



## FORENSIC ENGINEERING NEWS AND VIEWS

Spring 2018

### Presidents Box



*By Rene Caskanette*

We made it! This summer we celebrate 20 years in business. Quite an accomplishment, seeing our small business grow and

develop to the company we have become.

My wife Kate and myself started this company (Caskanette & Associates at that time), and we hired a few contract engineers to work part time as needed to add expertise where required for a job.

Working from our home in Kitchener, Kate handled office management and accounting duties, while I handled the project work. With 18 years experience mainly in fire science, and civil/environmental engineering, the range of jobs we handled were wide. Contract experts handled mechanical failures, electrical jobs and accident

reconstruction. The volume ramped up quickly so I was soon looking for more help.

Our first client was Brian Foster at Cockburn, Foster, Townsend and Graham in London, a personal injury job involving a lady who fell off a stool. This small job was followed by our first large job for an Ottawa lawyer Steven Victor at Kimmel, Victor. A residential fire where we represented the plaintiff homeowner against their insurer who had denied based on an arson defence. A long trial in Ottawa went the way of the plaintiff and they received a large punitive damage award in addition to having the claim covered with interest.

Over the years we have worked for many insurance companies and law firms which no longer exist. Many insurers from that era have merged so there are now fewer but larger companies. Law firms such as Cockburn, Foster have evolved as the founders have retired.

As clients change, business practises also have changed. Back then, we would meet adjusters and get to know them and get jobs directly. A gift exchange at Christmas was normal. Now, gifts at Christmas are not accepted to prevent

a perception of bias. Some adjusters still have the freedom to hire experts they choose while many others need to hire from the preferred list. Companies have centralized and then de-centralized, always interesting to see how they evolve.

Nothing stays the same, and we have to adapt to our clients needs. Jeff Udall joined the firm as a senior partner after working as a contractor for some time, and the name changed to Caskanette Udall Consulting Engineers. He brought a strong set of engineering skills in structural, mechanical and accident reconstruction work.

We spread out geographically, at first centered around our head office in Kitchener but now having spread throughout SW Ontario to be closer to our clients. De-centralization works well for us with the new technologies available to stay linked together.

Kate retired and new office staff were hired moving from the era of a home based family business to a more traditional company. As we expanded and hired more experts, both our children got involved keeping the flavour of a family business.

*continued on page 2*

### See and be Seen – Ride Safe



*By Jeff Udall*

With that exceptionally long cold winter finally done with, motorcycle season is in full swing. Bikes of all shapes and sizes are cruising down the roadways of Ontario.

While a motorcycle is required to follow the rules of the road, we are all well aware of the extra risks associated with mixing smaller less visible motorcycles with larger cars, SUV's, and transport trucks. A well-trained motorcyclist will always be on the alert for what's around them, constantly doing blind spot checks and making sure they are visible.

With the risks come the inevitable accidents. Some accidents are due to careless driving behaviour by the motorcycle rider. Some of the bikes out there seem to have the speed limit right at the bottom of the speedometer and they just 'sound better' when they are being revved high and fast. Some accidents are due to car drivers not looking or expecting a motorcycle to be there. Driver's will often report that they didn't see the motorcycle until the last second. Drivers are distracted enough with managing the traffic and all the controls in the vehicle, and then throw in a beeping cell phone and a small fast weaving motorcycle has a pretty good chance of not being seen.

Motorcycles have a more complicated set of controls than a basic automatic sedan. The clutch

is on the left handle, the gear shifter is at the left foot, the front brake on the right handle and the rear brake is at the right foot. There's a lot for a less experienced rider to concentrate on along with trying to constantly look over your shoulders for drivers that aren't looking in your direction.

When a car is involved in an accident, the driver is protected by an extensive safety system. Seat belts, air bags, and energy absorbing crush zones help protect an occupant from injury. Newer vehicles are also equipped with arrays of sensors and computer software that can actively avoid a hazard by braking on your behalf or at least wake you up by vibrating the steering wheel.

*continued on page 4*

# Legal Requirements for Designated Substances and Hazardous Materials in Buildings



*By Bob Caskanette*

It is concerning that many are still unaware of the regulations and legal requirements surrounding designated substances and hazardous

materials in buildings in the Province of Ontario.

Building owners in Ontario are required under the Occupational Health and Safety Act (OHS) to determine if there are any designated substances present at a project site prior to any construction or demolition activity. The owner and constructors are required to provide this information as part of the tendering information or to prospective contractors (and subcontractors) of a project before entering into a binding contract. This means that a designated substance survey (DSS) is required for older buildings prior to any materials within those buildings being disturbed or removed to legally satisfy this requirement.

