

# **Masonry & Concrete CONDITION ASSESSMENTS using Drone Technology**



## **Aerial Surveys of Buildings and Structures using Ultralight Drones fitted with High Resolution Cameras**



## **Specialist Consulting Services for the Conservation of Heritage Masonry**



**Paul Jeffs**

As founder and principal of PJ Materials Consultants Limited, (PJMC) Paul Jeffs specializes in the conservation of masonry structures ~ in particular, historical buildings. Prior to forming the operation in 1989, he was employed for over 25 years within the construction industry around the world, including Europe, the Middle East, South East Asia and the Far East. For the last eighteen years of this time he was employed by a multi-national group headquartered in the United Kingdom which manufactured a vast range of materials and products for construction-related industries.

Paul Jeffs has conducted investigations and building condition assessments and reported on the conservation of heritage structures and older buildings, either as Prime Consultant or Sub-Consultant, under such authorities as PWGSC, Parks Canada, (Atlantic Region), Halifax Regional Municipality, (NS), Region of Peel, Ont, Canadian Coast Guard (NF), Ministry of Transportation, Ontario, City of Belleville, City of Collingwood, City of Fredericton, City of Guelph, Region of Waterloo, Hamilton Regional Conservation Authority. and the City of Hamilton.

Investigations have included the review of existing conditions - utilizing non-destructive testing techniques where appropriate, such as Ground Penetrating Radar, Infra-Red Thermography, Boroscope - identification of repairs, replacements and/or restoration of building components, including identification of potential costs for such work. Paul also specializes in the development of conservation strategies which address the causes as well as the result of deterioration, damage and/or deficiencies. When appropriate, strategies have been developed and implemented to comply with the appropriate Heritage Foundation authority's requirements and the guiding principles of Parks Canada's "Standards & Guidelines for the Conservation of Historic Places in Canada". Paul has also developed or assisted in the development of specifications and contract documents, managing the bidding and award processes and providing review services for the project.

PJMC has provided consulting or sub-consulting services for the investigation and/or conservation of many National Heritage Structures and/or historically significant structures, including, Cape Race Lighthouse, (NF), Church of Our Lady Immaculate, Guelph, (ON), Brampton Heritage Complex, (ON), the Old Arts Building, UNB, Saint John Carleton Martello Tower, (NB), the City Halls of Belleville & St Catharines, (ON), Fredericton, (NB), & Halifax, (NS), Collingwood Town Hall & Curling Club (ON), Dingle Memorial Tower, Halifax, (NS), Moncton High School (NB), The Ordnance Building, Saint John, NB., The Departmental Building & The Old Education Building, Fredericton (NB), Hammond House and the Owens Art Gallery, Sackville, (NB). PJ Materials Consultants Ltd received the City of Fredericton Development Committee's 2011 award in recognition of its contribution to the historic preservation of City Hall Fredericton. Under the authority of PWGSC, sub-consulting services have been provided for Condition Assessments of Federal Buildings in Toronto, Windsor and Brantford (ON). as well as Fredericton (NB).

### **Educational Services**

Paul has provided technical professional development courses across Canada through PJ Materials Consultants Limited and the Continuing Technical Education Division of Dalhousie University; attendees have included representatives from such authorities as PWGSC, Parks Canada & Defence Construction Canada. He was also an instructor for the Professional Development Centre of the University of Toronto providing course modules and special event courses as part of their Building Science Certificate Program. He has also presented for many organizations, such as the Capital Projects & Design, Precinct Properties Branch of the Legislative Assembly of Ontario, the National Capital Commission, the Canadian Society for Civil Engineering and the Ontario Building Envelope Council. Professional Development Technical Training Courses include such topics as Conservation of Heritage Structures & Older Buildings and Masonry Restoration Projects ~ Case Studies, Paul has been a guest lecturer at several Canadian universities, he has authored and presented papers at many national and international conferences and has been a regular presenter of technical training courses in the Middle East.

### **Technical Articles**

Paul Jeffs has authored numerous technical articles, including: “Core Rubble Grouting of Heritage Structure Masonry Walls & Foundations Using Grouting Techniques ~ Canadian Case Studies” *9th Canadian Masonry Symposium*; Fredericton, NB, 2004; “Building Masonry with Natural Stone”, *Construction Canada*, November, 2003; “Stabilizing Cracked Masonry” *Construction Canada*, January 2007; “Cape Race Lighthouse ~ A History of Restoration”, *Construction Canada*, May 2007; “A Tale of Two Towers”, *Construction Canada*, November 2008; “Masonry Restoration ~ The Importance of Cause Analysis”, *Construction Canada*, November 2010. “Modern Materials & Techniques for Historic Masonry Structures” *Pushing the Envelope Canada* (OBEC) Spring 2011, “Traditional vs Modern Repointing Mortar”, *Home Builder*, September 2014 “Restoring a Solid Foundation”, *Pushing the Envelope* (OBEC) Fall 2013 & “Re-roofing Projects for Heritage Buildings & Damaged Masonry ~ Is there a Connection?”, *Interface* (The Journal of Roofing Consultants Institute) January 2014.

### **Published Books**

Paul is the self-published author of three books:

**Conservation of Heritage Masonry - Canadian Project Case Studies** (2021); Featuring case studies of conservation projects that illustrate the implementation of practical strategies based on technical concepts

**Investigating Concrete Problems - Learning from Those Who Learned the Hard Way** (2022); Real-world practical examples of concrete failures, defects and deterioration that can be caused by inappropriate specifications and/or the selection of incorrect materials and techniques - or just poor workmanship!

**Masonry Problems - Investigation, Identification & Restoration** (2022) Real-world practical examples of masonry defects and deterioration that can be caused by inappropriate design and construction - or by just poor workmanship!.



# Inspections & Aerial Photography using Remotely Operated Drone Technology

In 2015, taking advantage of the evolution in modern technology, PJ Materials Consultants Limited introduced a new way to carry out condition assessments of a variety of different types of concrete and masonry structures - using ultra-lightweight, remotely operated unmanned aerial vehicles fitted with high definition cameras.



This advanced technology is available for owners, architects, consulting engineers and property managers. In fact anyone who needs close up images of any type of structure can take advantage of this service.

At the time of publication over 100 buildings and structures have been successfully inspected. Just a few of the clients have included:-

PWGSC	Department of Fisheries & Oceans
City of Guelph	Hamilton Conservation Authority
City of Belleville	Mount Allison University
City of Fredericton	Basilica of Our Lady, Guelph
Niagara Parks Commission	City of Hamilton
Town of Collingwood	University of New Brunswick

**Experienced Pilot and Inspector Team**



## Drone Building Inspections Project References

- More than 100 buildings and structures have been inspected using a PJ Materials Consultants' drone ~ many of these have been heritage structures, including several National Historic Site. Examples of some of these include:-



Officer's Quarters, Fredericton



Fredericton City Hall



Sir Howard Douglas Hall, Fredericton



Old Gate House, Niagara Falls



Knox Presbyterian Church,  
Oakville, Ontario



Justice Building, Fredericton



Owens Art Gallery, Sackville, NB



Darnley Mill, Nr Hamilton, ON



Chantry Island Lighthouse, ON



Belleville City Hall



Guelph Civic Museum



Collingwood Town Hall



Paul Martin Bldg Windsor