming headlines.

The tone of coverage of industrial accidents was found to be significantly more alarming in all countries when compared to coverage of natural disasters. Despite a significantly high volume of coverage, H1N1 did not receive an especially high level of alarming headlines, nor did reports of failed terrorism.

The panel concluded that media assessments of performance, particularly during complex industrial failures, suggest that government and industry performance is explicitly tied, making it difficult for governments to dissociate themselves from industrial events, irrespective of who owns and operates the infrastructure.

Breakout sessions included discussions on (1) the role of government during disasters; (2) accountability; (3) the challenge of responding to inaccurate information in the media; (4) the importance of training staff on how to deal with the media during an event; and (5) the discrepancies between national and local coverage of CI incidents.

## Table of Contents

About the Workshop.....	5
Summaries	
Keynote Address: Designing Resilience for Communities at Risk.....	8
Lunchtime Speaker: H1N1 and Critical Infrastructure Protection: How They are Linked .....	11
Workshop Plenary 1: Capability-Based Planning for Disasters .....	14
Break-out Session: <i>International Experiences with CIP</i> .....	16
Break-out Session: <i>Ramping-Up and Ramping-Down</i> .....	18
Break-out Session: <i>Capability-Based Planning</i> .....	19
Workshop Plenary 2: Media Coverage of Canadian and International Disasters .....	20
Break-out Session: <i>Industrial Failures</i> .....	22
Break-out Session: <i>Media and Risk Communication—Health and Food</i> .....	23
Break-out Session: <i>Natural Disasters, the Media and CIP</i> .....	24
Appendix 1: The Program.....	25
Appendix 2: Workshop Chairs.....	27
Acknowledgements .....	28

## **About the Workshop**

### **Rationale**

The BP oil spill, H1N1, floods in Pakistan and China, earthquakes in Haiti and Chile and hurricanes Earl and Igor—all events that have occurred in the last 12 months—remind us of the fragility and interdependence of modern infrastructure and the significant social, economic and environmental risks inherent in such low probability occurrences. Limited resources means technologies must be exploited and people coordinated more effectively to support better emergency management policy and operations. Responses must be rapid, and often taken in spite of incomplete information. For good or for ill, the decisions we take will be interpreted and assessed by experts, critics and lay people alike.

### **Goals**

- Create a cross-sectoral and cross-jurisdictional space in which participants can access and share diverse and expert perspectives on protecting critical infrastructure and explore technical as well as managerial issues.
- Identify opportunities and constraints in capability-based planning and effective deployment of resources during the ramp-up and ramp-down phases of a disaster.
- Examine and draw lessons from media coverage of Canadian and international critical infrastructure events.
- Consider future prospects for shared dialogue and collaboration on this subject.

### **Format**

We started our deliberations with a keynote address from Professor Louise Comfort, Center for Disaster Management, University of Pittsburgh, on the evening of October 28, 2010, at the McInnes Room, Dalhousie University. On October 29, 2010, at the Atlantica Hotel, the workshop included two panels, each with three corresponding breakout sessions. The morning panel focused on capability-based planning and resource allocation during disasters. The afternoon panel focused on new media research of natural disasters, terrorist plots, food contamination, pandemics and industrial failures. The panelists each started with a brief presentation. The moderators then facilitated a discussion between the panelists and the audience.

Three breakout sessions followed each panel to discuss the themes presented. Participants joined one of the available groups in smaller breakout rooms. Each group had a facilitator. A note-taker was appointed in each room. Once the breakout sessions ended, the workshop reconvened. The facilitators reported to the entire workshop on the discussions in their respective groups.

## **The Audience**

The audience at the workshop included academics, as well as public, private and not-for-profit sector emergency management staff; operational risk managers; communications staff; and policy makers that have an interest in and/or responsibility for managing and securing critical infrastructure. There were also a number of graduate students from the Faculty of Management.

The workshop was designed to allow for a broad and divergent discussion, and lent itself to a lively exchange of ideas on the subject.

We thank everyone who participated and hope they found it rewarding.

## **This Document**

This document contains summaries prepared by Dalhousie University graduate students of the keynote address, the lunchtime speaker, both panels and all breakout sessions. The comments made by audience members at the keynote and lunchtime addresses as well as participants at the breakout sessions are not attributed.

*Kevin Quigley, School of Public Administration*  
*Ron Pelot, Department of Industrial Engineering*  
*Dalhousie University*

## **Summaries**

## **Keynote Address**

### **Designing Resilience for Communities at Risk**

**Louise Comfort, Director, Center for Disaster Management, University of Pittsburgh**

We see emerging threats in the 21<sup>st</sup> century, interacting threats that create larger consequences. The primary challenge is figuring out what the government should do in the absence of knowing what the next major threat will be. We are facing challenges such as aging infrastructure, changing demographics, and language barriers. At the same time, there is a deepening vulnerability to new unintended hazards such as technical breakdowns, and intended ones such as terrorist attacks. How do we use the scarce resources, time and attention in public institutions?

#### **Risk and Resilience**

- Risk is dealing with unexpected threats and trying to identify them, including interacting threats with larger potential consequences.
- Resilience is the capacity to absorb a major shock and keep major functions of a community running (such as backup plans).

