PJ Materials Consultants Limited

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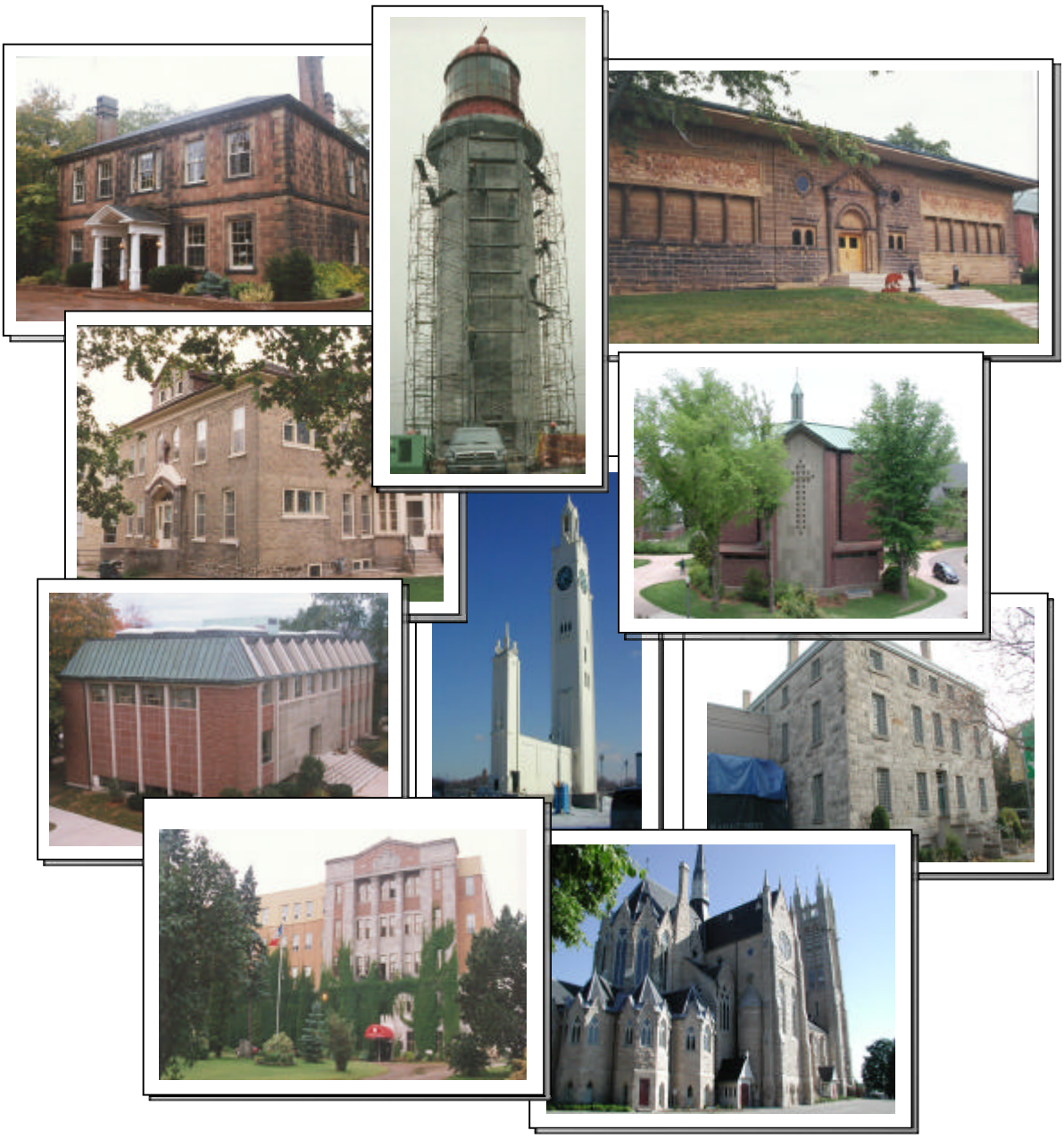

Specialist Consulting Services for the Construction, Restoration and Protection of Concrete & Masonry Structures

