

FORENSIC ENGINEERING NEWS AND VIEWS

At this time, our offices continue to operate as an essential service, conducting site visits while following health and safety guidelines including the use of PPE and physical distancing.

Spring 2021

Presidents Box



By Rene Caskanette

Here we are in lockdown 2021, in the never ending battle with a coronavirus. I'm sure most thought it would be over by now after a couple of previous lockdowns, but no such luck. Starting to hear rumblings about opening up in the summer after the vaccines do their work, so something to look forward to. Get that border open so we can migrate south again in the fall.

In spite of the troubles the virus has brought us, the economy seems robust with real estate leading the way and the stock markets and bitcoin remaining strong. Our consulting business saw an initial impact during shutdown 1, but the latest shutdowns have not been impactful on us. We continue doing our thing working from home offices as we always have.

Seems like a lot of house and barn fires this year, with people home more the cooking fires, smoking fires, barbecue fires, fireplace fires and other similar fires have more opportunity to develop.

Municipal offices are trying to adjust and provide permits for renovations, but the process is not as smooth in some areas as others, making the projects slower than normal. With rising material costs the price for repairs is also moving upwards.

Courts are still operating but much slower than previously, so litigation is bogged down. We are put on notice to testify often, but most trials never proceed on schedule, with long delays in some instances. It is expensive to do the trial preparation required before testifying and then be told the matter has been adjourned for another 8 months, at which point the preparation needs to be repeated driving up hourly fee accounts.

Our team is working hard and working safely as we navigate through the new normal. I'm sure it will never get back to pre pandemic business models. Companies have made many operational changes and some of those are bound to stick, such as work from home offices. As a small employee owned company we have the ability to change and adapt to provide expert services to our many clients, regardless of the model they plan to follow.

If your company is looking for expert speakers via zoom or other media, to augment staff training, we are happy to tailor a program to your requirements on any engineering related topics. Just give me a call and we can get started. Have a great summer, we all deserve one.

Tornado Season is Upon Us



By Jeff Udall

Every summer, southern Ontario experiences severe weather events that sometimes include tornados. While most of the time a tornado will touch down in some remote area and no one notices, sometimes it will strike a community and devastate peoples lives from wide spread destruction of property. Caskanette Udall has worked on many tornado events in various capacities over the years.

After the storm has left, first responders are on site immediately working to help victims and clear debris. Engineers are required to work with first responders to assess building safety before anyone can enter. If a building is not stable, it is an ongoing safety hazard that needs to be stabilized or demolished to a point where emergency personnel can enter to complete their work. We will work with first responders and contractors to acquire the machinery, materials and equipment needed to make a building safe.

Assessing the damage to buildings is the first step in determining how to repair a building. Sometimes the building is obviously damaged beyond repair and demolition is the only option. But the damage can vary widely from full destruction to simple mysterious cracks in a wall or ceiling. With our lengthy experience in assessing damage from tornados, explosions, and high wind events, we can examine the damage and determine if it is related and give the best course of action for repairs. We will provide a preliminary assessment that will allow the insurer to establish a course of action and set reserves. We then do a more thorough assessment after tearout of the interior finishes and provide a complete scope of structural repairs and engineered drawings.

Working in a disaster area requires fast thinking and coordination with multiple parties on multiple properties. One must understand the immediate needs and provide information on a timely organized basis. But less severe claims will also follow in the coming weeks or months. As time passes, it becomes more difficult to distinguish between a pre-existing problem and a new issue. Having experience with losses in the immediate aftermath of a tornado greatly helps with deciphering unrelated claims.

Caskanette Udall has the experience and tools necessary to hit the ground running when the next tornado strikes. Call us. We're ready.

A New Year and a New Fuel Code



By Alex Caskanette

The Technical Safety and Standards Authority (TSSA) is the delegated administrative authority that was established by the Government of Ontario to be responsible for the administration and enforcement of public safety laws in various sectors under the (Ontario) Technical Safety and Standards Act, 2000. The TSSA was established in 1997 and is a not-for-profit and self-funded

organization.