#### **Preparing for Crisis**

Some events, such as the collapse of the I-35W bridge in Minneapolis, take public officials and the transportation department by surprise; they knew the bridge was deteriorating, but not its threshold point of collapse. They need to develop ways to monitor degrees of stress to provide information to engineers and policy makers about how to address potential threats.

Cities are becoming increasingly diverse in terms of background, language, age and other demographics. They may interpret risk in different ways, and interdependencies between groups at the local levels can create vulnerabilities at the national level; different local needs for electricity can create a blackout across the grid. It is important to recognize that any system is made up of interdependencies that can create strengths or, if missing, greater vulnerabilities which could cause the system to fall apart.

In California, all schoolchildren are trained to duck, cover and hold in the event of an earthquake, but that same earthquake in Saint Louis, where earthquakes occur every 200-300 years, creates greater risk. There is less knowledge about that risk and how to avoid it.

#### **Responding to Crisis**

The events immediately following a crisis will often shape the events that follow. We saw that very clearly with Hurricane Katrina and other events. It is unrealistic to try and follow a command-and-control function in a disaster where the situation changes so fast that managers are making decisions based on information and resources available at that particular moment. The capacity to think under stress is very important.



During the disaster, it's essential to maintain ordinary operations; even if the hospital is down, there are still mothers giving birth and citizens in critical condition. There's a need to manage both ordinary situations and an influx of new patients who are in need of care. It's important to look at the thresholds in the system where you can inject people and infrastructure to make the system more adaptable.

With US fire marshals, standard fire training considers all of the equipment and personnel; they do not rely on any one piece of equipment. Sending all the fire trucks to one particular location when there are multiple fires may cost all of the other areas that are at risk of a fire.

## **Earthquake in Haiti**

Haiti lacked preparedness and awareness of risk conditions in which people were living. The earthquake's effects were exacerbated by pre-existing vulnerabilities in geographic and socio-political conditions. The impact of the earthquake was devastating:

- At least 32,000 lives lost, while roughly 1.5 million people are still homeless; 80% of the buildings in Port-au-Prince were either totally destroyed or rendered unusable.
- 11 of the 12 government ministry buildings collapsed, including the ministry of public works, which was responsible for facilitating the logistics.
- 80% of the schools were damaged or destroyed, along with 3 of the city's 4 universities.
- Hospitals had to have operating rooms in tents outside in 100°F heat.

We did see pockets of interaction in some neighbourhoods, parts of the city and the country, where some people had a much wider impact than we would expect. A "small world network"—a small group of diverse individuals—focused their attention on a small group of people in the city to mobilize an effective response to the earthquake within their community. Despite the disconnected larger system, there were small groups acting effectively in the midst of the broader chaos.

We have a small world ratio, clusters of organizations working together that are able to do so because their distance of communication is very short. This means they probably know one another and share the same approach and goal to act quickly. We can accomplish much more by having these small pockets of collaboration share information.

## **Inter-Jurisdictional Collaboration**

In Haiti, the response effort included international and national organizations, but only two at the local level, leaving the larger organization uncertain of local resources and conditions. To avoid a disconnected response, you need international organizations supporting the national ones, which in turn support provincial and local associations.

To build resilience, we need to build a knowledge base that has detailed information at the local level that the local police, fire and ambulances know. Local people need to know the geography, meteorology and geology of the regions, know its strengths and weaknesses—not just geophysical, but also economic, social and political situations. Where are the

pockets of people who need help? Where are those who can help not only themselves, but also others?

If the information is not transmitted clearly, actively and in a timely way, it becomes difficult to mobilize a common response to that disaster. Well-designed information technology and communications infrastructure is needed for nations like Canada, which have multiple cities spread across a very large landmass, in order to manage crises.

Furthermore, the government relies on the private sector, which often has the logistics and equipment, and also the non-profit sector, which often sets up shelters. Combined, inter-sectoral collaboration builds resilience in a city.

### **Knowledge Commons**

There is a need to build the capacity to assess the changing situation, integrate the information and disseminate it to people who need it. Professor Elinor Ostrom, Nobel Laureate in Economics, says we need to build a knowledge commons: computer infrastructure that allows organizations of different types to use an interactive knowledge base where the people using it are updating and validating the information.

- People from different levels and jurisdictions can access this and understand much more quickly what the threat is and where the resources are that they can turn to for help.
- It creates new knowledge because people who share that knowledge understand the problem in a different way and contribute back to the community-wide knowledge base.
- It also creates a historical record to consider potential alternative approaches.

The characteristics of the knowledge commons are interdisciplinary and inter-jurisdictional. We need to know a community's geographic location, geophysical characteristics, and the risks to which it is exposed. A focus on the local level allows well-trained local managers to respond with this knowledge and request targeted assistance in the needed area.

The major resource we need is the knowledge of our region and the capacity to move across distances and integrate knowledge; a lack of knowledge exacerbates local risk. We can never stop hurricanes and earthquakes, but understanding when, where and how they will happen can inform how we build communities. We can exacerbate the risk or increase the resilience.

### **Closing**

The fundamental resource in any community is the capacity of its people to learn. The mission of universities is to develop the capacity, train the personnel and build the knowledge bases to reduce the effects of catastrophes.

• Eric Snow

**Lunchtime Speaker**  
**H1N1 and Critical Infrastructure Protection: How They are Linked**  
**Dr. Robert Strang, Nova Scotia's Chief Public Health Officer**

Dr. Strang discussed the province's recent response to H1N1 and what we learned from it. Public health and public safety are two sides of the same coin, he noted, and there needs to be better interconnectedness and understanding between these worlds.