Please Visit Our Web Site:
http://www.pjmc.net

15TH ANNIVERSARY
1989 | 2004

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Paul Jeffs
President

As principal of PJ Materials Consultants Limited, Paul Jeffs specialises in masonry and concrete structures and provides technical advice at all stages of construction or restoration and conservation. Prior to forming the operation in 1989, he was employed for over 25 years within the construction industry around the world. 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. In 1976 he transferred from England to the Middle East, living for three years in Bahrain and Iran. During this time he was involved in many projects throughout the Arabian Gulf, including Saudi Arabia, Kuwait, United Arab Emirates and Qatar. In 1979 he moved to Japan and established a regional base from where he became involved in projects throughout South East Asia, including the Philippines, the Republic of Korea, Hong Kong, Taiwan, Indonesia, Singapore and Malaysia. Prior to emigrating to Canada in 1982, he was also involved in construction projects in South Africa and India.

Paul is a member of the American Concrete Institute and the Canadian National Research Council's Working Party on Repointing Mortars. He is a past director of the Concrete Restoration Association of Ontario and served as a member of the Technical Advisory Committee to the Ontario Ministry of Housing for the deterioration and repair of existing parking structures. He has also served as an associate member of the Canadian Standards Association's S-413 Technical Committee for Parking Structures, as a member of the A-266 Concrete Admixtures technical committee and as a member of the Ontario Ministry of Transportation's Technical Advisory Committee which developed provincial standard specifications for concrete restoration.

Paul is a lecturer for the Continuing Technical Education Division of Dalhousie University and has presented for many organizations, such as the National Capital Commission, the Canadian Dam Association and the Canadian Society for Civil Engineering. He provides training courses and technical seminars on such topics as Restoration, Reconstruction & Maintenance of Masonry Structures; Restoration & Conservation of Heritage Structures & Older Buildings, Modern Concrete Materials & Practices, Concrete Repair & Protection; and Designing, Specifying & Constructing Concrete Slabs on Grade. He has been a guest lecturer at several Canadian universities, he has authored and presented papers at many national and international conferences and is a regular presenter of technical training courses in the Middle East.

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Project Profiles

The projects detailed below are two examples of restoration projects for which PJ Materials Consultants were the Consultants
(Please check out our web site for additional examples)

Cape Race Lighthouse

Constructed in 1905 and situated in Newfoundland, Cape Race Lighthouse is the oldest reinforced concrete light-tower in North America. The tower underwent three major attempts at restoration in 1937, 1969 and 1983 - the first two projects based on adding an extra layer of concrete to the original tower. All of these attempts failed to address the original causes of the accelerated deterioration and damage and the tower continued to suffer the effects of cracking, freeze-thaw damage and corrosion of embedded reinforcing steel. In 1995, the tower was closed to the public due to the potential hazards of falling concrete debris.

In 1996, PJ Materials Consultants carried out a detailed investigation of the tower's condition and devised and implemented a new restoration strategy on behalf of the Canadian Coast Guard. The restoration work, which was completed in 2000, included the installation of vertical joints, installed through the outer layer of concrete, to better accommodate differential movement. The strategy also included the installation of helical stainless steel masonry ties, the repair of deteriorated concrete and the application of a breathable, waterproof coating. The strategy also included a monitoring programme which determined the appropriateness of coating the concrete after a period of forced drying.

Owens Art Gallery

Situated on Mount Allison University's beautiful campus in Sackville, New Brunswick, the Owens Art Gallery is the oldest university museum and art gallery in Canada. Constructed in 1895, the art gallery underwent a major renovation in 1971 which included replacement of the roof. Unfortunately, the reconstruction work caused considerable damage to the inner core rubble of the masonry which - together with decades of water infiltration through joints - led to cracking and displacement of masonry units.

PJ Materials Consultants were retained in 1996 to identify the cause of the problem - which was unknown at that time - as well as to devise the restoration strategy and oversee the project. The work included grouting of the inner core rubble using a lightweight cellular grout - after the installation of special stainless steel masonry ties - the waterproofing of below grade foundations, and the repointing of masonry joints using a lime-basedmortar.

