

Qualifications for Fire and Explosion Investigators

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The science of Fire and Explosion investigation has evolved significantly in recent years. The first edition of the “Guide to Fire and Explosion Investigations” (NFPA 921) was published in 1991 and it introduced the ‘Scientific Method’ as the accepted systematic approach to fire and explosion investigations. Many organizations, including government agencies, rebelled against NFPA 921 – openly expressing their opinion that it was only a ‘guide’ and that it was not necessary to comply with its requirements. Case Law prevailed, and NFPA 921 has been described as the ‘standard’ by which all fire and explosion investigations are judged.

I recall giving testimony at trial in January 1996 and using the scientific principles contained in NFPA 921. Although NFPA 921 was in its infancy, Justice Haley noted in her judgment that NFPA 921 contained ‘accepted fire protection engineering principles’ even though a Fire Investigator testifying on behalf of the Ontario Fire Marshal’s office insisted that NFPA 921 was only a guide and that his investigation was not bound by it.

Recent editions of NFPA 921 have expanded in scope to include ‘Legal Considerations’. This section notes that an expert’s opinion must be scientifically valid. It is no longer acceptable to provide opinion

evidence based solely on experience – an expert’s opinion must be scientifically proven in order for it to be considered reliable. This holds true for both origin determination and cause determination.

The latest edition (2008) of the ‘Standard for Professional Qualifications for Fire Investigator’ (NFPA 1033) has a significant change that relates to the increased reliance on science in fire investigations. The minimum educational requirements for a qualified Fire Investigator now include a post-secondary knowledge of a number of fire science topics.

The Professional Engineers of Ontario (PEO) has weighed in on this issue as well. Their position was explained in an article by Deputy Registrar Roger Barker, P.Eng., published in ‘Engineering Dimensions’ entitled ‘Forensic Engineering: When is it Engineering?’ (www.peo.on.ca). He advised that if a Fire Investigator ‘rules out the limited clearance as the cause of the fire, on the basis of calculations of radiant and convection heat transfer, resultant surface temperatures, etc., that opinion would fall within the practice of Professional Engineering.’ The practice of Professional Engineering in Ontario can’t be undertaken without a license.

'Like medical or legal professionals, professional engineers are licensed, and are accountable for their work. Their duty is to serve and protect the public welfare where engineering is concerned. Professional engineers subscribe to a strict code of ethics and practice standards. The practice of the profession is regulated by Professional Engineers Ontario.'

In Canada, the title "professional engineer"; is restricted by law. In Ontario, only those individuals who have demonstrated that they possess the necessary qualifications and have been licensed by PEO can use the title, which is often abbreviated as "P.Eng."

Post-secondary courses such as Fire Science, Fire Chemistry, Thermodynamics, Thermometry, Fire Dynamics, Explosion Dynamics, and Failure Analysis and Analytical Tools generally form part of the course curriculum for Engineering. The other post-secondary topics listed in NFPA 1033 including, Fire Investigation Methodology, Fire Investigation Technology, Fire Investigation, Computer Fire Modeling and Fire Analysis, have their basis in science and contain fire protection engineering principles.

The chapter on 'Origin Determination' in NFPA 921 demonstrates how science and fire protection engineering principles should be used in an assessment of the origin of a fire. A fire investigator must analyze 'fire patterns' and consider 'eye-witness observations', but he/she must also analyze 'the physics and chemistry of fire initiation, development, and growth as an instrument to related known or hypothesized fire conditions capable of producing those

conditions' and 'note the location where electrical arcing has caused damage and the electrical circuit involved'. Fire Investigators can't cross the line into the practice of engineering unless they are licensed to practice Professional Engineering in the Province of Ontario. The 'Fire Cause Determination' section of NFPA 921 prescribes the same scientific methodology.

The scientific method endorsed by NFPA 921 & 1033 were introduced during my testimony at a recent trial (Hall v. Kawartha Carpet & Tile Company Limited, 2007 CanLII 46916 – Ontario section). After considering the evidence, Justice Ferguson made several references to the use of science and engineering principles in determining the cause and origin for the fire. The following excerpts from his judgment reflect his reliance on the scientific method,

'In my opinion Mr. Rochon is the most qualified of the three because he has knowledge and experience relating to a broader range of relevant considerations including the scientific method, fire patterns and combustion. In my opinion his knowledge was more sophisticated than that of the other two experts.'

and,

'I observed as a matter of logic and common sense, and accept a number of Mr. Rochon's comments as to, the lack of logic and science underlying some of the opinions of' the other experts.

My expert testimony at another trial (Danyliw v. 578693 Ontario Ltd., 2006

CanLII 13101 – Ontario Section) referenced NFPA 921 and other peer reviewed technical and scientific papers. Justice Wright determined whether the evidence of other experts was scientifically reliable by referencing technical and scientific papers such as ‘The Ignition Handbook’ in his judgment.

Fire investigations have evolved during my 22 years of practice. It has been my experience at recent trials that expert testimony delves deeply into scientific and engineering principles. Fire Investigators must be conversant with these principles and be qualified to give opinion evidence.

Only a licensed Professional Engineer can complete a fire investigation that crosses the line into the practice of Professional Engineering. A fire investigation that is not thorough or does not include scientific or engineering principles will likely not meet the required standard of proof at trial.

Vincent Rochon is the President of Rochon Engineering Incorporated, a multi-disciplinary forensic engineering firm. He has extensive experience in the investigation of fires and is a Certified Fire and Explosion Investigator and a Certified Vehicle Fire Investigator. The Professional Engineers at Rochon Engineering Incorporated also have expertise in both accident reconstructions and vehicle fire investigation. Visit us at www.rochons.ca.