In preparing for a range of emergencies, we need to focus on:

- scalability and adaptability
- communication and information
- interconnectedness.

**Background of H1N1**

Influenza 101: every year, in the winter months, there's an epidemic of influenza. The virus changes its structure enough from one year to the next such that last year's vaccine no longer works; we need a new vaccine and to vaccinate everyone all over again. The department planned for a pandemic because one was overdue (the most recent was a mild one in 1968), but H1N1 proved not to be too serious.

Human, pig and chicken illnesses came together in Mexico to form H1N1, a totally new strain. With no underlying immunity in the human population, the virus had the potential to spread widely and quickly. In late April 2009 Nova Scotia had the first cases in the country; school-aged youth contracted it while traveling in Mexico. The first wave had 582 cases with one death. Before H1N1 hit, public officials had spent 5-10 years developing pandemic plans for the health system at a very high level, but a lot of operational detail still needed to be worked out.

Typically, flu affects the very old and the very young. H1N1 was affecting not just young children, but also young adults, who usually are not as affected by influenza. There were similarities to the 1918-1919 outbreak where healthy people became sick and quickly died. Fortunately, H1N1 did not become widespread and instances of death were the exception, not the norm.

**Vaccination**

This was the largest-ever vaccination campaign in Canada. About 60% of Nova Scotians were immunized; the Atlantic Provinces did better than other parts of the country in this regard. As soon as H1N1 appeared, Canada had the foresight to order 50 million doses from a vaccine manufacturer, but it required six months to produce. The plan took into account that there would be no vaccine for the first several months, and focused on vaccinating as many people as quickly as possible. The governments also stockpiled antivirals; in Nova Scotia, citizens who were already ill and at high risk of contracting H1N1 received them for free.

Public opinion polling showed that a large percentage of the population did not want to get vaccinated. Two high-profile deaths of young people in Ontario in late October, however, dramatically changed public perception of the illness and the vaccine overnight and created a problem with supply. With a shortage, the vaccine had to be restricted to the highest risk groups. This created perception problems; people who felt they were at risk asked why they could not receive the vaccine. Elected officials supported the fact that the health department had an evidence-based approach, no matter how hard it was for people to understand.

Vaccination clinics were held, but there was a period of three or four weeks during which individual doctors could not obtain the vaccine because of the shortage.

### **New Strategies and Capacities**

Governments had to adapt to changing circumstances. Every day they were learning more about the epidemiology, which meant changing messages to the public from week to week, creating some confusion. They did not build in scalability, but planned for the worst-case scenario without considering that it might not be that bad.

With the first confirmed case of H1N1, health officials ramped up the regular system of tracking flu across Nova Scotia; they set up procedures for emergency rooms and tracked the number of people that were hospitalized. This greatly enhanced the surveillance system and will be the new norm for when the next strain occurs.

People with flu-like symptoms were urged to stay home and not go to the hospital or family doctor. If treatment were required, this could be obtained at one of 15 flu assessment centres. This helped avoid overwhelming existing healthcare resources and reduced the spread of the illness. These assessment centres can be reactivated quickly for other purposes, such as support for athletes at the Canada Winter Games, in order to avoid clogging up existing infrastructure.

ICU capacity was examined and a protocol developed to prioritize patients. Ninety additional ventilators were acquired. A province-wide approach was needed to determine who had the greatest need and where treatment could have the greatest impact.

Schools, workplaces and long-term care facilities were looking for information, so toolkits for the health and education systems were produced to provide good, accurate information on H1N1. The health department briefed elected officials so they had confidence in the department's decision-making process. There was a lot of pressure to close the schools, for instance, but evidence said it was not the right thing to do. Fortunately, Canada has an established mechanism in which health officials across the country participate in a monthly teleconference. This was helpful in creating a consistent national approach to setting priority groups for vaccines, for example. It would be much more challenging to deal with H1N1 in the United States, which has a very fragmented approach to health care.

### **Lessons Learned**

Provinces and territories are now involved in the development of vaccine contracts, which will help when considering the practical, frontline issues from which the federal government is somewhat removed. Increased use of electronic records and information

technology for public health would allow colleagues nationally to learn from one another, and scale their plans appropriately.

Prevention was the focus of the immunization program. Primary care is separate, but there is a lot of overlap between the two. Immunization is generally delivered by family doctors, who were expecting to receive the vaccine. Things improved as doctors and the department came to understand one another's roles.

We need to use 21<sup>st</sup> century communication tools to get information out in a timely manner and to counteract inaccurate and false reports. People 20-40 years old routinely use electronic communication tools, but they are generally hard to reach.

The real issue is maintaining public confidence and trust. The health department had to very actively engage the media. The messages conveyed in many editorials were not helpful, yet editorials play a critical role in communication strategies. Pandemic planning is moving ahead; the plan is to create an all-hazards approach, examining everything from strikes to mass casualties, by building capacities and relationships.

People tend to view infrastructure as bricks and mortar. In health we think of people. They are two sides of the same coin. If large numbers of people are sick with influenza, what is the plan to make sure we still have a reliable source of power, not just for hospitals but also for communities? A lack of heating or refrigeration can create huge public health issues. Telephones, communications and transportation systems are also critical infrastructure components that connect to the health sector.