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Project Profile

The project detailed below is a further example of restoration projects for which PJ Materials Consultants were the Consultants
(Please check out our web site for additional examples)

Saint Louis Parish Church Convent, Waterloo, Ontario

This 100-year old convent suffered badly from cracks within the brick masonry and there had been many attempts at repair over the years - all of them failing, with the result that rainwater continually entered the masonry assembly.

An investigation carried out by PJ Materials Consultants determined that the most likely cause of the problem was below grade water infiltration. Rainwater was penetrating through deteriorated mortar joints in the rubble stone foundation wall to cause disintegration of the inner core rubble lime binder. This in turn was causing lack of adequate restraint to stresses developed during extremes of temperature change, resulting in differential movement and settlement, to ultimately cause the cracking problems.

A restoration strategy was devised which included below grade waterproofing, grouting of the voids within the foundations walls using a lightweight cellular foam, the installation of stainless steel masonry ties across the foundation wall and across cracks within the brick masonry and finally cutting out and repointing all cracked mortar joints. In spite of several severe winters and the extremes of temperature, the masonry has remained crack-free and the basement is now dry.

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Project References

University Chapel - Constructed in 1975

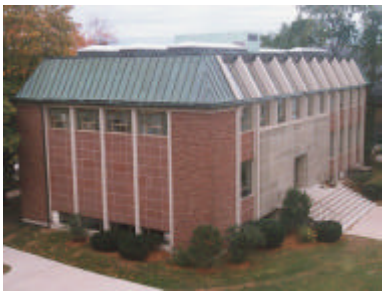
The stone window units on three sides of this beautiful contemporary style place of worship were suffering from inadequate movement accommodation - largely due to the use of a hard cement mortar when they were installed. As a result, many of the units suffered from damage and rainwater infiltrated to the interior at some location. After an investigation by PJ Materials Consultants Limited, a restoration strategy was devised which has resolved the problem. Many of the units were secured in place using semi-flexible stainless steel ties and the hard mortar was cut out and replacedwith an elastomeric sealant.

Client: Mount Allison University, Sackville, New Brunswick.

Gairdner Fine Arts Building - Constructed 1971

This campus building suffered badly from inadequate accommodation of movement, even after a major attempt at restoration during the early 1990's. As a result of the poor movement accommodation, concrete columns were badly deteriorating and water infiltration entered the building through cracks. Following a comprehensive study of the problem by PJ Materials Consultants Limited, a strategy was implemented which created a sliding movement joint within the structural steel beam spanning the columns. Hard cement mortar was removed from cladding panel joints which were sealed with an elastomeric sealant and movement accommodating jointswereformed between column lifts.

Client: Mount Allison University, Sackville, New Brunswick.



Cranewood House, Sackville, NB - Constructed from 1836

PJ Materials Consultants were retained to develop a restoration strategy and to supervise the first phase of the exterior restoration of historical Cranewood House - once the home of William Crane, a member of the New Brunswick legislature in the early 1800's. Carried out in 2000, the restoration work predominantly included localized repointing of the sandstone masonry joints using a lime-based mortar, but also required reconstruction of the main entrance porch, and localized pinning of damaged or dislodged sandstonewindow mullion units using stainless steel masonry ties.

Client: Mount Allison University, Sackville, New Brunswick

Memramcook Institute, NB. - Constructed from 1864

PJ Materials Consultants Limited provided sub-consulting services to the Prime Consultant, who was retained by N.B. Dept of Supply & Services, to provide assistance during the investigation of deteriorated masonry and to provide technical advice during the development of a restoration strategy and specifications. The major restoration work is being carried out in several phases over several years. The first phase, which was carried out in 2000, included the complete replacement of the outer brick wythe of one elevation of the building and the rebuilding of the corner of another elevation - including the repair of damaged sandstone quoin units.

