

**BRIAN HUBBS, P.Eng., BEP**

**Expertise & Role**

Mr. Hubbs has over 20 years experience as a consultant practicing exclusively in the field of building science. Brian is recognized by his peers as being a practical building science engineer and researcher who consistently delivers innovative solutions. He has a unique blend of theoretical and hands-on knowledge gained from completing hundreds of building enclosure investigations and rehabilitation projects as well as from design consulting and construction review of building enclosures for new buildings. Brian's experience includes work on both high and low-rise commercial, institutional and residential building projects in many cities and in virtually all climatic regions across Canada and the United States.

Brian has extensive experience with a variety of building enclosure systems, components, and materials. This includes steep and low-slope roofing systems, wall cladding of all types (masonry, EIFS, concrete, metal panel, stucco, wood, vinyl siding, etc.), windows, glazing, glass/metal curtain walls and skylights, as well as below-grade and plaza waterproofing systems.

Brian is skilled in the design, forensic investigation, and repair of pressurized high humidity natatoriums, museums, and galleries in cold climates.

Brian is a Principal and shareholder of RDH and as such participates in the overall direction and management of the firm.

**Education**

B.A.Sc., Civil Engineering, Management Science Option, University of Waterloo, ON

Building Envelope Professional (BEP), AIBC/APEGBC program

**Memberships**

Association of Professional Engineers & Geoscientists of British Columbia

CSA A119 - Technical Committee on Performance Standards for Windows

- CSA A440 Windows
- AAMA/WDMA/CSA 101/I.S.2/A440-05 Standard/Specification for windows, doors, and unit skylights
- AAMA/WDMA/CSA 101/I.S.2/A440S1-07 Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440-05

CAN/CSA A440.4 Subcommittee on the Recommended Practice for the Installation of Windows, Doors, and Skylights - CSA A440.4

National Building Code, Joint Part 5 & Part 9 Task Group on Harmonized Window, Door and Unit Skylight Standard 101/I.S.2/A440.

Insulating Glass Manufacturers Alliance (IGMA) Technical Services Committee

ASTM International, Technical Committee D08 on Roofing and Waterproofing

British Columbia Building Envelope Council

Past Member, Technical Committee, Glazing Contractors of British Columbia

**Senior Building Science Specialist**



**Typical Projects**

**NEW CONSTRUCTION**

Brian regularly leads new construction building enclosure design, integration, field review and capital planning projects on high-rise commercial, multi-unit residential, and wood frame buildings. Some examples include:

- Westbank - Shangri-La, Vancouver, BC
- Intrawest - Honua Kai development, Hawaii
- ASPAC Coal Harbour Development, Vancouver, BC
- Concord Pacific - Centerville Development (16 high-rise towers), Vancouver, BC
- Nisga'a Museum, New Aiyansh, BC
- Metrotower 3, Burnaby, BC

**INVESTIGATION AND REHABILITATION**

Brian has provided investigation, design, and construction review for rehabilitation programs to address the enclosure failures on over 50 high-rise and low-rise buildings in British Columbia and the Pacific Northwest. Some of these include buildings with challenging special use requirements, such as:

- Alberta Art Gallery, Edmonton, AB
- Fernie Aquatic Centre, Fernie, BC
- UBC Museum of Anthropology, Vancouver, BC
- Belkin Art Gallery, Vancouver, BC
- Seattle Asian Art Museum, Seattle, WA
- Museum of History and Industry, Seattle, WA

**EXPERT SUPPORT**

The legal community recognizes Brian's expertise and experience. He is regularly asked to provide expert reports and testimony regarding design and construction-related building enclosure performance problems. As an indication of his unbiased opinion, it is not uncommon for a group of defendants to accept Brian as an objective technical expert for all parties in order to avoid other, more costly conflict resolution options.

**Guideline & Research Projects**

As one of the key contributors to the evolution of building enclosure technology in British Columbia, Brian has led landmark policy, guideline and research related initiatives including:

- Performance Monitoring of Rainscreen Wall Assemblies in Vancouver British Columbia – 2007, CMHC, HPO and BCHMC.

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This project was initiated as a result of recommendations from the Barrett Commission to ensure that new rainscreen wall designs were performing as expected. The project included the design and implementation of a comprehensive long term monitoring system on five buildings, which incorporated new rainscreen wall assemblies. Data from the first five years in service was collected and analyzed. Results from this study have been used to improve rainscreen wall designs for the coastal climate and make them less vulnerable to internal moisture sources and condensation.