• Eric Snow

## **Workshop Plenary 1 Capability-Based Planning for Disasters**

### **Panelists**

Chung Young Chang, Fo Guang University, Taiwan  
Chun Nen Huang, Central Police University, Taiwan  
Lew MacDonald, Saint John Fire Department, New Brunswick  
Mark Gillan, Saint John Fire Department, New Brunswick  
Russell Stuart, NS Department of Health, Nova Scotia

### **Moderator**

Ron Pelot, Dalhousie University

### **International Perspectives: CIP in Taiwan**

The morning panel represented a range of perspectives and experiences related to capability-based planning. Dr. Chung Young Chang began the plenary session by outlining the need for government reinvention to secure Taiwan's critical infrastructure against increasing vulnerability to natural disasters and industrial accidents. While still a new phenomenon in Taiwan, interagency coordination and public-private partnerships (PPP) have been internationally identified as the foundation of capacity building and critical infrastructure protection (CIP).

Efforts in Taiwan have only recently focused on coordinating and integrating existing CIP systems to enhance emergency preparedness and response agencies. Major reforms underway in Taiwan aim to enhance information sharing and resource integration through the establishment of a new department responsible for coordinating CIP. It is expected to begin operating in 2011.

Dr. Chun Nen Huang noted that every country has a different definition of CI risk. Using Taiwan's exposure to natural disasters as an example, he outlined a quantitative system of measurement for analysing risk for four factors: economic loss, affected population, public and private sector loss, and public morale and confidence. Nine sectors were identified in this analysis and then were evaluated on a measure of vulnerability and hazard risk. Using this analytical framework, Dr. Huang and his colleagues hope to integrate expertise across identified sectors to expand the knowledge base for enhancing CIP.

### **Capability-Based Planning at the Municipal Level**

Deputy Fire Chief Mark Gillan highlighted the need for investment in education and training at the local level of emergency response. Capability-based planning (CBP) can be defined as "preparing under uncertainty to provide capabilities suitable for a wide range of challenges while working within an economic framework that necessitates prioritization and choice". He asserted that the need for prioritization in planning is essential as municipal managers must be able to deliver services effectively while managing the expectations of the public.

Through the Chemical, Biological, Radiological-Nuclear, and Explosives (CBRN-E) and the Research and Technology Initiative, Lew MacDonald has helped to develop a framework for assessing capability needs and vulnerabilities along an event horizon continuum representing pre-event prevention and protection missions, and post-event response and recovery missions. Using this framework, Mr. MacDonald presented 37 interrelated target capabilities identified for pre-and post-event missions. Each capability represents the means to accomplish a mission and achieve coordinated performance across federal, provincial and municipal systems. The target capability list breaks down each capability into a definition and an outcome, and a relationship to an emergency support function. The list represents a common language between all responding agencies and levels of government to ensure an ongoing cycle of emergency preparedness.

### **Where the Rubber Hits the Road**

Russ Stuart underscored the importance of CBP at the moment when “the rubber hits the road” through an analysis of emergency healthcare response to the H1N1 pandemic that surfaced in Nova Scotia in 2009. Seasonal flu normally affects older members of the population, and the health care system is well equipped to deal with this annual phenomenon. With H1N1, however, children were particularly vulnerable. This changed the nature of the challenge and as result required a more innovative and far-reaching response.

Pandemics usually occur in three waves, and in order to develop an appropriate response to H1N1, threshold metrics were identified to alert healthcare managers and responders to proceed to the next stage of response. During the first wave of H1N1, only one flu assessment clinic was established in Nova Scotia for H1N1 testing. As more people became sick, additional flu assessment clinics were established throughout the province to confirm cases of H1N1. Once hospital admissions reached a critical threshold, the mitigating strategy was to determine resource allocation based on infection severity.

A theme that emerged from Mr. Stuart’s discussion of the H1N1 response was the need for scalability—responders must be able to “ramp up” and “ramp down” capability to ensure that resources and capabilities are being allocated in a way that aligns with demands for response.

• Jeannette Lye

## Break-out Session: *International Experiences with CIP*

Lead: Mark Gilbert, School of Public Administration, Dalhousie University

A participant noted that Canada seems to follow a *top-down* approach to both identify and plan around critical infrastructure sectors. Most participants agreed with this. The *top-down* approach has government ministers being identified as having jurisdiction over individual sectors, which are dealt with in the corresponding department. The approach emphasises government and ministerial accountability. A challenge faced by Canada due to its *top-down* approach is that responsibility over a sector may change depending on certain circumstances. When considering energy resources such as natural gas, for example, the jurisdiction over this sector could shift from Industry Minister to Natural Resources Minister to Transport Minister depending on where the resource is in its lifecycle. This process, it was agreed by participants, creates accountability issues and may not be the ideal means through which critical infrastructure can be addressed.

Participants discussed how other countries, including the United States and those in the European Union, tend to follow a *bottom-up* sector approach when it comes to critical infrastructure. The US, for example, involves stakeholders, uses a sector-assignment mechanism and evaluates its sectors annually, which includes identifying gaps and areas of overlap between them. In going through this iterative process, the US government ensures that policy challenges and infrastructure planning can be dealt with in a proactive manner.