Many use the age of 1986 or older as the year for having a DSS completed, however many consultants leave a bit of a buffer as some excess asbestos containing building materials may have been used in buildings following 1986. We always strongly recommend a DSS be completed in buildings which were constructed prior to approximately 1989 to protect from potential liability.

What is a designated substance? A designated substance is defined as "a biological, chemical or physical agent or combination thereof to which the exposure of a worker is prohibited, regulated, restricted, limited or controlled." In Ontario, there are eleven (11) designated substances, including:

- |                     |                |
|---------------------|----------------|
| Acrylonitrile       | Isocyanates    |
| Arsenic             | Lead           |
| Asbestos            | Mercury        |
| Benzene             | Silica         |
| Coke Oven Emissions | Vinyl Chloride |
| Ethylene Oxide      |                |

This regulation applies to every employer and worker at a workplace where the designated substances are present, produced, processed, used, handled or stored and at which a worker is likely to be exposed to the designated substance. Specific regulations apply to each of these designated substances above.

So what is a Designated Substance Survey (DSS)? The assessments are performed to identify designated substances (and other hazardous materials) within the work area that may present a hazard to workers if disturbed. These substances are commonly a component of building materials or equipment found in buildings. A DSS is performed by a competent person/consultant and includes:

- A walkthrough of the facility to identify materials suspected of containing designated substances.
- Locations, types and conditions of the suspect materials.
- Collecting samples of suspect materials to be analyzed by an accredited laboratory.
- Providing a professional DSS report to the owner/client. The DSS report can be provided to prospective contractors so that measures can be taken to protect workers.

Other hazardous materials which can also be assessed during a DSS include:

- Chemical Hazards – Urea Formaldehyde Foam Insulation (UFFI)
- Biological Hazards – Mould Contamination, Animal/Rodent Feces/Contamination
- Environmental Hazards – Polychlorinated Biphenyls (PCBs) and Ozone Depleting & Global Warming Substances

What if a DSS is not completed?

- An owner/client is legally liable to the constructor, as well as every contractor, and subcontractor for loss or damages if a list of designated substances within a building was not provided or designated substances within a building were not identified.
- An owner/client can be fined under the Occupational Health and Safety Act (OHS). Fines vary, but can often be in the tens of thousands or more. **A recent fine we saw an owner receive was for \$60,000 for failing to determine whether any designated substances were present at the project site, and failing to prepare a list of all designated substances present.**
- The Ministry of Labour (MOL) can issue a "stop work" order or a contractor may refuse to complete the work. This can cause significant delays and money.

- Persons must be aware of the hazards and appropriate controls must be put in place to protect workers and occupants within a building. Liability and litigation could follow if the project is not done right from the start. This is very big business in the United States and is being seen more often in Canada. This trend to litigation is expected to increase in future years.

But what if the building or most of it is going to be demolished? Demolishing a building does not remove the legal requirement to identify and remove (to the extent practicable) designated substances such as asbestos from the building prior to demolition. However, if a professional engineer (P.Eng.) or other qualified consultant has deemed that a section of a building or entire building is legitimately unsafe to enter, then this requirement does not apply, as it is no longer "practicable" to identify and remove potential designated substances from the building safely as workers could be put at risk. However, provisions to protect workers during the demolition can still be put into place under the guidance of a professional and competent consultant.

A professional and competent consultant is critical to navigate and breakdown the complex legal requirements for each individual project and to ensure a professional DSS is properly completed to protect the liability of owners, clients and contractors. We recommend that they be done on every building built prior to 1989. Our team of professional engineers and scientists are happy to help navigate you through these legal requirements to protect from liability and to safeguard workers and occupants within a building.

---

## Presidents Box

*continued from page 1*

As I move to semi retirement, the new crop of engineers have started to acquire ownership, so the company will continue to be employee owned, so clients have the satisfaction of working for an owner of the company and not just an employee. The mindset of an owner allows for more discretion and flexibility in assignment handling, so clients get what they need.

It has been a great joy developing the company. I don't see my work as a job, and I will continue to handle projects and mentor the new owners and managers as they develop. It is like watching your baby grow to a responsible adult, and taking pride in the role played as the founder.

Thanks to all of our clients present and past for your support in helping us reach this milestone.

# Crash Data Retrieval



*By Alex Caskanette*

Active safety features are common in newer vehicles such as Adaptive Cruise Control (ACC), Lane Departure Warning (LDW), Lane Keeping Assist (LKA), Forward

Collision Warning (FCW), and Automatic Emergency Braking (AEB). These features are a major step towards autonomous driving vehicles. However, what happens when one or more of these features do not work as intended? Two recent deaths have occurred involving Uber and Tesla vehicles testing driverless systems. On March 18, 2018 a pedestrian pushing a bicycle was fatally struck by a Volvo SUV. Five days later a Tesla SUV crashed into a road divider in Mountain View California.

