SINTRA
ENGINEERING INC

SUMMER EDITION NEWSLETTER

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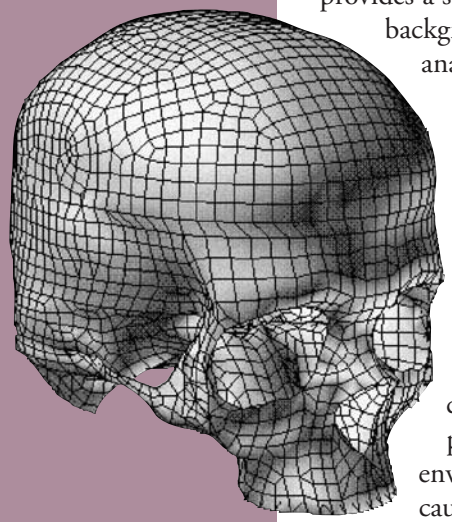
IN THIS ISSUE

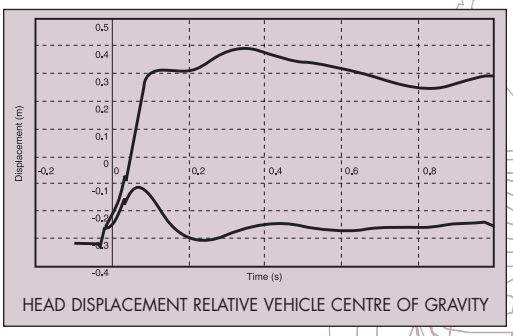


BIOMECHANICAL ENGINEERING

What do you get when you cross Engineering and Medicine?

Have you ever had a file come across your desk where the question of injury--either causation or severity--is beyond the scope of a standard engineering analysis? Does a medical assessment not quite address the issue either? If the answer is yes to either question, then a biomechanist may provide the answers you are looking for.

At Sintra Engineering, our biomechanists have a degree in engineering and post-graduate training in biomechanics. This combination of medical and engineering knowledge provides a strong background in the analysis of the actual physics of the incident in question. We then take it one step further by evaluating how unexpected changes in a person's environment could cause injury, and determine the potential severity of such injuries. Knowing the specific accident information and the tolerances of the human body, and employing computer modeling programs, a biomechanist can address issues such as the expected injuries or the effect of seatbelt use.



HEAD DISPLACEMENT RELATIVE VEHICLE CENTRE OF GRAVITY

The types of incidents that can be examined are not limited to automobile collisions; they can also include vehicle-pedestrian collisions or slip and falls. Since humans are complicated and have many moving parts, there are many variables to consider in an incident when evaluating injury potential. In general, the more information that can be obtained about the incident and about the individual's actions, both before and after the accident, the better. Pre and post-collision medical records also provide useful information. The specific description of the person's stature, physical condition, location during the incident, and extent of injury can all help to pinpoint how an injury may have occurred and whether any pre-existing conditions may have contributed to the outcome.

Alice Bardas and Rebecca Moss are both biomechanists working for Sintra Engineering. In addition to their mechanical engineering backgrounds, Rebecca has completed a M.Sc. in Mechanical Engineering with a specialization in Bio-mechanics and Alice is in the process of completing her M.Sc. in Biomedical and Mechanical Engineering this year. They look forward to building up the bio-mechanics area in Sintra's forensic engineering repertoire.

ACCIDENT INVESTIGATION

Asking the Right Questions for Left Turn

One of the common types of collision that accident reconstruction engineers are retained to investigate is urban collisions, where one vehicle turns left across the path of an oncoming vehicle. Common issues can relate to visibility, speeds of the vehicles, and traffic light conditions at the time of the incident. Since police investigations into these matters are often limited and traffic erases the evidence soon after the incident, there is sometimes little evidence remaining at the collision scene by the time an engineer has been retained. As a consequence of this limited physical evidence, statements from involved parties and witnesses becomes critical in analyzing the collision.

Questions to ask a witness that would assist in an engineering investigation:

- How fast were you travelling at the time of impact?
- What did you do just prior to the impact and immediately after impact?
- How hard did you brake?
- How fast did you accelerate?
- Where, approximately, did the vehicles collide within the intersection? (If possible, have them draw a sketch with points of reference including lane lines, curbs, medians, sign posts, etc.)
- Which direction were the vehicles facing at impact? (If bearings are not known, use fixtures at site, i.e. building, bus stop, sign post, etc.)
- Where did the vehicles come to rest? (draw on a sketch)
- Which way were the vehicles facing when they came to rest?
- What colour were the traffic lights in your line of sight?
- If the traffic lights changed at all during the incident, describe how they changed and what your actions were when the change occurred.
- Can you estimate time duration between changes in traffic light colour and the impact or actions of yourself or other involved parties?
- What were the road/weather conditions like at the time of the incident?

