Caskanette Udall
CONSULTING ENGINEERS

FORENSIC ENGINEERING NEWS AND VIEWS

Spring 2017

Presidents Box

By Rene Caskanette

We have seen an increase in business on the personal injury assessment front. Don't know if Canada is becoming more litigation oriented like our neighbours to the South, or if we are just getting a bigger share of this work. I have started to see more advertising from plaintiff injury law firms so maybe that is a factor as well.

Engineering experts are often retained on these cases to document site conditions following an accident and then to compare the conditions to various codes and standards to check for compliance or deficiencies.

Stairs and walkways need to meet Building Code requirements, while maintenance of fire alarms and fire suppression systems must meet Fire Code requirements. Then there are the plumbing codes, electrical codes and a multitude of product safety standards published by a wide assortment of agencies such as ASTM. It takes a large document library to stay up to date on the requirements.

Recently we handled a case where a lady was injured when a hook on a product display rack in a retail store poked her in the eye. It turns out this happens occasionally and there is an industry standard for safe hook design to prevent these injuries.

Another case involved an aluminum storm door, where the moveable glass portion of the door dropped from the locked position like a guillotine and chopped the finger off a young child. Turns out this is not an uncommon occurrence and there is an industry standard for design and construction of these doors to prevent this type of injury.

Falls from ladders are common cases, and of course there are many safety standards for ladders. Falls from decks, or elevated surfaces are also common, and codes contain safety provisions for safe design of guards to prevent these accidents. Ongoing maintenance is then needed to keep them safe as wood rots and connections deteriorate over time.

The Ministry of Labour has many safety guidelines to protect workers from the many hazards found on job sites. Construction sites are some of the most hazardous places to work, and there is a whole book of standards to safeguard construction sites. Scaffolds, swing stages and lifts designed to work at heights must be designed and maintained well to avoid injuries to workers.

Municipalities are involved in defending many cases of falls or motor vehicle accidents on their property due to inadequate design or maintenance of infrastructure. Roads must be designed to code, and maintained well to prevent ice and slippery conditions which can cause accidents. Sidewalks need constant repair to remove trip ledges and slippery spots which cause many falls. Recreation areas like ski hills, toboggan areas, swimming areas, bike paths, etc. present unique hazards that must be protected adequately. There are minimum maintenance standards for municipalities to follow, and many cities have their own standard operating procedures that outline inspection and maintenance duties of their staff.

Environment Canada keeps historical weather data which is often needed when looking at winter maintenance issues, or any accident where weather is a factor. Strong winds can cause doors to close suddenly and forcefully, striking people and causing injuries. Building Codes are useful for evaluation of the design of the doors.

Personal injury accident investigation can cover a wide spectrum of issues and lots of different codes and standards to review and analyze. Experienced experts are needed to ensure these jobs are handled properly. Our team of experts handle many cases each year and have had great success defending our opinions in courts, since our opinions are solidly based on science.

If you have a case you would like to discuss give me or our team a call to discuss how we could assist.

Accident Reconstruction

By Jeff Udall

Accident reconstruction is one of the many services that we provide for our clients. Reconstruction can involve many different types of investigations to develop an opinion regarding liability.

Speed of the vehicles involved is often a question that arises. High speeds increase the severity of an impact and reduce the amount of time available for the different parties to react. Other issues we are asked to address are signage on a roadway, lighting conditions, timing of an accident such as the opportunity to avoid, and seat belt usage.

It is advantageous to be at the scene of the accident shortly after it occurred in order to obtain as much evidence from the roadway as possible. Evidence on the road can include tire marks, gouges in the pavement, and debris from the damaged vehicles. These can disappear quickly with weather and continuous traffic that drives over the area. We are often asked to attend the scene quickly and obtain whatever evidence is available at the time to simply preserve the information for future use.

Collecting evidence from the vehicles themselves then provides a more complete picture of the nature of the impact. Exterior crush damage, interior body contact points, and data from the crash data recorder are all useful pieces of information that can help reconstruct the events leading up the accident. Photographs, witness statements and the police file are invaluable in an investigation.