In this rapidly changing world, traditionally available data captured by the event data recorder in the airbag control module must now be used in combination with additional tools to analyze these

increasingly complex motor vehicle accidents. I had the opportunity to attend the 2018 Event Data Recorder (EDR) Summit in Houston, Texas. The EDR summit brought together industry experts from around the world and focused on event data recorder research, collection, and analysis for vehicle crash investigations. Two of the conference topics I found particularly interesting include:

Forensic techniques can be used to analyze vehicles equipped with ADAS technology (windshield camera and bumper radar). If the vehicle can be powered on, then the settings for collision warning sensitivity can be verified and it can be determined if emergency braking was disabled. We can then correlate the EDR data to the expected emergency braking deceleration profile to determine if the automatic emergency braking functioned correctly.

Tractor trailers equipped with Bendix brakes may also be equipped with a Bendix Data Recorder (BDR). This data recorder is contained within the anti-lock braking system electronic control

unit. The BDR records information that can aid in motor vehicle accident investigations such as the vehicle speed, steering angle, and accelerator pedal position. This data allows the investigator to recreate the moments leading up to the accident.

Caskanette Udall Consulting Engineers possesses a Bosch Crash Data Retrieval Tool which we use to collect crash data from the air bag control module. This tool supports coverage of 56% of vehicles in the US/Canada Market with new vehicle models being added yearly. As of Spring 2018 the Bosch Crash Data Retrieval Tool now supports retrieving the event data recordings from Tesla vehicles. The number of Tesla manufactured vehicles on the road in Ontario continues to increase making this compatibility useful for motor vehicle accident investigations.

Contact us if you require our accident reconstruction services or if you wish to have us perform a CDR download to retrieve information that may be stored on a vehicle. This allows you to preserve important data and is useful for both insurance and litigation purposes.

---

## High Resistance Connections: The Leading Cause of Electrical Fires



*By Sadie Breg*

Current flowing through an object produces heat. The amount of heat produced is proportional to the amount of current, the length of time

current is applied, and the resistance of the object. For example, copper is more conductive than aluminum, and a thin wire will have greater resistance than a thicker wire.

We take advantage of this phenomenon in ovens, space heaters, and tea kettles. These devices all harness resistance heating for a useful purpose. The resistive wires are designed to get hot, but not hot enough to melt or burn their housing. And if these devices do overheat, the thermal cut off switch (TCO) operates to stop the flow of current.

One day, my hair dryer stopped working mid-use. Of course, as a forensic investigator, the first thing I did was take it apart to find out why. After playing around with my multi-meter, I discovered that the thermal cut-off switch had opened. Like a fuse, the TCO can't be re-set – it opens once and then it's done. I could have made my hair

dryer work again by bypassing the TCO with a bit of wire. It would have appeared like a successful repair job... until the next time my hair dryer overheats and turns to molten goo in my hands!

Most appliances nowadays have at least two TCO's. This has drastically reduced the number of product failures from defective TCO's, since the likelihood of two or more defective TCO's in the same device is much less.

Resistance heating doesn't just happen in appliances; it occurs wherever current is flowing. Current starts flowing at the power plant and continues on through the power lines, transformers and meters into our homes. From there, it flows through a main panel and branches off into a number of circuits to power our outlets and lights, encountering a variety of connections along the way. Some common connections include: two wires are spliced together, wires connecting to a receptacle and a plug blade in a receptacle.

These connections are often the weakest points in the system, as current must flow through a smaller contact area, which has more resistance than the wire leading up to it. Increased resistance produces increased heat, which can damage the connection, causing it to become still

more resistive and generate even more heat. This is called a high resistance connection.

High resistance connections are the leading cause of electrical fires. Unlike appliances, where the TCO will shut off the power, the breaker for an electrical circuit is usually far away and is triggered by an increase in current flow. Since a high resistance connection does not result in an increase flow of current, from the circuit breaker's perspective, the high resistance connection is no different than a light bulb. Breakers don't trip as a result of a high resistance connection. If the circuit gets hot enough to melt insulation on the wires and cause a short circuit then the breaker will trip. By this time, a fire may already be underway.

High resistance connections can be prevented by ensuring plugs are fully plugged in. Receptacles that hold a plug loosely are making a poor connection and should be replaced. Certain types of switches and receptacles are also more prone to high resistance connections, as they have a smaller contact area at the connection. For example, wire-wrapped screw connections are typically better than clamp or spring connectors. Thermal scanning of electrical equipment can help identify high resistance connections before they become a fire.

