

GHL provided fire protection consulting services for Alberta Art Gallery's non-traditional Atrium space.

# Safety First

GHL CONSULTANTS LTD OFFERS CREATIVE AND PRACTICAL FIRE PROTECTION SOLUTIONS FOR CLIENTS WHO THINK OUTSIDE THE BOX

**A** CASUAL STUDY OF ANY Canadian city skyline reveals that glazing tends to dominate the upper portions of buildings, while wood cladding, accents and beams are prevalent at street level. More than other materials, glass and wood have inspired architects to push the boundaries of design over the past few decades – much to the delight of both building occupants and passersby.

But as architects push the envelope, companies such as Vancouver-based GHL Consultants Ltd must help make their designs

a reality. Celebrating its 20th anniversary this year, GHL is a leading fire protection consulting firm with extensive experience in fire hazard analysis and the preparation of performance-based approaches to building code compliance. Founded by David Graham, Andrew Harmsworth and Teddy Lai, the 20-member firm is well versed in all aspects of fire science, life safety and code consulting.

In other words, while designers think primarily about esthetics and engineers worry about structural integrity, GHL

focuses exclusively on whether the plans and proposed building materials will meet fire and life-safety regulations. “Sometimes the projects we work on pose no special problems, and we can help clients obtain all the necessary permits in a reasonably short period of time,” says Graham. “But more often than not, a design will contain unforeseen challenges, and we’ll take an alternative approach to achieving compliance with the building code.” Performance-based analysis using Computational Fluid Dynamics (CFD) fire modeling is a key method of solving code challenges arising from non-traditional design and construction practices.

“And then we have projects that are a real challenge to bring to a successful conclusion,” Graham adds. “Consider renovation projects, which are extremely popular throughout North America. Designers have no idea what they face until the building is stripped down to its frame. That can create a really complex situation.”

In Vancouver, GHL has been involved in some of the city’s most successful and high-profile renovation projects including the upgrade of the Queen Elizabeth Theatre and The Stanley Theatre makeover. Handling hundreds of projects annually, GHL’s resume demonstrates the firm’s enormous contribution to not only local building development, but projects across Western Canada. GHL has worked on assembly sector projects like the Vancouver Convention Centre Expansion, Canada Place, UBC’s Museum of Anthropology and the Prince George Airport. In the health-care sector, GHL’s projects include the Abbotsford Regional Hospital and Cancer Research Centre, VGH’s Gordon and Leslie Diamond Health Care Centre, the BC Cancer Research Centre and upgrades to St. Paul’s Hospital.

Although projects take GHL across Western Canada, work is especially intense on home turf in B.C., where wood and glass enjoy a special prominence in the local architectural community. “Recent provincial government initiatives that have enabled buildings to be constructed of wood up to six storeys have inspired designers to find ways of using the material even more extensively,” says Graham. “But despite the inherent code challenges or maybe because of them, this is an exciting time to be in



our profession. One of the reasons GHL has enjoyed 20 years of steady growth is that we've consistently been the recipient of good word of mouth. Private clients, developers and governments habitually refer us to new clients and this has enabled us to preside over a wide variety of projects, even though we're best known for our proficiency in the development of shopping centres, institutional facilities, hotels and multi-tower residences."

According to GHL building code engineer Jeffrey Mitchell, fire modeling "can be as straightforward as undertaking basic calculations to define the broad parameters of a fire scenario, or as complex as using CFD models to calculate the movement of fire and smoke throughout a building." For a large project, this process can take weeks to complete. Every element of a design – building material, room dimensions, electrical, and other systems – is methodically assessed.

The Allard Hall project, the home of UBC's premier law institution, is an example of GHL's creative approach to problem solving. To reflect the openness of the Canadian legal system, the building was designed with extensive interconnection between all floor levels. This unique design, however, ran afoul of building code requirements for smoke control vestibules (which take up valuable square footage), specifically for the exit stairs and protected floor spaces. GHL's solution was to develop a performance-based smoke modeling analysis that looked at worst-case fire scenarios coupled with evacuation analysis, proving that smoke control fans could prevent smoke infiltration into the exits and protect floor spaces. Because of GHL's analysis, Allard's developers obtained the

necessary building permits without having to construct vestibules, and the building opened successfully in 2011.