The analysis of the evidence when doing a reconstruction can involve using complex computer programs that simulate the movement of the vehicles before and after an impact, or sometimes a simple review of photographs and witness statements is sufficient to provide an opinion. Performing an accident reconstruction takes all the available evidence and uses the available tools at hand to complete a picture of the events that caused the loss. There are countless scenarios of different accidents with different circumstances. A reconstruction of the accident can provide lawyers and insurance clients with valuable information that assists with determination of liability.

Mould Contamination in Buildings

By Bob Caskanette

So what exactly is mould? Moulds are a fungus, which grow on various kinds of damp or decaying organic matter. Moulds and fungi are found everywhere in nature, and are necessary for the breakdown of leaves, wood and other plant debris. There are more than 100,000 species of mould in the world and 1,000 species which are common in Canada and the USA.

People are exposed to moulds through inhalation or skin contact. Touching mouldy surfaces can, in some cases, result in skin irritation. Moulds become airborne when materials are disturbed and spores are released into the air. Mould spores can be spread throughout buildings in ventilation systems using forced air. Central heating, ventilation and air conditioning (HVAC) systems that are poorly maintained are common sites for mould growth. Occupant activity like walking can spread mould spores throughout a building. Mites, which thrive on paper and dust, can carry mould.

Visual inspection is the normal method of identifying mould problems. Moulds will most often appear as dark spots, stains or patches. The presence of mould or fungi can be confirmed by dabbing a spot with chlorine bleach. If the colour changes or disappears, the stain is likely organic and probably mould.

Various air samplers and sticky surface samplers can be used for indoor air quality sampling to identify the species/genus of moulds present. Spore trap cassettes are the most common type of air samples collected. Laboratory staff can then determine spore counts for each mould species identified. This type of testing is normally done after a water damage claim to assist in establishing the extent of contamination within a building compared to outdoor background levels so an abatement protocol can be derived. It is also done to verify if the structure is rehabilitated and fit for occupancy following a mould abatement. Swab or tape lift samples are useful to identify the visible moulds found on surfaces. Culturable mould samples are also an option but can take longer for laboratories to analyze as time must be given for the moulds to grow within the culturable media they are collected on. Remediation is intended to return the spore count to background levels after the mould abatement is completed by a certified contractor. Air quality testing is also often performed in workplaces and public buildings such as schools, when the possibility of mould is identified.

Mould contamination in buildings continues to receive attention in the media and is a concern for homeowners, property managers, insurance companies, and restoration companies. Without proper use of an indoor moisture control system, black mould can start to grow in a building in as little as 48 hours after exposure to water.

Common symptoms of prolonged inhalation include aggravation of asthma, cough and nasal congestion, eye irritation, fatigue, difficulty concentrating and headaches, similar to non-toxic allergic reactions. Dr. Johanning proposes the name “fungal syndrome” for the ailments produced by indoor air exposure to mycotoxin and allergen producing fungi. In his 2001 publication “Clinical findings related to indoor fungal exposure-review of clinical data of

continued on page 3

Drywall Cracks: Is There a Problem Here?

By Sadie Breg

Most buildings will experience drywall cracking over the course of their lifetime. They are easy enough to fix, but may have an important story to tell. What causes these cracks? Are they an outward sign of something more insidious behind the surface?