The TSSA delivers public safety services on behalf of the government of Ontario in three main sectors. These sectors include:

- Boilers, Pressure Vessels and Operating Engineers.
- Elevating Devices, Amusement Devices and Ski Lifts.
- Fuels.

The TSSA promotes and enforces public safety. One of the ways they accomplish this task is by supporting the development of regulations, codes and standards. For example, the Sixteenth Edition of the CSA B149.1 [Natural Gas and Propane Installation Code](#) is out now and comes into force on May 1st, 2021. The CSA B149.1 specifies installation requirements for various appliances, equipment, engines, turbines, and other components that utilize natural gas or propane as a fuel source.

The Sixteenth Edition of the CSA B149.1 updates a number of the requirements found in the previous edition of the [Natural Gas and Propane Installation Code](#) that was published in 2015. One particularly major change we note in the newest edition is the introduction of a new mandatory Appendix that specifies acceptance criteria for the visual inspection of welds. The CSA B149.1 now requires that the installation contractors visually inspect completed welds along 100% of the weld length on the outside surface of a pipe for imperfections.

Additional methods that the TSSA uses to protect both industry participants and the general public is to influence training institutions to correctly train, examine and certify trades people, register plants and equipment, and license devices, sites and contractors. The TSSA also conducts inspections and audits of trades people, contractors, plants, equipments, and sites for compliance with relevant codes and regulations.

Our engineers at Caskanette Udall Consulting Engineers keep up to date on the latest TSSA announcements and the CSA standards which we use frequently in our investigations. Many of the component and equipment failures that we investigate are directly a result of noncompliance with the applicable codes which is usually due to negligence of the installer or maintenance contractor.

If you encounter a loss that involves fuel burning systems, elevating devices, boilers, or any other type of specialized equipment, reach out to us to see if subrogation is an option for you.

Identifying Age of Mould in a Water Loss and Special Challenges of Sewer Backups



By Bob Caskanette

Appropriate remediation of buildings affected by sewage backups can be a special challenge, since large numbers of buildings can often be affected by a single storm incident. Building restoration following a sewer backup or any water loss should occur quickly to remove excess water and solids and address affected building materials. The work should be completed by a

certified professional restoration contractor. Often these firms are stretched to their limits by major flood incidents with multiple sites to attend, so being efficient in their work is critical.

Mould growth can occur in as little as 48 hours time following a water loss, provided conditions are appropriate. If a professional consultant is brought in quickly following a loss, mould sampling can be done to determine if pre-existing mould growth already exists in the home. This information can save considerable money on the remediation project for the insurance company in excluding older damages. While there is no laboratory test available to tell you the exact age of any mould, a fast response time, site inspection and sampling following the loss, along with our expert observations and analysis can often provide answers as to when the mould growth began and the source or sources of moisture responsible. There are many other indications of potential older pre-existing damages within a building which our experts are trained to identify.

If certain mould species are identified in a timeframe that is not consistent with their required growth phase, this can indicate it is a pre-existing condition. We work with contractors and insurance companies to respond to claims immediately to conduct a detailed assessment. Yes, we do work weekends and evenings when necessary. There can be problems if there are delays in the claim being reported, which may make the analysis more difficult. However, some mould species require 7-10 days to establish, so the window of opportunity may be larger in some cases and identification of this mould early on helps to separate new damage from old. Delays in having an assessment done will pose issues with this however.

While mould growth can be a major problem following a water loss, people often forget about potentially harmful pathogens left behind on surfaces contacted by the Category 3 water (such as sewage). Health effects to those exposed can be devastating as witnessed by past events of E.Coli exposure through drinking water in Walkerton. The highest risk often occurs in children, the elderly and immune compromised or suppressed individuals, as their bodies cannot fight the pathogens as well if they are exposed. If mould growth or sewage contamination becomes an issue in a building, containment should be immediately addressed to isolate the affected area(s) and the use of drying equipment and HEPA air scrubbers evaluated. Air scrubbers vented to the exterior within a containment zone provides a negative air pressure differential within the containment zone(s) and filter harmful airborne mould spores or pathogens out of the indoor environment. It also ensures air flows from clean spaces to contaminated spaces, and not the other way around.

