

## FORENSIC ENGINEERING NEWS AND VIEWS

Fall 2011



### Seasons Greetings

2011 has been another eventful year for us and for many of our customers. 2011 will be remembered in the insurance industry as the year an F3 tornado devastated the town of Goderich. We have dedicated this issue of our newsletter to provide a summary of some of the investigations that we conducted in the early days of the aftermath of the tornado. We hope the new year brings with it, a speedy recovery for Goderich and its people.

We appreciate your business which has allowed us to continue to grow in 2011: **Peter Johnston P.Eng.** retired as a Toronto firefighter this past spring and now has dedicated more time to working with us on product failures; **John Morgan P.Eng.** joined us this past summer as an associate who specializes in building science; **Liz Falsetto** joined our office in May to assist with administration and enable us to have our head office open each day Monday to Friday from 9am to 4:30pm (our phones are answered 24 hours per day, 7 days a week); **Glenn Tatsu** joined us as our draftsman allowing us to better serve our clients with drawing preparation; and we hired our first co-op student, **Greg Bolzon**, who has assisted Bob with environmental assessments.

Holiday Hours: Although we are closed on December 26 & 27 and January 2, in the event of an emergency please call us, our phones will be answered.

From all of us to you, we hope that the holiday season finds you and yours well and we look forward to working with you in 2012.

### Plastic Tubing and Water Damage due to Freezing

By Peter Johnston

The use of plastic tubing commonly known as PEX tubing is on the rise in Ontario. This is primarily because the PEX line of plumbing products is less expensive and easier to install than the more traditionally used copper tubing.

The term PEX has been coined from the raw material used to manufacture the tubing. PE is a common abbreviation for the plastic polymer polyethylene. The X is added to indicate the molecules in the PE have been cross-linked. The common standard given for PEX tubing in Ontario is: *CSA B137.5 crosslinked polyethylene (PEX) tubing systems for pressure applications.*

PEX tubing is inherently more resistant to freeze damage than copper tubing. Generally speaking, freezing of water within a length of PEX tubing can occur without damage to the tubing; whereas, water freezing in a copper tube often results in a length wise split of the tubing. The inherent resistance to freeze damage that the PEX tubing displays is a significant benefit that should result in a reduction in claims, as more PEX is installed. PEX tubing and PEX installations, however, should not be considered to be 'freeze proof' as PEX tubing in certain circumstances could rupture due to freezing water.

In a household, there are a number of brass valves and copper fittings that are used to control the flow of water within the home and to provide connections, bends and transitions where necessary. These fittings, being less resistant to freezing than plastic tubing, are the weak links that can rupture and result in a water damage claim. The fact that a residence has been plumbed with plastic PEX tubing does not mean it is immune to damage due to freezing of the plumbing.

It is important to properly protect temporary residences in Ontario from the damage that can be caused by freezing during our cold winter. Shutting off a buildings water supply is a good start, as it will stop an uncontrolled flow of water into a structure due to a leak. Draining of plumbing lines is required to prevent freeze damage which is typically seen in the form of fractured valves, burst pipes and tubing, and broken solder joints.



# Dealing with Catastrophes



*By Rene Caskanette*

August 21, 2011 is a date that everyone in Goderich and surrounding areas will remember forever. That day their town was ravaged by an F3

tornado that turned Ontario's Prettiest Town into a disaster zone in just 18 seconds.

Over the years our firm has been involved in many large scale disasters with wide spread property damage and a large volume of claims. Tornadoes in Leamington, Durham, Vaughn, Conestoga Lake; house explosions in neighbourhoods in Cambridge and Brantford; propane explosions in Toronto (Sunrise Propane) and Grimsby; and municipal sewer backups with multiple basement flooding claims in Hamilton and other municipalities.

Based upon these previous experiences, we have geared ourselves up to respond quickly and efficiently to these situations, providing our clients with the quick answers they need to deal with their clients.

Building owners and tenants with significant damage to their property expect quick service and answers so they can move forward. Stress levels rise and slow service just compounds problems. With this in mind we have assembled a team of experts and administration staff to respond rapidly to these events.

The tornado happened on a Sunday and our calls started on Monday, first a trickle and then a flood. Our administrative staff set up a special on line computer data bank accessible from our smart phones in the field. They built up the list as calls



were received and our engineers in Goderich were able to divide and conquer the list quickly.