Client: Arthur Arseneau Architects, Sackville, New Brunswick

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Church of Our Lady, Guelph, Ontario - Constructed from 1877

An investigation of this National Historic Site was carried out in 2002 to determine the cause of major cracks that had occurred in the twin tower masonry. The investigation, utilizing visual inspection and ground penetrating radar non-destructive testing, confirmed that the most likely cause of the damage has been lack of movement accommodation and destabilisation of the inner core rubble, which is preventing uniform distribution of loads across the full mass of solid masonry. A detailed investigation report was prepared which identifies a comprehensive restoration strategy and funding for work is currently under development.

Client: Church of Our Lady Parish, Guelph, Ontario

Saint Louis Convent, Waterloo, Ontario - Constructed in 1895

The convent is a brick masonry structure supported on a double wythe foundation wall. In 2000, PJ Materials Consultants investigated the cause of masonry damage and identified that the problem was related to deterioration of the inner core rubble within the below grade foundation walls. A restoration strategy was devised which included below grade waterproofing, grouting of the inner core, installation of helical stainless steelmasonry ties, repair of a cracks and repointing of cracked and deteriorated masonry joints.

Client: St. Louis Parish Church, Waterloo, Ontario

County of Peel Jail (now a Museum), Brampton, Ontario - Constructed in 1866

As part of the Brampton Heritage Complex restoration programme, PJ Materials Consultants devised and supervised an appropriate strategy to address concerns regarding cracking and deterioration ofmasonry joints of the old jail building. The work - carried out in two stages during 2001 - included the installation of helical stainless steel masonry ties, installation of lintel joint reinforcement, crack repair and complete repointing of allmasonry joints.

Client: Region of Peel, Brampton, Ontario

Peel County Courthouse (now Municipal Offices) - Constructed in 1866

Also part of the Brampton Heritage Complex, the old courthouse building had suffered from deteriorated joints and cracked masonry. PJ Materials Consultants carried out a detailed investigation of the exterior of the building, devised an appropriate restoration strategy, prepared technical specifications and supervised the work. The restoration project, which was carried out in two stages during 2000 and 2001, included the installation of helical stainless steel masonry ties, crack repair and repointing of foundation wall masonry joints.

Client: Region of Peel, Brampton, Ontario

Clock Tower, Old Port of Montreal - Constructed from 1919

PJ Materials Consultants provided sub-consulting services to the Prime Consultants - who were retained by Public Works & Government Services, Canada - to assist in the development of a restoration strategy and to provide on-site advice for the restoration of this historical monument. Carried out in 2001, the work primarily consisted of removal of the old stucco coating, repair of concrete and parged concrete masonry units and the application of a new breathable, elastomeric coating.

Client: Duschenes & Fish Architects, Montreal, PQ

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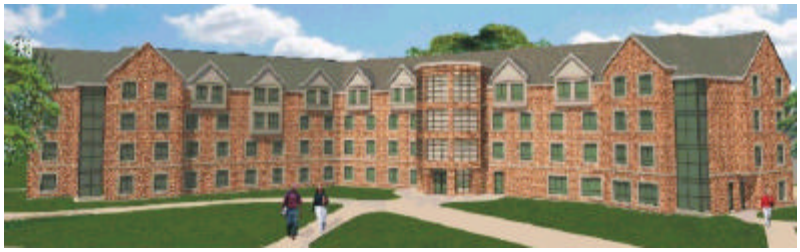
Project References

New Residence Hall - New Brunswick

PJ Materials Consultants Limited were retained as Stone Consultant to the Prime Consultant to source the red sandstone masonry units and buff window and door surround units and to provide technical advice for the masonry construction of this beautiful new campus residence building, which is currently under construction.

Client: Mount Allison University, NB



Convocation Hall Building - New Brunswick

The sandstone cladding panels and columns were suffering the effects of inadequate movement accommodation due to the use of a hard cement mortar to joint the units. The consulting services provided by PJ Materials Consultants Limited were retained to develop and implement a strategy to correct this problem. This included cutting out the mortar and installing a more appropriate elastomeric joint sealant.