While these questions are not a comprehensive list of all that can be asked of a witness, they do cover some of the important engineering issues. Witnesses are not always excellent judges of distance and time, and the accuracy of their descriptions may be poor but their answers can be compared against the physical data and other statements.

FORENSIC ENGINEERING

BUILDING CODES

"When is a building not a building?"

In Alberta, buildings are generally constructed in conformance to the Alberta Building Code and the Alberta Fire Code. These documents provide a prescriptive approach to building design, setting minimum criteria for the performance of construction materials and building systems. However, one category of buildings is exempt from these requirements: farm buildings.

The Alberta Building Code does not cover most farm buildings. Those buildings that are covered include abattoirs, meat processing plants, dairy manufacturing plants, riding arenas, and buildings used for non-farming commercial activities. However, the majority of buildings constructed on Alberta's farms do not fall under the guidelines established in the Alberta Building Code.

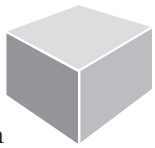
Consequently, there has been a bit of a free-for-all with respect to the materials and designs used in the construction of farm buildings. Because there are no construction guidelines, there are also no minimum standards. Unfortunately, while the building code exemption is seen by some as a suitable limit to the unnecessary regulation of farmers, it exposes farmers to being taken advantage of. Some suppliers of building materials and temporary structures occasionally use substandard designs for farm structures in order to provide the cheapest solutions for the farmer's needs. This lowest cost approach secures the sale, but it overlooks potential risks to human life.

Improper practices and substandard materials used in the building of farm structures may be important factors contributing to the cause of a loss. If you suspect that such practices or materials have been employed in a situation that you are investigating, you may want to check your building code or consult a local inspector. Be warned that the rules governing the construction of these types of buildings are very limited.

ACCIDENT INVESTIGATION

Black Box Update

While cars are not actually equipped with black boxes, if they are equipped with airbags, they probably record some information from a collision. Most manufacturers do not allow this information to be downloaded. However, two manufacturers do: Ford and GM.



Sintra Engineering can download the crash parameters for a large number of Ford (2001 - 2003), Isuzu (2000 - 2003) and GM (1994 - 2003) products. While it is not a replacement for a comprehensive analysis, the downloaded data is a useful piece of information for the investigation of most types of collisions.

EMPLOYEE PROFILE : CRYSTAL KUCY OFFICE MGR.

- Start date with Sintra: May 3, 1999
- Enjoys creative writing and spending money
- Plays indoor and beach volleyball
- Loves jewelry and voice mail
- Position with Sintra: Office Manager

Here's a little ditty about me:

I've been blonde and red and a brunette,
love to dance and sing divinely—
that is if you like
your songs slightly off key.

I rule the office with an iron fist
and if you screw up
you know what you have to kiss

I have a flawless memory
except when I forget,
probably because I've got
way too much useless info in my head

I'm never on time
but I always leave late
but what—I ask—does that matter?
when I'm a better rapper than Eminem!

(I'm also a dog person because cats don't impress me much)

RESEARCH

SINTRA Publishes Research on Low Speed Impacts

Sintra Engineering has turned a corner in its continuing development as a leader in forensic engineering in Western Canada by publishing a peer reviewed article that represents an important milestone in the analysis of low speed impacts. The paper, with the particularly long title *"Practical Methodology for the Analysis of Low Speed Vehicle Collisions for Vehicles with Modern Bumper Systems"*, was published and presented at the Society of Automotive Engineers (SAE) World Congress in Detroit in March of 2003. It is available from the SAE website at www.sae.org (#2003-01-0492) or by contacting Sintra Engineering directly.

The number of low speed impacts involving claims has been steadily increasing for the past few years, and understanding causation is becoming increasingly problematic for insurers and lawyers. One persistent problem is the lack of a clearly laid out procedure on how these accidents should be analyzed. This is particularly true for accidents involving vehicles without isolators or bumper shocks. Most of the previously published methods identified theoretical techniques that required information that was not readily available. Consequently, a comprehensive description of a robust method of analysis was required. This paper breaks new ground by presenting a practical way of analyzing collisions for vehicles that do not have isolators.

The paper also includes some details from crash testing that was performed during the summer of 2002 to verify that the method was reliable. In addition, although it has been presumed that barrier tests with vehicles could theoretically be compared to vehicle to vehicle impacts, the paper shows exactly how this relationship exists in practical terms.

The paper was authored by Andrew Happer, P. Eng., Mark Hughes, P. Eng, Micheal Peck, P. Eng., and Susanne Boehme, but included involvement of almost all of Sintra Engineering's staff. The paper represents the results of almost two years of planning, testing and analysis.

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