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Identifying Age of Mould in a Water Loss

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Many pathogens can be found in Category 3 water, including harmful bacteria and viruses. The bacteria of concern in sewage is primarily gram negative bacteria such as E.Coli, Pseudomonas, Shigella and Salmonella, which can be transmitted from hand to mouth contact. Children often make the basement a play area, the elderly may have an in-law suite in a basement, which is where sewer backups typically affect. Kids being kids will put their hands on everything and increase their chances of contracting harmful pathogens if the surfaces have not been properly cleaned and sanitized/sterilized. Restoration contractors use a number of products to clean and sanitize surfaces contacted by sewage water, but mistakes do happen and areas can be missed. Alcohol based sterilizers are some of the best products to use on affected materials as it will kill essentially any bacterial related pathogen it comes across on contact.

Bacterial swabs can be collected from surfaces and finish materials, or even contents following professional cleaning to assess the effectiveness of the treatment and identify if harmful gram negative bacteria (such as fecal coliforms) are present. Contents can be evaluated to determine whether they can or cannot be effectively cleaned and if so if the cleaning was

successfully done by the contractor. Generally, any contents affected by sewage however should be discarded. The swabs are collected and sent to a specialized laboratory where they are cultured for approximately 24 hours and analyzed to identify what coliforms are present, if any.

This type of analysis is very cost effective and can be done in conjunction with mould clearance testing (if applicable) or can be done separately at the end of a project not involving mould abatement, prior to residents re-occupying the area. These simple steps will put the homeowners at ease and eliminate potential liability for insurance companies and restoration contractors, knowing that there are no potential biological threats pertaining to the loss remaining in the home following the restoration work. It is also crucial in identifying appropriate and detailed scopes of work required for a restoration project and ensures the work being undertaken is specific to the insured loss and separates damages which are not related. We have the experts to give you the important answers you need.

From The Archives

Swimming Pools

Swimming pools can be a fun way to cool down on a hot day, but they can also create a number of problems, both with the pool itself and the users of the pool.

One common problem is failure of the vinyl liner, including leaks and wrinkles. Leaks should be repaired immediately. Sand can escape around the hole, causing the liner to stretch and weaken. If enough sand escapes, the pool structure may collapse. A circular patch should be placed over the damaged liner, and should be approximately twice the size of the hole.

Abrasive cleaning materials and improper chemical balances are two of the most common factors resulting in premature failure of pool liners. In order to prevent this, some simple rules should be followed: only add one chemical at a time to your pool, maintain pH values between 7.3 and 7.6, do not close a pool without circulating the water to disperse all chemicals equally, ensure the products you buy are safe for vinyl liners, clean the pool and filter regularly, and do not drain your pool without consulting a specialist.

Failure of the pool structure occurs not only from liner leaks, but also from wear and tear, improper construction and high groundwater tables. High groundwater tables impose lateral stresses, which can cause below grade wall collapses. The vertical uplift pressure can cause the pool structure to heave upwards, especially if it is empty. If the pool is not constructed on the proper base or does not have the proper support, failure of the structure can also occur.

We investigate numerous pool failures, normally in the spring. Above ground pools are constructed with steel walls and support legs. The steel corrodes over time, especially where it is in contact with chlorinated pool water. Corrosion weakens the walls and supports, resulting in collapse claims.

Many deaths and injuries occur each year in swimming pools, due to drowning and diving accidents. Drowning accidents are the second leading cause of death and injury for children under the age of 14, and the leading cause of death and injury for children under 4 years of age. There is generally little noise to alert an individual that a child is drowning. The most effective ways to keep a child safe from death or injury is to supervise them at all times, teach them proper behavior around water, keep a cordless phone or cell phone nearby, and use a life vest. Water wings are not recommended, since they do not prevent drowning.