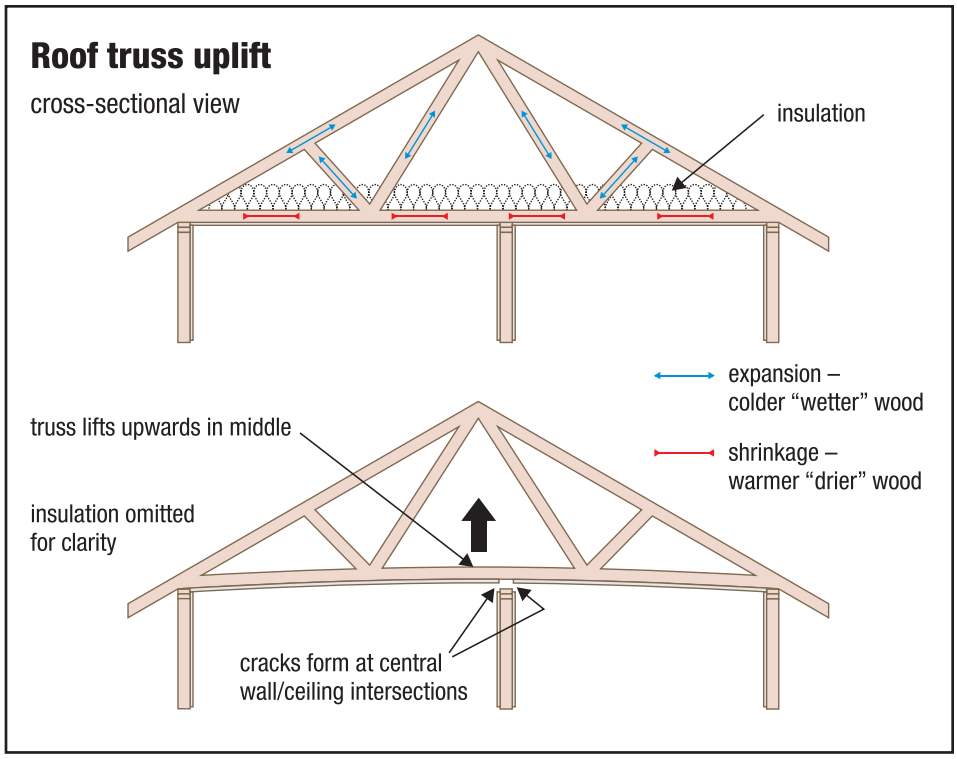
Drywall cracks are indicative of movement within the structure, which typically manifests itself initially in brittle materials, such as drywall or ceramic tile. Some movement in a building is normal: for example, if wet lumber was used during construction, the wood will shrink as it dries out, pulling the drywall along with it. Buildings can also experience some shifting and racking with wind pressures; wood is flexible enough to absorb this movement, but it might show up in the drywall.

Movement related to settlement or frost heave is more of a cause for concern. If you see diagonal cracking or unusually wide cracks, this can indicate more serious structural problems that should be investigated by a Professional Engineer,

If you experience sudden or seasonal cracking, particularly at wall-to-ceiling interfaces, truss uplift may be the culprit.

Truss uplift is a phenomenon which is caused by a difference in moisture content between the top and bottom chords of a truss. Truss uplift occurs in the winter when the temperature differential (and relative humidity differential) is the greatest. The top chord of the truss is cold and the surrounding air is at a higher relative humidity, with a lower dew point temperature causing condensation to wet the top chord. The bottom chord is kept warm from insulation, and is at a lower relative humidity; water vapour in the air will tend to condense on colder surfaces, away from the bottom chord.

As the top chord absorbs moisture, it expands. The bottom chord dries out and contracts. This movement causes the bottom chord of the truss to deform, lifting the drywall ceiling away from partition walls with it, as shown in the figure following:



Truss uplift is normal and is not a structural concern, although it can be a pain when drywall cracks reappear each year as temperatures change, causing old cracks to reopen after repairs are completed.

Certain drywall hanging techniques can allow drywall to move independently from the wood behind it. This allows the wood to expands and contract naturally, without constraining the drywall. Seasonal cracks can also be hidden by fastening corner trim to the ceiling but not to the wall, so the trim moves freely with the ceiling.

Truss uplift is also exacerbated by humid attics, so it is important to ensure that there is adequate ventilation and the vapour barrier is continuous: sealing bathroom vent fans and other penetrations through the ceiling.

Mould Contamination in Buildings

continued from page 2

a specialty clinic", key messages reported include; "Many patients have a variety of symptoms, primarily the skin, mucous membrane, respiratory organs, central nervous system and constitutional symptoms" and "The prognosis appears good provided the exposure can be stopped".

Mould contamination has been identified as a contributor to building-related illness and poor indoor air quality. Some moulds release mycotoxins, which can have adverse health effects for some people, particularly those with increases sensitivity to mould. Some moulds also release microbial volatile organic compounds (MVOC's) which contribute to the musty odours often found with mould and can also contribute to health related symptoms.

A qualified mould professional should be retained by insurers to identify areas and causes of moisture within buildings that lead to mould growth. Prevention of mould growth is achieved by removal of moisture within the first 48 hours after exposure. If water is removed and materials are dried within that time period, then mould abatement is usually not necessary. We are happy to assist you on your next project.