Participants knowledgeable about Taiwan stated that both *bottom-up* and *top-down* approaches of infrastructure sector classification were informally applied in that country. A formal methodology would be difficult to develop, however, and would require contributions from government, legal officials and industry experts. Cultural considerations would also have to be taken into account, given the Taiwanese propensity to be critical of government, which would suggest that such prioritization would need to rely on comprehensive analyses and formal studies.

Discussing the Taiwanese context of critical infrastructure also allowed participants to learn that the water sector in that country was historically the responsibility of the Ministry of Economic Affairs due to the country's prioritization of economic development. The scarcity of water in Taiwan and the prominence of bottled water as a consumable also supported the sector being located in Economic Affairs (until recently). This discussion demonstrated how critical infrastructure in one country could be contextually different than it was in another country.

Participants engaged in a thought exercise to discuss where the water sector should be placed in the Canadian context. The multiple uses of water, including for power generation, agriculture, industry, drinking, IT resources and fire-fighting were all raised as actions that complicated the exercise. One participant asked if it made sense to have a single minister responsible for the water sector, given its multiple uses. While most participants stated that they would keep the sector in the Minister of Environment's portfolio, the Industry and Agriculture portfolios also had proponents. Further, some participants advocated for multi-jurisdictional committees to oversee this sector as municipal, provincial, First Nations and international stakeholders were also all of relevance.



A final thought shared amongst participants was that much remains to be learned about the resilience of Canadian critical infrastructure. Understanding the base operating levels at which society can still function for each sector is essential for planners and policy-makers so that critical infrastructure priorities can be set in an appropriate manner.

- Alex Szumilas

## **Break-out Session: *Ramping-Up and Ramping-Down***

**Lead: Wayne Boone, Carleton University**

This session examined the processes and dynamics involved in “ramping-up” from a baseline state in order to respond to a high-intensity situation, and then “ramping-down” post-crisis in order to restore the baseline, albeit altered, state. While ramping-up requires a transition to response and recovery efforts, organizations experience pressure from the public and other external parties to return to “business as usual” as quickly and seamlessly as possible. In order to enter the ramping-down phase, which focuses on restoration, however, organizations must first be able to ascertain that the high-intensity situation has been adequately resolved and/or addressed.

In order to begin ramping-down, participating organizations must agree on certain signals or threshold points that indicate the need for a high-intensity response has passed. This decision-making process regarding appropriate timing for ramping-down often includes conflict because various stakeholders employ different risk assessments and are motivated by different incentives. As one participant described, a response effort after an earthquake could include input from politicians, who want to respond to public demands to return to “business as usual”; business representatives, who want to resume operations as quickly as possible; engineers, who need time to verify the safety of structures; and geologists, who are wary of the potential for aftershocks. Since each of these stakeholders is operating with different priorities and degrees of uncertainty, their ability to collaborate may falter and result in disintegration of the unified command system established during the ramp-up phase.

Challenges of remaining in a ramped-up phase include bearing the extensive hard and soft costs of operations, including financial outlays, opportunity costs, inconveniences to the public and potential losses of organizational credibility when a ramp-up occurred, but the risk (e.g. a hurricane) did not materialize. Additionally, there is a toll on human resources, as staff members often reach a point of fatigue at which they are no longer effective. Finally, it can be difficult to determine at which point certain organizations should join, and then exit, the response effort.

Throughout the entire ramp-up and ramp-down stages, there must be continuous communication with the public to manage expectations for government response. A participant stated that members of the public often do not take personal responsibility for emergency preparedness and, instead, rely on public authorities to provide all needed information and recovery services. It was noted by a participant that communities that contributed to their own post-Katrina rebuilding were much more successful than those that waited for authorities to initiate the response. Public messaging must focus on self-reliant ways to prepare for significant events. Finally, communications must redefine, as opposed to simply manage, public expectations. Government must lead the way in acknowledging that the baseline state never again will be the same. Indeed, an important aspect of the ramp-down process is assisting the public to adapt to a new, post-crisis reality.

• Laura MacLean

## **Break-out Session: *Capability-Based Planning***

**Leads: Lew Macdonald and Mark Gillan, Saint John Fire Department, NB**

Participants indicated that emergency planning organizations in Canada are moving toward a new approach to emergency response known as capability-based planning (CBP). CBP involves identifying the necessary tasks and capabilities required to respond effectively during a disaster, determining roles and responsibilities for emergency response, and initiating collaboration among key players of the emergency management community.

Participants identified several benefits of using CBP from a public security perspective. For example, its collaborative approach brings together various players from the emergency management community, with different response capabilities, in order to identify gaps in emergency planning measures and find solutions. CBP also provides an opportunity to develop exercises or scenarios for disaster planning that contribute to the community's ability to implement planning initiatives before disasters take place. Participants also identified that CBP encompasses a cost-benefit component, in which cost effectiveness is improved through the collaboration of various stakeholders in the emergency management community and the use of scenario planning to increase the efficiency of response measures.

Participants noted that there are numerous challenges to implementing CBP, including the need for leadership in order to support initiatives, motivate higher levels of government to take action and initiate collaboration among key players. Furthermore, information-sharing between partners was identified as a challenge due to the number of players involved in various forms of emergency management. Participants also noted that stakeholders could be reluctant to identify gaps in emergency planning, as taking on additional areas of responsibility can create liability issues. Moreover, concern was expressed about the limitations of scenario planning, as there will always be 'unknown unknowns' or surprises arising along the way. And finally, participants identified the issue of sustaining a reasonable amount of commitment to planning for low-probability events, which can be a challenge to maintain.