We had 5 structural engineers in Goderich the first week, and we kept engineers in Goderich every day for 5 weeks until things calmed down. We also had 2 asbestos experts in Goderich sampling buildings before demolition. We were able to provide next day reports on hazardous materials so contractors could move quickly with demolition activities in these buildings.

We were able to handle over 120 Goderich claims in just a few weeks with multiple site visits and reports required on many of those projects. This was in addition to our normal full workload, requiring many hours of overtime from our dedicated staff. We received a few inevitable complaints along the way, but our client feedback was overwhelmingly positive.

Every time we experience one of these catastrophic events, we get better at handling the special demands they put on our firm. Based on lessons learned at the Sunrise Propane explosion site, we offered our regular clients flat rate pricing for multiple assignments in Goderich. This special pricing arrangement was appreciated by clients who were able to save some money using this offer.

Goderich Square was a special challenge for us, since it was closed for several weeks, with daily permits required for access. Police and security were present in abundance to enforce the rules, so each day we lined up at the Town Hall and applied for our permits before we could begin our work in the restricted zone. Full protective gear including asbestos masks and fall arrest equipment were required by Ministry of Labour inspectors who were patrolling the square.

We got to know the town staff very well during this time, especially the Chief Building Official since we were also inspecting his house after it was damaged by the tornado. We learned more about dealing with repairs and demolition of designated heritage sites since the entire Square was a designated area. Permits for demolition of these buildings required extra levels of reporting and review before approvals could be obtained.

Happily, Goderich is getting back on their feet, with an influx of \$100 million insurance dollars and more money from other sources to help rebuild. We are pleased that we could play a part in allowing this work to progress quickly for the benefit of our clients and all those living in the affected area. When the next disaster occurs we are here and ready to help.



# Separating New Damage from the Old



**By Jeff Udall and  
Micheka (Caskanette) Kostyniuk**

We recently spent a lot of time in Goderich after a devastating tornado damaged or destroyed a sizeable section of the southwestern Ontario city. Many houses and buildings were scheduled to be demolished after roofs were blown off and walls collapsed. Other buildings were damaged but could be repaired. The lucky ones had no damage at all. We were called in on many files to decipher what damages were caused from the tornado, and what damages were pre-existing. Many home owners will examine their houses with much thoroughness after an event like this and will often find problems. Sometimes they find structural problems that were unrelated to the loss, but just never noticed in the past.

Appearances can be deceiving when looking at tornado damage. People may walk through their

homes and see cracks everywhere in plaster, drywall and other finish materials, warped exterior siding, or doors/windows that are out of alignment. This can lead them to believe that their house has sustained extensive damage and is unsafe, and that as a result it will need to be demolished and rebuilt. In many cases, this is not the case. Wood framed buildings are incredibly resilient. They can move and shake during tornados, vibration, high winds, etc and go back to their original position with no long term effects that would compromise their structural integrity. Finish materials, on the other hand, are rigid and do not have the same kind of give that the wood framing does, and as a result can have extensive cracking.

When we are asked to examine the condition of a house after the tornado, we look for many things that provide evidence of what caused the problem and when it occurred. First of all, does it make sense that the damage was caused from the event? We looked at a number of houses where the homeowner found cracks in the foundation. Depending on the damage to the rest of the house, there was often no reason why a foundation would crack if the windows and roof were not damaged by the high winds. We would look for construction around the 'damage' to give us an idea if the condition was present before the tornado. Things like sloping floors, tipping

walls, and sagging roofs may very well have been caused by the high winds, but if the interior drywall and trim has been cut to fit these crooked shapes, then it is clear that the floor, wall, or roof was in this condition long before the tornado came through.

Another contentious issue was cracked framing lumber. Many of the houses affected by the tornado were old, built in the first half of the 20th century. The lumber was larger and building standards were different. Home owners, contractors, and other engineers often drew our attention to the cracks in various sections of wood. These cracks were often attributed to the tornado damage from shifting of the house or impacts from flying debris. We would examine the cracks and determine if they were new or old by considering a few key points. Again, does the damage reflect the cause? A floor joist in the middle of the house really should not be damaged from wind - at least not without considerable obvious surrounding evidence. Second, does the crack look like it should given the expected mode of damage? Old dry wood will crack in certain ways with age, while wood that has been damaged will crack in different ways depending on what happened to it. Third, does the crack look new? Wood surfaces that are exposed to oxygen will turn grey with age. Wood below the surface will not change colour to the same degree. So when a crack is found, examining the interior of the crack will give clues to how new it is.