Ladder Safety

By Micheka Kostyniuk

Ladders are a big part of many claims investigations. Whether you or someone involved in your claim is using a ladder (e.g. field adjuster, contractor, engineer) and you want them to be safe, or you are looking at a ladder accident after the fact from a liability point of view, there are many things to consider. We are regularly called to investigate ladder accidents to determine the root cause(s).

ANSI has a Standard for Ladders, ANSI -ASC A14.2-2007, American National Standard for Ladders – Portable Metal – Safety Requirements. They cover some information that would be intrinsic to the ladder from manufacturing (e.g. spacing of rungs; workmanship of burrs, bolts, rivets, welds). But there is also information that relates to operation (e.g. the correct angle to place a ladder at; how much of the ladder should extend up above the roofline). There is also information available from various government resources, including Workplace Safety & Prevention Services. If you are using ladders for work purposes, you should have appropriate training for Working from Heights.

The most common accident causes for a self-supporting ladder (i.e. step ladder) are related to stability or sliding. The most common for non self-supporting (e.g. single ladder, extension ladder) are related to human slip, lateral sliding at top support, or outward sliding at the lower base support. There are many common contributing factors to these accidents; some due to operator error, some due to manufacturer defect, and some due to wear and tear of the ladder itself.

No one would expect you to have knowledge about manufacturer requirements (e.g. are the rungs properly spaced?) before you use a ladder, but it's important to make sure that you understand basic safety items that are operator related. Things such as the proper inclination of the ladder (typically 75.5o or 1' out for every 4' of vertical height) and making a visual assessment to make sure it looks safe and appropriate for its intended use (e.g. nothing looks broken, dented, warped, worn out, the feet are in good condition and appropriate, etc).

When the ladder is set up, it's important to make sure it is properly set up! Is the angle correct? Are you properly tied off at the top (if required)? Are the feet in good condition and appropriate for the use (e.g. if you are doing this in winter, do the feet have ice picks)? Are you on a proper surface (e.g. firm, level, clean, dry, non-slip surface)? It is important to make sure there's another person there and helping, if possible. That person can hold the ladder at the base to prevent it kicking out or at the top so it doesn't pull away or tip.

When you're on the ladder, it is important to be careful – don't carry items up a ladder if possible, always maintain three points of contact (i.e. two hands and one foot or two feet and one hand), keep your balance centred on the ladder/avoid side loading (i.e. don't lean out sideways while you're on the ladder), ascend/descend/climb on/off the ladder carefully while trying not to cause jerky movements or loading onto the ladder, etc.

If you are around someone using a ladder, make sure you are cognizant of your surroundings. It is not just the person on the ladder that has the potential for an accident. Things get dropped from heights from people on the ladder or at higher work areas (e.g. people working on a roof) that can strike a person on the ground. Similarly, you can be struck by the person falling from the ladder or the ladder itself if it falls. It's also common for people to trip on ladders.

There are so many factors that can cause or contribute to an accident, either singly or in combination. The items above are common causes, but there are many other less common causes. We encourage everyone to be safe out there. But if it's too late and the accident has already happened and you're trying to figure out what went wrong for liability purposes, give us a call to help you sort it out.

Contact Us

519-745-5066
1-800-920-5854
Fax: 1-888-489-9193
www.caskanette.on.ca
Follow us on twitter @caskudall

Rene Caskanette
B.A.Sc., P.Eng
rene@caskanette.on.ca
519-489-2901

Jeff Udall
B.Sc., B. Eng., M.A.Sc., P.Eng
jeff@caskanette.on.ca
519-342-4569

Bob Caskanette
B.A.Sc., CEC, C.E.T., EP
bob@caskanette.on.ca
519-618-9044

Sadie (Hewgill) Breg
B.A.Sc., EIT
sadie@caskanette.on.ca
519-489-0518

Micheka Kostyniuk
B.A.Sc., P.Eng, CFEI
London Ofiice
micheka@caskanette.on.ca
519-488-5454

Peter Johnston
P.Eng.
Burlington Office
peter@caskanette.on.ca
905-399-9635

Gail Tomka
Office Manager
gail@caskanette.on.ca
519-745-5066

Caskanette Udall
Consulting Engineers

248-675 Queen Street S.
Kitchener, ON N2M 1A1