Participants discussed several requirements that must be met in order for CBP to be effective. They noted that the cooperation level among members of the emergency planning community determines the scope of the process and in Canada this is a difficult group to motivate due to the size of the country. Therefore, communication initiatives through practical, on-the-ground work are necessary in order to disseminate information to the community, elicit cooperation and determine roles. Furthermore, a common language among the emergency planning community is needed so that stakeholders can develop a shared understanding of the issues and agree to a course of action. Participants agreed that there is a need to identify gaps and issues at the local, provincial and federal levels, and to ensure that all three levels have appropriate emergency support functions in place. They further identified that it is necessary to meet government expectations in order to secure funding for CBP exercises; otherwise these initiatives cannot be undertaken. Therefore, proposals must demonstrate the benefits of CBP in reference to government interests, including financial benefits, public safety and the inclusion of stakeholders.

• Rachael Weir

## Workshop Plenary 2 Media Coverage of Canadian and International Disasters

### Panelists

John Quigley, Strathclyde University  
Kevin Quigley, Dalhousie University  
Penney Young, Dalhousie University

### Moderator

Rick Garber, Defence Research and Development Canada

While it is accepted that much of the public base their perceptions of risk primarily on information presented by the media, Kevin Quigley cautions that the link between media coverage and public risk perception may be lessened by the degree of personal impact an event has on the audience. As such, Dr. K. Quigley emphasises that there is value at looking at the media coverage, not necessarily to understand its relationship to public opinion, but as an ongoing assessment of government and industry performance during critical infrastructure (CI) events.

To investigate media coverage, researchers at Dalhousie created a database to capture information on the number of articles written exclusively on an event, the tone of headlines and performance assessments of government and critical sectors. High-profile events that were comparable across the United Kingdom, Australia, Canada and the United States were selected for inclusion in the database. Events selected for study included the Canberra bush fires, Hurricane Juan, Potters Bar train accident, the Toronto propane explosion, the Texas City refinery explosion and others. This selection allowed for a comparison across types of events as well as an investigation of the unique characteristics of each country that may account for some of the variance in media coverage across countries. Sources for media articles were restricted to national, well-distributed newspapers that provided coverage of domestic events.

Researchers noted that natural disasters tend to receive more media coverage because such events lend themselves to a variety of dramatic photos and affect a large segment of the population. In addition, because causal linkages appear to be straightforward, less background research is required. Conversely, industrial accidents receive less media attention because they require a significant amount of knowledge in order to present an explanation. While natural disasters receive the most media attention, the coverage of industrial accidents tends to last longer, indicating that less coverage does not necessarily indicate lesser concern.

Penney Young further explained that the tone of coverage of industrial accidents was found to be significantly more alarming in all countries when compared to coverage of natural disasters. Despite a significantly high volume of coverage, H1N1 did not receive an especially high level of alarming headlines, nor did reports of failed terrorism.

Results from comparisons across countries revealed that Canada and Australia were comparable in amounts of coverage across all types of events, while events in the United States received the least amount of coverage. The United Kingdom was found to have a greater number of alarming headlines.

Joining the plenary session via video conferencing from the United Kingdom, John Quigley described the study's findings related to performance evaluations of government and industry in media coverage. Using statistical analysis, he investigated differences between event types, time trends, and associations between events and countries. It was found that 55 per cent of the articles included in the analysis evaluated government performance negatively, while only 19 per cent gave positive evaluations. Failed terrorism events were found to have a statistically higher proportion of positive evaluations in comparison to industrial failures and pandemics.

The analysis revealed a significant association between time and assessments of government. Fewer negative assessments were found within the first 12 days of event coverage and, over time, the number of negative assessments increased at the expense of positive assessments. It was also found that within the first 12 days of event coverage, government and industry performance evaluations were strongly correlated—when assessments of industry were negative, assessments of government were also negative.

Kevin Quigley concluded that media assessments of performance, particularly for complex industrial failures, suggest that government and industry performance is explicitly tied in the “hunt for accountability”, making it difficult for governments to dissociate themselves from industrial events. Drawing on the response of the United States government to the recent BP oil spill, Dr. Quigley reiterated the strong association between government and industry performance and the increasing public demand for governments to consider their role in response to CI failures.

• Jeannette Lye

## **Break-out Session: *Industrial Failures***

**Lead: Mary R. Brooks, School of Business Administration, Dalhousie University**

When discussing whether accountability is clear in relation to industrial failures, participants agreed that after a disaster has occurred, gaps can be identified right away, but it is difficult to determine who is accountable; it takes a long time to gather the information necessary to present a clear picture of what went wrong. Participants indicated that if the industry that failed is owned privately, then accountability is usually determined after a lengthy legal process. Participants also noted, however, that the private sector might be quicker to accept accountability for an industrial failure if the issue is constantly publicized in the media.

Participants further identified that, in reality, whether the industry is publicly or privately owned, the public tends to see the government as accountable. This could be due to the fact that citizens may not know who provides these services or it may be due to a public expectation that government has a role in ensuring industrial safety, for example through regulations or setting legislation.

