SINTRA ENGINEERING INC

SUMMER EDITION NEWSLETTER

2007

PROFILE OF Jian Yao, P.Eng., Ph.D.

Jian Yao, P. Eng., Ph.D., is a senior structural engineer and is a recent addition to Sintra Engineering. Jian received his Ph.D. in Structural Engineering in 1994. He completed a post-doctorate fellowship at the University of Alberta. Jian is a registered Professional Engineer (P. Eng.) in Alberta.

Prior to joining Sintra Engineering, Jian was with Read Jones Christofferson (RJC) Engineering and Stantec Engineering, both prominent structural engineering consulting firms. Jian has worked on a number of significant structural projects over the years including the Robbins Health Learning Centre at MacEwan College, Century Park, and the Edmonton International Airport Redevelopment.

At Sintra, Jian's focus is structural failure investigations and assisting our clients in determining the cause of structural failures and providing scope of reparation.

Away from work Jian swims on a daily basis and is a beer and wine connoisseur, brewing his own wine and beer.

PROFILE OF Bill Shaver

Bill Shaver is an Engineering Technologist and a recent addition to Sintra Engineering's Calgary office. Bill spent 15 years as an automotive journeyman technician and received his Red Seal through the Interprovincial Standards Certification Program in 2000. He returned to school and completed the Mechanical Engineering Technology program at SAIT.

Bill's experience and background will allow Sintra Engineering to expand our service offering to include property loss related investigations based out of Calgary. Bill's extensive knowledge of vehicles will enhance our accident reconstruction and defect investigation capabilities. In addition, having recently received his certification as a Fire and Explosion Investigator, Bill will also allow us to offer vehicle fire and structure fire investigations in the Calgary region.

Outside of work Bill is interested in automotive design and rebuilding older model vehicles. He custom built a three-wheel bicycle and is currently constructing a motorcycle. He enjoys ATV's, camping, demolition derbies and other outdoor activities.

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FIRE INVESTIGATION

Origin and Cause vs. Cause and Origin

The Order Matters

When we are retained to investigate a fire the question we are always asked, for obvious reasons, is: what caused the fire? Our engineers, who are trained and certified to use current fire investigation techniques and practices, are able to combine their technical knowledge of mechanical and electrical systems with an understanding of how fires spread.

In most cases, this allows us to provide conclusive answers to the oft asked question. However, before we can say how the fire started, it's important to ask the question and determine: where did the fire originate? While all experienced fire investigators know the difference between the terms 'origin' and 'cause', there is also significance to the order in which the terms are presented.

NFPA 921: The Guide for Fire and Explosion Investigations defines 'cause' as "the circumstances, conditions or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or combustion explosion". The term 'origin' is not specifically defined but refers to the "point of origin or area of origin". If one was to look up 'point of origin' you would find it defined as "the exact physical location where a heat source and a fuel come in contact with each other and a fire begins".

The terms seem obvious, and both meanings clear. Can the order in which the terms are presented affect a fire investigation? Is it meaningless semantics?

In general a proper fire investigation, which follows the scientific method outlined in NFPA 921, always follows a similar pattern. In most cases, the fire investigator arrives at the fire scene, proceeds to examine the remains from the fire and identifies the area of origin. A variety of information sources are used in addition to the fire scene to narrow the area of origin including: information from witnesses, information from first responders, and information from building owners. Once the area of origin is established, the trained fire investigator will investigater in that area for possible causes of the fire. Without the establishment of an area of origin (even if there are multiple areas of origin), the cause will be very difficult to establish.

Many fire investigators are often told theories as to the cause of the fire before arriving at the fire scene. Often an insurance adjuster or lawyer is looking for an opportunity to subrogate and is hoping the investigator's report validates his/her theory. The reliability of a fire investigator's opinion rests in their ability to objectively and thoroughly consider

Origin and Cause vs. Cause and Origin *Cont'd*

all possibilities based on the evidence available to them. Some investigators fall into the trap of assessing the cause first without determining the area of origin.

Articles have been published supporting this very method of investigation. These articles state that there are many exceptions to the rule of finding the origin first and then the cause. They further imply that digging in a fire scene for the area of origin is often a waste of time.

Our fire investigators believe the order of the phrase 'origin and cause' provides an order for investigation and is not simply a matter of semantics. If a fire investigator does not adequately investigate the fire and first determine the origin of the fire, then the cause may be incorrectly reported. At Sintra Engineering, it is our approach to review the burn patterns from a fire scene and use them to determine origin before we try to deduce the cause regardless of any pre-conceived ideas we may have as to the cause and origin of the fire. This is the only way to ensure that our investigations routinely return results that reflect what actually occurred.

SINTRA ENGINEERING: YOUR SOURCE FOR FIRE INVESTIGATIONS

Sintra Engineering is establishing itself as a leader in fire investigation in Western Canada. We are committed to providing our staff with the training they require to provide you, our clients, with the technical expertise and customer service that you expect from a forensic engineering firm. Five of our staff have been certified in fire and explosion investigation (CFEI) through the National Association of Fire Investigators (NAFI). The CFEI designation represents an accepted method and standard of evaluating the qualifications of individuals who are conducting fire, arson and explosion investigations.

The following staff at Sintra Engineering have experience in investigating both vehicle and structure fires and are Certified Fire and Explosion Investigators (CFEI):

Mark Hughes
P. Eng., CFEI

Andrew Happer
P. Eng., CFEI

Thomas Kamm
P. Eng., CFEI

Carly Fink
EIT, CFEI

Bill Shaver
CFEI

VEHICLE FIRE INVESTIGATION

When Vehicles Catch Fire

Burning More Than Just Rubber

The design of modern motor vehicles is rapidly changing and the costs of them are increasing significantly. As a result, the value of a loss in the case of a motor vehicle fire can be substantial and that leads to the economic decision to investigate a fire for possible avenues of subrogation.

As a consequence, when a vehicle has caught fire our clients generally want to know two things: where did the fire start and how did it start? Understanding the answer to the first question can give insight into the answer to the second. Without knowing the origin of the fire, a probable cause cannot be determined. In a structural fire, the area of origin is usually characterized by the most intense burning. Once an investigator has found that area, they can begin to deduce a probable cause. Due to the nature of how vehicle fires develop and spread, typical structural fire clues are not as applicable to a vehicle fire, so a different approach must be taken.

While vehicle fire investigation uses many of the same investigative principles as structure fire investigation, there are several factors that make vehicle fires a specialized form of investigation:

1) Vehicle fires develop in confined spaces and spread in unique patterns making them more difficult to analyze than structure fires.

2) Compact structures, such as vehicles, burn quickly and completely and are extremely difficult to investigate because the fire itself can destroy potential evidence.

3) The significant electrical wiring system and complex mechanical systems in vehicles require specialized knowledge of how these systems work together.

4) There are numerous sources of combustion contained within a vehicle, so vehicle fire investigators must be able to distinguish between damage by primary and secondary causes (ie. vehicle parts/components that ignited subsequent to the initial fire).

5) There are various non-intentional contributing factors, such as damage from impact, defective parts, and system failures.

Sintra Engineering has conducted numerous vehicle fire investigations over the past 10 years. With five Certified Fire and Explosion Investigators (CFEI), we are your source for helpful answers that arise out of vehicle ashes.