Client: Mount Allison University, New Brunswick

Marjorie Bell Music Conservatory, New Brunswick

The masonry walls of this attractive sandstone building suffered from cracking and many attempts had been made to repoint the step-crack patterns at several locations - each attempt failing to cure the problem. After an investigation by PJMaterials Consultants, it was determined that the original design lacked sufficient expansion joints to facilitate all of the movement due to temperature change. The answer was to “stitch” the cracks and install joints at key locations and install an elastomeric joint sealant that blended with the natural appearance of the sandstone. Following this work, which was carried out in 2000, themasonry has remained crack-free.

Client: Mount Allison University, New Brunswick

The Dunn Physics, Engineering & Geology Building, NB

The consulting services of PJ Materials Consultants were retained to develop specifications and assist in the sourcing and fabrication of the red sandstone masonry units and buff window and door surround units required for this attractive campus building. A quality assurance programme was also developed to provide for winter seasoning of the quarried stone prior to fabrication and outside storage.

Client: Mount Allison University, Sackville, NB

Flemington Building, Sackville, New Brunswick

Problems were encountered with this beautiful red sandstone building. Rainwater leaked to the interior and continually caused damage to decorations, although it was not obvious where water actually infiltrated. An investigation by PJ Materials Consultants revealed that the source of the problem was deteriorated mortar joints between the coping stone units on the gable ends as well as damaged flashings. Problems of leakage to the interior ceased once these defectswerecorrected.

Client: Mount Allison University

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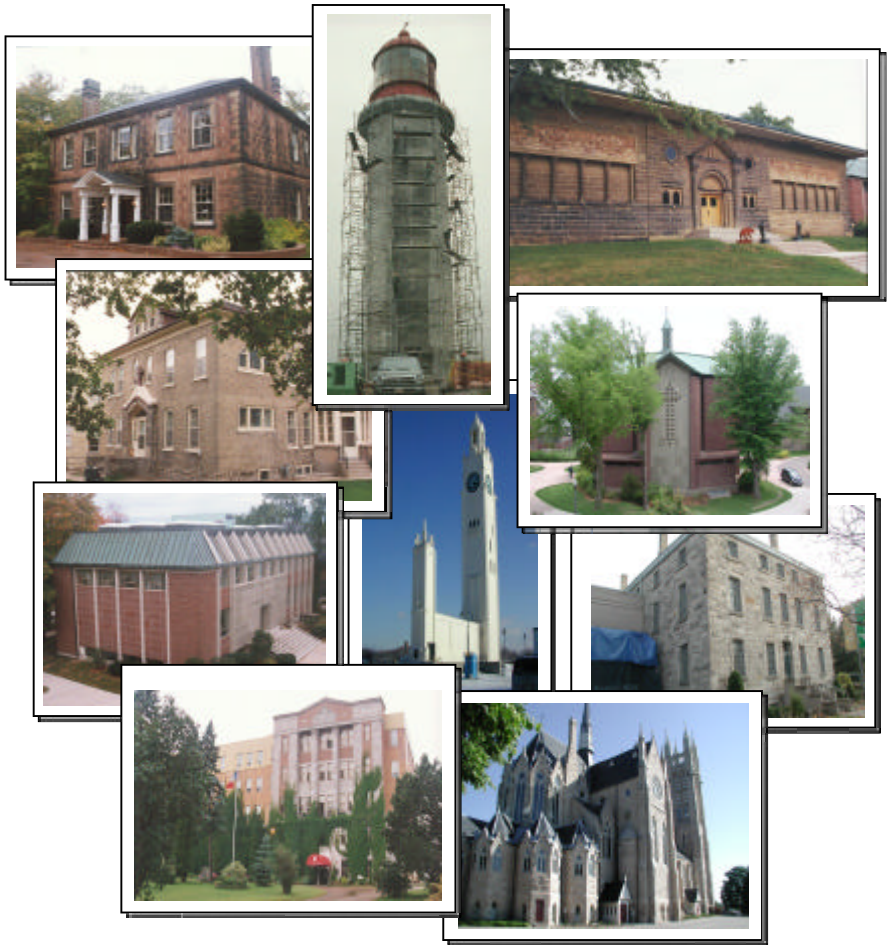

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