GHL's work on UBC's five-storey Earth Sciences Building also required an alternative solution approach in order to permit the use of exposed, heavy timber for the building's structure and interior finish. Although the building code had been amended to permit mid-rise wood frame buildings, the amendment pertained to residential buildings only. GHL's solution was to evaluate the combustibility and structural capacity of the heavy timber structure with respect to fire. Risk analysis demonstrated that the building could be designed to provide a level of safety equal to that of a noncombustible building.

"We worked in conjunction with structural engineer Equilibrium to substantiate that exposed wood members can attain the same fire resistance as noncombustible structures," Graham says of the Earth Sciences project. In fact, it was determined that because heavy timber performs more like concrete than wood frame (as fire causes the formation of char layers in the material), heavy timber construction has significant advantages in fire safety not evident in light wood frame or steel construction. GHL is working with the Natural Sciences and Engineering Research Council (NSERC) and the National Research Council (NRC) on NEWBuildS, a research initiative focused on innovative wood design, to incorporate this knowledge into future versions of the National Building Code.

Even something as seemingly innocuous as an architect wanting stairwell glass to be sloped instead of vertical can be a huge impediment in achieving code compliance. Such was the case with the Electronic Arts

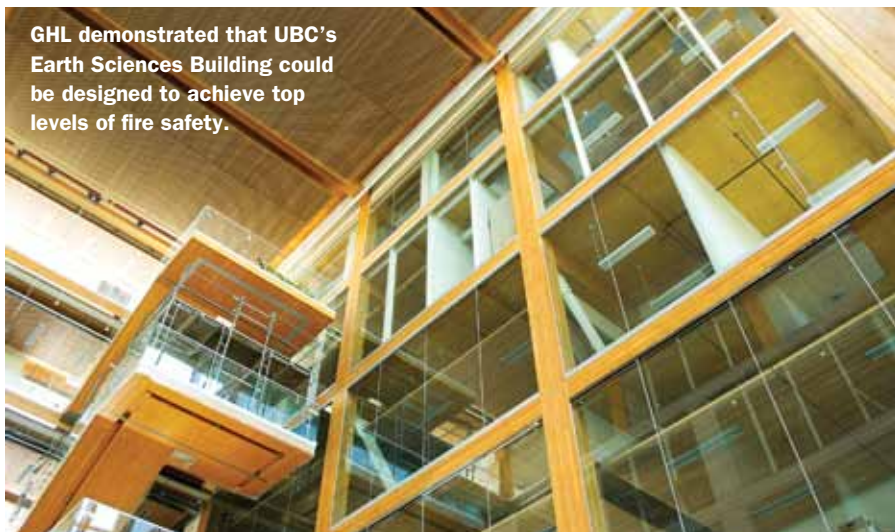


**UBC's Pharmaceutical Sciences Building required GHL's alternative solutions approach to reach acceptable levels of fire safety.**

four-storey glass atrium and spiraling stairway that Musson Cattell Mackey Partnership Architects designed in Vancouver. "That was one of many problems, and it was caused by the simple fact that fire ratings on glass are all based on vertical fire models," recalls Mitchell. "The atrium also had interconnected floor spaces that could enable fire to spread more quickly through the building." GHL's extensive fire modeling and analysis demonstrated that the design provided an acceptable level of fire safety, although Graham adds, "The atrium was a prime example of a very challenging project."

As GHL enters its third decade of operation, Graham's intention is to continue to focus on high-profile projects such as convention centres, mixed-use developments, hospitals and universities. "That's where the big challenges lie," he explains.

And challenges are what keep the GHL team in peak form. "We are problem solvers at a basic level, and we're very grateful for the enormous number of clients who rely on our analyses and recommendations to keep their building projects on track," says Graham. "Our main goal is to simply keep doing what we've always done – moving forward while maintaining our level of high-quality work." ■



**GHl demonstrated that UBC's Earth Sciences Building could be designed to achieve top levels of fire safety.**

*This promotional feature was prepared for GHl Consultants Ltd. by BCBusiness magazine's Special Advertising Features Dept. Writer: Robin Brunet. For more information contact VP of corporate features John Cochrane at 604-299-7311. Email: jcochrane@canadawide.com*