Participants agreed that although it is difficult to determine who is accountable when an industrial failure first happens, there is the ability to present clear information to the public surrounding what is being done to rectify the situation. Therefore, government's role can be seen as informing the public of facts and reassuring citizens that things will be taken care of. Participants also saw the speed of response by government as an important indicator in terms of having control over the situation.

When discussing what an appropriate role for government would be in dealing with the media in advance of a disaster, participants agreed that advance planning for an industrial failure is difficult, as these events happen suddenly. Unlike planning for a natural disaster such as a hurricane or earthquake, it is impossible to disseminate plans of action for industrial failures in advance, as there is potential for this to cause panic. Participants did agree that one form of action that can be taken in advance by government is to ensure that departments have a clear understanding of and are familiar with the language surrounding their areas of responsibility. This will influence the organization's ability to get an appropriate message out quickly through the media when a crisis event does occur.

When discussing what an appropriate role for government is in dealing with private industry in advance of a disaster, participants identified that the government should be involved in enforcing regulations, as failure to follow regulations is often the cause of industrial failures. It is also important for government to meet with private owners in order to review emergency plans. Government is usually responsible for emergency preparedness, but there is a need for the private sector to have greater involvement in this area. Participants also saw government as playing a role in reviewing communication strategies with private sector owners in order to ensure that they are prepared to provide the public with appropriate information in the case of a disaster.

• Rachael Weir

## **Break-out Session: *Media and Risk Communication—Health and Food***

**Lead: Martine Durier-Copp, Dalhousie University**

This session examined the nature of media coverage of food and health issues, with particular focus on how the media facilitates collective learning in these sectors. The role of government in such situations was explored, with discussion on the appropriate management of the amount, timeliness and quality of information that is disseminated to the public.

Recent research by K. Quigley et al. found that the level of alarm and the volume of media reports on food and health were quite similar to that of reports on other types of disasters, although the volume of reports on the H1N1 epidemic was substantially higher than others. A participant also noted that higher alarm is attributed to cases of deliberate contamination, which can be considered a form of terrorism. Additionally, higher volumes of media coverage, as well as more alarming coverage, are often exhibited in situations in which failures of accountability are perceived as causes for contaminations. For example, one participant stated that the Walkerton, Ontario, water contamination attracted a great deal of coverage because it involved lapses in accountability and a lack of principled actions demonstrated by involved individuals.

The media often plays on the conflicts that exist between the regulatory role of government and the business role of industry in cases of food-related disasters. When an incident occurs, the media captures the process of “finger-pointing” that occurs between these two sectors. Blame-shifting has become normal because there is much uncertainty as to who should be held accountable for lax industrial standards. The media tend to amplify and sensationalize these dynamics in order to produce more engaging stories.

The media can also provide the public with misinformation, or can blow certain information out of proportion. One participant noted that the latter occurred after a young boy died of H1N1 in Ontario; the volume and nature of the subsequent media coverage caused widespread anxiety among the population and precipitated panicked rumours that there was not enough vaccine for the whole population. In situations such as this, the media should be held to a code of ethics and accountability for the adverse effects on the public that it causes.

Government should actively correct any misinformation disseminated by the media, as doing so can be an important way of ensuring that the public has received clear communications about sensitive issues or events. It is important for government to recognize that any vacuum of information on a certain topic will rapidly be filled by other sources, so it must be proactive in developing communication strategies and providing information when it is required. Due to an increased demand for information, the public is no longer satisfied with media statements of “no comment” from government officials. The use of the media can indeed be a very positive tool for government, as it is extremely effective in getting timely information to the public, and doing so can save lives during emergencies. Finally, it was noted that undemocratic countries, such as China, are much better at managing media dynamics because they are less concerned with transparency and can apply command-and-control frameworks to the management of information.

• Laura MacLean

## **Break-out Session: Natural Disasters, the Media and CIP**

**Lead: Lucia Fanning, School for Resource and Environmental Studies,  
Dalhousie University**

Media coverage of natural disasters has the potential to hasten a government's disaster response as well as serve as a tool, *post-hoc*, from which to learn. In order to serve these purposes, however, media reporting must be fair and objective. During the 1989 Loma Prieta (San Francisco) earthquake, one participant recalled, some journalists made sensational and false claims about the loss of life. The result of these inaccuracies was that public managers had to expend valuable time dealing with these errors, which took away from the actual disaster response.

Participants agreed that media professionals need to undergo continuous professional training. This training must include journalistic ethics and some kind of core responsibilities to ensure that media professionals relay accurate information to the public and to government. It was also agreed by participants that governments could support media training through their information officers (who already meet with media professionals approximately once per month). These meetings could be used as an avenue through which the government could emphasize responsibility to the public. For example, informing reporters of government information dissemination processes could curb unjust usage of phrases such as "department refused to comment". Lastly, when there is significant foresight ahead of natural disasters, media could be briefed on government priorities, plans (including how military intervention may come about) and management frameworks, which would give media professionals an informed perspective as well as allow them to focus on issues that would help mitigate damages and prevent the loss of life.

Participants noted that there was a discrepancy between what was reported nationally about Hurricane Juan and the perceived reality on the ground. Participants offered anecdotes about how Environment Canada was perhaps unfairly criticized by the media after Hurricane Juan for not sufficiently warning the public about the hurricane. Indeed, government news outlets *were* providing constant alerts and warnings in the days leading up to the hurricane's landfall. Participants speculated that in fact the private media outlets may not have emphasized the dangers of the hurricane enough. One reason suggested for this was that some of the news outlets have headquarters outside the region and as a result, the media sources and their audiences were too removed from the on-the-ground reality.

