



## Fire safety design for non-residential buildings

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 Abstract:

In the non-residential sector, prescriptive building codes often demand a higher level of fire safety be built into wood-frame buildings than into buildings of non-combustible construction. The extra cost associated with providing this higher level of safety can make wood-frame buildings less economical to build. Even when building code requirements and economics are not impediments, concerns about fire safety often cause designers or insurers to avoid the use of wood. This makes it challenging for the wood industry to capture a larger share of the non-residential market.

Performance-based fire-safety design offers the promise of eliminating the inequitable treatment of wood present in prescriptive codes. Consequently Forintek has taken steps to develop the requisite engineering tools required to undertake performance-based design. With funding from the Natural Sciences and Engineering Research Council (NSERC) and from Forintek, an NSERC Industrial Research Chair in Fire Safety Engineering was created at Carleton University in 2001 with Prof. George Hadjisophocleous as the Chair holder. Since that time, Forintek has engaged in active collaboration with the Chair in delivering his research program, and in educating students and practitioners capable of undertaking or approving performance-based design.

The Chair, Prof. George Hadjisophocleous, has just completed the last year of his five-year term. The product of his research has been the development of CURisk, a computer model for evaluating the risk from fires in three- and four-storey wood-frame commercial buildings. It is a comprehensive system model that treats the building as a system complete with fire protection systems, building characteristics, occupant characteristics and inherent functions. CURisk assesses the impact of fires on both life safety and property protection, and enables comparison

...to ensure the safety and property protection, and enable comparison of the costs and benefits of various design options.

With support from Forintek scientists, the Chair has also set up a strong educational program in fire safety engineering. A Short Course Series for practising engineers has been introduced with the fourth Short Course to be offered in May 2006. Six post-graduate courses are offered regularly on campus and across the country by internet. An Advisory Council has prepared a proposal for creation of a Graduate Level Program in Fire Safety Engineering by 2007.

The Chair has also leveraged support from Forintek and others to attract additional research funding and resources to Carleton University. Most notably, he has leveraged funding from the Canadian Foundation for Innovation and Ontario Innovation Trust to have a \$10 million Fire Research Facility constructed for Carleton University. The experimental data obtained from tests carried out in this Facility will be used to develop new and validate existing computer models to evaluate fire safety levels in buildings.

In order to introduce further refinements in CURisk and to market its use within the design community, Forintek and NSERC have recently agreed to extend the Chair's for a second five-year term. By supporting development of the requisite design tools, such as CURisk, and the training of engineers in their use, the wood industry can expect to capture a larger share of the non-residential market.

Non-residential buildings

Fire safety design

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## Fire safety design for non-residential buildings

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