# Storms, Storms, and More Storms



## By Micheka Kostyniuk

If you speak with anyone in the insurance industry lately, you hear a common theme... the number of storms and storm related claims

are staggering. This year alone, there were the large snow storms of early January, followed by heavy rains/freezing that caused widespread collapses to buildings and pools, among other issues. In February there was the heavy rain that resulted in massive floods between the rain and snow melt. In March there were yet more large storms. April had a large ice storm, causing a wide variety of problems from huge waves off Lake Erie crashing over/through breakwaters to more typical property damage and everything in between. It's early May at the time of writing this, and already there was the huge wind storm on May 4th.

It's not even halfway through the year, and we have been slammed with storm after storm. We haven't even gotten to tornado season yet this year, and it seems there is always at least one tornado somewhere in Ontario that causes extensive damage. Usually these are smaller or rural areas, but then you have the Goderich tornado events where the area is more densely populated, and therefore more property destruction.

We have been involved in all types of support roles for the insurance industry when it comes to storms. We help out on individual sites when the storms are smaller, and we've been involved on more widespread large cat events. We have provided everything from immediate site inspections to successful expert witness testimony when there have been relationship breakdowns between insurers and insureds during these emotional times.

We had a minimum of three engineers on site all day, every day for weeks following the 2011 Goderich tornado to assist with structural inspections, designated substance surveys, safely escorting people into unsafe areas, providing emergency temporary shoring advice (and even pitching in with a hammer when needed). We sent an engineer out to Alberta following the flood

of 2013 to assist with property inspections for several weeks. We had our engineers on standby following the 2016 Fort McMurray fire, ready to fly out and assist with structural work as needed.

We always strive to provide quick service with accurate reports at competitive prices. When large storms hit an area, we provide special bulk pricing to assist our clients. Whether this is to inspect dozens of roofs after a hail claim, inspect tornado or flood claims in a localized area, pool collapses, or component failures in our lab (e.g. pipes/components to determine whether something froze or failed for another reason).

As this trend of large storm events continues into the future as predicted by most climate studies, we anticipate that these bulk pricing arrangements may become more typical going forward. If you have a large volume of claims and need engineering help, don't hesitate to reach out to us. We are well equipped to assist you with your needs and would be happy to put together a special pricing package to help assist with these large loss events.

---

## See and be Seen – Ride Safe

*continued from page 1*

With the coming of autonomous vehicles, the nature of driving is changed completely. A motorcycle does not have the same protections. A rider has a helmet, a good leather jacket, and gloves to separate your skin from the asphalt. Some motorcycles have anti-lock brakes which can help keep the bike from sliding out when having to brake aggressively, but a rider is fully open to the world around them. Injuries can be severe with relatively minor collisions, and there is a much higher chance of a fatality.

Motorcycling is a fun experience and a more efficient method of travel. But riders and drivers alike need to have extra caution and awareness when driving the same roads. Failing to keep watch and understand each other's intentions on the road can prove to have serious consequences. Keep a safe space around motorcycles. See and be seen. Follow the rules of the road. It's all common sense, but accidents still happen. Have a safe and enjoyable summer!

## Contact Us

519-745-5066

1-800-920-5854

Fax: 1-888-489-9193

[www.caskanette.on.ca](http://www.caskanette.on.ca)

Follow us on twitter @caskudall

**Rene Caskanette** B.A.Sc., P.Eng

[rene@caskanette.on.ca](mailto:rene@caskanette.on.ca)

519-489-2901

**Jeff Udall**

B.Sc., B. Eng., M.A.Sc., P.Eng

Niagara Office

[jeff@caskanette.on.ca](mailto:jeff@caskanette.on.ca)

519-342-4569

**Bob Caskanette**

B.A.Sc., CEC, C.E.T., EP

[bob@caskanette.on.ca](mailto:bob@caskanette.on.ca)

519-618-9044

**Alex Caskanette** B.A.Sc., EIT

London Office

[alex@caskanette.on.ca](mailto:alex@caskanette.on.ca)

519-913-2066

**Sadie (Hewgill) Breg** B.A.Sc., EIT

[sadie@caskanette.on.ca](mailto:sadie@caskanette.on.ca)

519-489-0518

**Micheka Kostyniuk**

B.A.Sc., P.Eng, CFEI

London Office

[micheka@caskanette.on.ca](mailto:micheka@caskanette.on.ca)

519-488-5454

**Peter Johnston** P.Eng.

Burlington Office

[peter@caskanette.on.ca](mailto:peter@caskanette.on.ca)

905-399-9635

**Gail Tomka**

Office Manager

[gail@caskanette.on.ca](mailto:gail@caskanette.on.ca)

519-745-5066

**Caskanette Udall**  
Consulting Engineers

248-675 Queen Street S.

Kitchener, ON N2M 1A1

**Caskanette Udall Consulting Engineers**

[www.caskanette.on.ca](http://www.caskanette.on.ca) | 1-800-920-5854