Brian has had a significant author role in the following guideline and research projects:

- Best Practice Guide: Wood Frame Envelopes in the Coastal Climate of British Columbia (1998, CMHC). This guideline has become the benchmark for wood frame construction in British Columbia.
- Building Envelope Rehabilitation Guides; one for consultants, and one for property managers and owners (2001, CMHC). These guideline documents contributed to a consistent approach to the evaluation, design and implementation of construction for moisture-damaged buildings.
- Water Penetration Resistance of Windows – Study of Manufacturing, Building Design, Installation and Maintenance Factors & Study of Codes, Standards, Testing and Certification (2003, CMHC, BC HPO). These national studies are the most comprehensive analysis of the variety of factors influencing window water penetration performance.
- Study of Poured-in-place Concrete Wall Performance in Coastal British Columbia (2004, CMHC, BC HPO). Variables impacting this increasingly popular construction type were examined, and design and construction guidelines were developed.
- Development of a new comprehensive Best Practice Guide – Windows publication, addressing the selection of appropriate windows and design of the wall to window interface for use across North America.
- Field Survey and preparation of a guideline for Heating Ventilation and Air Conditioning (HVAC) for multi-unit residential construction in the U.S. Pacific North-West. This project examined the interaction of HVAC, the performance of the building enclosure as well as the impact of the occupants to develop practical recommendations for achieving acceptable indoor air quality, as well as quantity and distribution of heat for occupant comfort and condensation control.

### Publications

Brian regularly publishes research papers at internationally recognized science and technology conferences. A sample of his more recent papers includes:

- Monitoring of Historic Structures for Whole Building Improvements. 2010 International Building Envelope Systems and Technologies (ICBEST) Conference. Vancouver, BC, June 2010.
- Moisture Transport by Osmotic Flow through Waterproofing Membranes – Towards the Development of Osmosis Resistant Membranes. 2010 International

Building Envelope Systems and Technologies (ICBEST) Conference. Vancouver, BC, June 2010.

- Osmosis and the Blistering of Polyurethane Waterproofing Membranes. 2<sup>nd</sup> Building Enclosure Science and Technology (BEST2) Conference. Portland, OR, April 2010.
- A New Paradigm for the Design of Sustainable Buildings. 2<sup>nd</sup> Building Enclosure Science and Technology (BEST2) Conference. Portland, OR, April 2010.
- Long Term Building Performance Monitoring – What Have We Learned. RCI Building Envelope Technology Symposium. San Diego, October 2008.
- Hygrothermal Performance and Drying Potential of Wood Frame Rainscreen Walls in Vancouver's Coastal Climate. 11<sup>th</sup> Canadian Conference on Building Science and Technology. Banff, AB, March 2007.
- Balancing the Control of Heat, Air, Moisture, and Competing Interests. 11<sup>th</sup> Canadian Conference on Building Science and Technology. Banff, AB, March 2007.
- Building Envelope Performance Monitoring and Modeling of West Coast Rainscreen Enclosures. 3<sup>rd</sup> International Building Physics Conference. Montreal, QC, August 2006.
- “Cast-in-Place Concrete Cladding: Is It All It's Cracked Up To Be?” Proceedings from 11th Canadian Conference on Building Science and Technology. Banff, AB, 2007.

### Presentations & Lectures

Brian regularly speaks at seminars, conferences and guest lectures. A sample of these presentations includes:

- University of Oregon, School of Architecture, ARCH 471-571. Co-development of a Building Enclosure course and lecturing to fourth year and graduate architectural students at the University, 2005-2007
- University of British Columbia, School of Architecture, ARCH 351. “Forensic Investigation and Repair - Belkin Art Gallery.” 2001-2004
- “Canadian High Performance Residential Building Envelope Systems.” Can/Asia Conference, Canadian Mortgage and Housing Corporation, Vancouver, BC, 2000
- “The Role of the Building Envelope Consultant.” Construction Defects Conference, The Seminar Group, Portland OR, 2006
- “Current Window Installation Trends.” BC Hydro Task Group, Vancouver, BC, 2005
- “Mass Concrete Walls-Thermal Analysis.” UK Warranty Providers, Home Protection Office, Vancouver, BC, 2003
- “Water Penetration Resistance of Windows.” Alberta Building Envelope Council, Calgary, 2002 and British Columbia Building Envelope Council, Vancouver, BC, 2001
- “Waterproofing Performance Expectations.” British Columbia Building Envelope Council, Vancouver, BC, 2004
- “The Building Envelope Rehabilitation Process.” Home Protection Office Information Sessions, Vancouver, BC, 2000-2003
- “Risk Management.” Walsh Construction Seminar, Seattle, WA, 2005
- “The Windows Best Practice Guide.” Glazing Contractors Association of British Columbia, Vancouver, BC, 2006