We looked at several commercial buildings that were damaged by the tornado. These inspections were different than the residential inspections. Whereas most residential buildings in Goderich were wood framed, most of the commercial buildings were a combination of structural brick walls with wood and steel floor and roof framing. Structural brick buildings do not have the same flexibility that the wood framed buildings have. When the brick cracks, shifts, twists, or is damaged in other ways, the damage may look minor to the casual observer but can be a major structural concern that requires extensive repairs.

In addition to determining what damage was pre-existing and what damage was new, Goderich presented a number of other challenges. Many of the buildings had a heritage designation, which required additional considerations for repairs and/or demolition to ensure they complied with applicable heritage regulations and rules. There were a large number of commercial buildings damaged during the tornado. Many of these buildings had common party walls. Communication and cooperation between neighbours becomes important so that an adjacent property isn't damaged during repairs or demolition activities.



# Hazardous Materials in Buildings



*By Bob  
Caskanette*

Hazardous materials are present in many older buildings that must be identified quickly and properly to ensure project delays are minimized following a major loss. Designated substance regulations have been developed for eleven (11) contaminants and are enforced by the Ministry of Labour under the Occupational Health and Safety Act of Ontario (Ontario Regulation 490/09). Contamination of the environment can result from building demolition activities, renovations, or any other building disturbance. Of the eleven designated substances, the main designated substances dealt with on a regular basis in residential and light commercial buildings include asbestos, lead and mercury.

Following the large tornado loss in Goderich this past summer, several buildings were left in need of significant repair or demolition. It was critical that parties of interest such as insurance companies, building owners and contractors had the answers they needed in regards to building materials of concern prior to conducting any remedial work. Our team of experienced experts handled several hazardous materials assessments in a very short period of time with a key focus on fast laboratory turnaround times. In most cases formal reports were delivered the same day or next day following our site assessment.

## Recent Training

Our staff remains committed to on-going education. Staff have attended the following courses in the past few months:

- Bob : Certified Vehicle Fire Investigator
- Micheka : Investigation of Gas and Electric Appliance Fires  
Design and Analysis of Earth Retaining Walls
- Peter : Advanced Fire and Explosion Investigation  
Fundamentals of Glass Science and Technology

The major asbestos containing materials (ACMs) of concern identified in the various buildings included vermiculite insulation, vinyl floor tiles, flooring mastic, sheet flooring, ceiling tiles, drywall compound, plaster and lathe finishes, texture coat finishes, exterior siding, transite, pipe wrap insulation, and so forth. In some cases, lead based paint (LBP), mercury (such as in thermostats), formaldehyde (such as in urea formaldehyde foam insulation (UFFI)) and mould growth were also concerns. Dust and debris which entered into buildings during the tornado through broken windows or other voids often required analysis to identify if potentially hazardous compounds were present.

This presented a difficult challenge, complex building assessments and long days due to the high volume of work required in a short period of time, but it was a challenge we were pleased to accept. Potentially costly project delays were avoided and we were able to give our clients peace of mind with the fast answers they required to move forward.

## A Co-Op Student's Perspective at Caskanette Udall

*By Greg Bolzon,  
University of Waterloo Co-Op Student*

When searching for a co-op job, you never know what to expect from just a title and a two sentence description. But when I saw the position for a forensic engineering student, my curiosity sparked.

That spark was nothing like the explosion I felt my first day on the job when I was placed smack-dab in the centre of Goderich after the tornado. I was on the job in a disaster zone, learning the trades of the company. It was definitely the best first day ever.

Since then I have accompanied the staff on many jobs, gaining insight on the various services Caskanette Udall provides. From my first day sampling asbestos in Goderich and mould assessment and abatement, to slip and fall claims, to fire cause and origin, I have valued the knowledge I have gained, but the staff even more.

I have enjoyed my time here at Caskanette Udall. Their attention to detail and commitment to perfection has pushed me to learn and strive for excellence so I can come back and work here full time when I graduate.



*Rene, Micheka and Jeff channeling their inner Roman at the 2011 Provincial Claims Conference, Caesars Palace, Windsor.*

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