The average victim of a spinal cord injury as a result of a diving accident is an athletic male between the ages of 18 and 31, who is over 175 lbs and performing his first dive in an unfamiliar area. Nine out of ten accidents occur in less than 6 feet of water. Some simple methods that help to prevent injury or death as a result of a diving accident are: enter the water feet first, never dive into water when you cannot see the bottom or do not know the depth, never dive into an above ground pool, do not consume alcohol, test the spring of the diving board prior to usage, dive straight ahead and never to the side of a diving board, plan your dive path, do not dive where there may be hidden objects, practice your diving techniques including how to steer yourself upwards, and do not dive off objects that are not meant for such an activity including balconies, ladders, roofs, etc.

Currently, there is a standard, ANSI/NSPI-5 *Standard for Residential Inground Swimming Pools*. This is helpful to investigators for determining if the pool was designed properly and if diving equipment was appropriate for the pool. It specifies minimum and maximum depths, widths, etc. for swimming pools to ensure safety.

Pool claims often require a full engineering investigation to determine if the pool was properly designed, constructed, and maintained, to evaluate the cause of the accident and establish contributing factors.

Vibration Damage Assessments



By Micheka Kostyniuk

Construction season is coming, and with it come the inevitable vibration damage claims. While we are asked to undertake vibration damage

assessments on a regular basis for a variety of reasons, including large trees falling, vehicle impacts, etc., the main reason is due to road construction.

While it is possible to get vibration damage to a home from construction activities, it is extremely rare. Vibrations produced from road construction are usually too far from the house to cause any structural damage to a home. Unless the road construction extends up close to the building for some reason, it is almost impossible for standard road construction to cause new damage to a building.

As vibrations move through soil, they dampen (decrease) at a quick rate. As vibrations reach a building, they dampen even further. So, if you are going to experience damages, they will typically be localized to the area nearest the construction. You won't be experiencing damages at the rear of the building if the road construction is out front, for example.

There has been extensive research done into several types of construction equipment and several types of buildings to document vibrations from various sources and their effects on buildings and people. While we are doing our assessments, we will measure the distance from the structure to the nearest construction site, compare to published research, and undertake

calculations to compare to known data and damage thresholds. While we have extensive experience assessing buildings for vibration damages, these scientific reasonings are often helpful to satisfy client concerns for their homes.

Often times, vibrations are strong enough to be susceptible or even disturbing to people, but still well below the threshold to damage a building's structure. It's common for us to hear from people that they were sitting in their homes and they could feel the vibrations or their pictures were rattling or other similar anecdotal evidence, especially now that people are home more often due to Covid. They can then start looking around their home and thinking "these cracks weren't here before". This can lead to aesthetic concerns or to concerns that their structure has shifted, settled, cracked, or other various concerns that we have heard.

As mentioned above, it's extremely rare for us to find any structural or new aesthetic damage to a home from road construction. The exception where we do sometimes see damages are worsening aesthetic damages. While the road construction vibrations are typically too low to cause new aesthetic damages (e.g. crack drywall), it takes very little force to propagate an existing crack. If the house has pre-existing cracks, sometimes not necessarily visible as they were painted over or otherwise repaired before, they can extend, re-open, etc. This minor worsening of a pre-existing aesthetic concern rarely is indicative of any structural concerns, though.

If you have clients who are concerned about their home this construction season, or for any other reason, feel free to reach out. We'd be happy to help you out.

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Congratulations Justin and Sadie Breg!



Caskanette Udall congratulates Justin and Sadie Breg and big sister Meira on the arrival of their son Silas, on March 4, 2021. Sadie is currently on maternity leave. Please contact our main office if you have any questions regarding projects that Sadie has worked on and one of our other engineers will be able to assist you.