Some participants commented that when citizens pay relatively high taxes, as they do in Canada, they have an especially high expectation of government, including response times after natural disasters. They need to realize that there will always be lag time in response after a disaster, however. Participants also discussed the extent to which citizens must be able to cope on their own after disasters occur, at least for a period of time. Participants noted that citizens must inform themselves of the news, too. Lastly, it was discussed whether urban and poorer residents would be as resilient as rural residents when disasters occurred. The answer to this question could not be generalized, but it was agreed that disaster planning would have to accommodate the diversity of needs in urban settings.

• Alex Szumilas



## Appendix 1: The Program

### CRITICAL INFRASTRUCTURE PROTECTION WORKSHOP – OCTOBER 28, 2010

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4:00–5:30 PM

#### Keynote Address

Louise Comfort  
Director, Center for Disaster Management, University of Pittsburgh  
*Designing Resilience for Communities at Risk*

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5:30–7:00 PM

#### Reception

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### CRITICAL INFRASTRUCTURE PROTECTION WORKSHOP – OCTOBER 29, 2010

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8:30–8:45 AM

#### Welcome Address

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8:45–10:10AM

#### Capability-Based Planning During a Disaster

Panel

Chair Ron Pelot, Dalhousie University

Panelist Chung-Young Chang, Fo-Guang University, Taiwan

Panelist Chun-Nen Huang, Central Police University, Taiwan

Panelist Lew MacDonald, Saint John Fire Department, NB

Panelist Mark Gillan, Saint John Fire Department, NB

Panelist Russ Stuart, NS Department of Health

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10:10–10:30 AM

#### Nutritional Break

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10:30–11:20 AM

#### Breakout Session #1 Ramping Up and Ramping Down

Lead Wayne Boone, Carleton University

Lead Mark Gilbert, Dalhousie University

Lead Lew MacDonald & Mark Gillan, SJ Fire Department, NB

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11:20–12:00 PM

#### Report Back: Discussion of Breakout Sessions

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12:00–12:40 PM

#### Lunch

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12:40–1:30 PM

**Lunchtime Speaker**

Dr. Robert Strang  
Nova Scotia's Chief Public Health Officer

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1:30–3:00 PM **Media Coverage of Canadian and International Disasters**

Panel

Chair Rick Garber, Defence Research and Development Canada

Panelist John Quigley, Strathclyde University

Panelist Kevin Quigley, Dalhousie University

Panelist Penney Young, Dalhousie University

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3:00–3:20 PM

**Nutritional Break**

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3:20–4:20 PM

**Breakout Session #2**

**Media and Risk Communication**

Lead Mary Brooks, Dalhousie University

Lead Martine Durier-Copp, Dalhousie University

Lead Lucia Fanning, Dalhousie University

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4:20–4:45 PM

**Report Back: Discussion of Breakout Sessions**

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4:45–5:00 PM

**Closing Remarks**

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## Appendix 2: Workshop Chairs

### **Dr. Kevin Quigley, Dalhousie University**

Kevin Quigley specializes in public sector risk and strategic management. He is the principal investigator for the research initiative Critical Infrastructure Protection in Comparative Perspective, which is supported by the Social Sciences and Humanities Research Council of Canada. In 2008 he published *Responding to Crises in the Modern Infrastructure*. He is also a co-investigator for Dalhousie's Critical Infrastructure Protection (CIP) Initiative and the editor of *The CIP Exchange*. Dr. Quigley obtained a PhD from Queen's University, Belfast, and a Master of Science degree in Public Administration and Public Policy from the London School of Economics and Political Science. Prior to starting his graduate work, he had been a senior public servant in the Ontario Public Service.

### **Dr. Ronald Pelot, Dalhousie University**

Ronald Pelot is a Professor of Industrial Engineering at Dalhousie University, where he was also the Director of the Centre for Risk Management from 2005 to 2008. He conducts risk research in several areas including maritime risk, environmental risk and critical infrastructure protection. He founded the Maritime Activity and Risk Investigation Network (MARIN) at Dalhousie, and since 1997 has developed new software tools and methods applied to maritime safety (accidents), security, marine spills, and coastal zone management, in collaboration with the Canadian Coast Guard and several other government departments. Dr. Pelot has authored 43 refereed publications, and over 120 conference proceedings and technical reports.

## **Acknowledgements**

### **Workshop Organizing Committee**

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Patrick English, CSIS  
Mark Gilbert, Dalhousie University  
John Kirschner, Public Safety Canada  
Lew MacDonald, Saint John Fire Department  
Keith McGuire, RCMP  
Ron Pelot (Co-Chair), Dalhousie University  
Kevin Quigley (Co-Chair), Dalhousie University  
Jim Stewart, Dalhousie University / Defence Research and Development Canada  
Russell Stuart, Nova Scotia Department of Health  
Penney Young, Dalhousie University

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Carleton University  
Central Police University (Taiwan)  
Dalhousie University  
Defence Research and Development Canada  
Fo-Guang University (Taiwan)  
Nova Scotia Department of Health  
Saint John Fire Department  
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