

MONTHLY TECHNICAL SESSION
Building Envelope Council of Ottawa Region

NONDESTRUCTIVE TESTING & MONITORING
NORTH AMERICAN CASE STUDIES

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PRESENTATION OUTLINE

The investigation of deteriorated buildings and masonry structures without creating damage to the fabric can be a difficult task. The challenges facing the investigator often include learning sufficient information regarding the masonry assembly to reliably identify primary and contributory causes of damage, and how to evaluate the condition and extent of hidden components. Without sufficient, meaningful information, the development of an effective restoration strategy can become extremely difficult and this often results in destructive evaluation methods being utilised, such as the extensive removal of exterior masonry units.

Nondestructive testing (NDT) methods and computerised monitoring devices are now available that may be used to evaluate all types of buildings, including heritage structures and older masonry. This joint presentation first provides details of a range of NDT and monitoring methods to assist in the effective development of restoration and conservation strategies. In particular, impact echo, ground penetrating radar and dynamic vibration response testing of stone, brick and concrete block masonry assemblies are presented, together with selected examples of the data that they can provide to the investigator. The second part of the presentation provides examples where the methods have been used as diagnostic tools for a range of investigations, including the detection of voids and hidden damage within solid masonry and the identification of damaged brick header units. The evaluation of delaminated dimension stone units and the determination of the condition of grouted cores with concrete block construction will also be presented. Case studies will also be used to illustrate the use of monitoring devices to determine crack and joint movement, as well as moisture-related conditions within masonry assemblies and the way in which the data can be used to determine the wetting/drying characteristics of the fabric.

PRESENTERS



Ron Grieve has over 30 years experience within concrete related industries across North America and Europe. Prior to founding his own consultancy company in 1987 to offer NDT and computer monitoring services, he was employed by an international geotechnical company as the head of their concrete division. Ron is a leading Canadian expert in the field of computer aided technology for the investigation of concrete and masonry structures. He was a pioneer in the field application of impact-echo testing in Canada and has used this technology on many types of structures. Today, he uses a wide of range of nondestructive testing equipment, including impact-echo, ground penetrating radar and dynamic vibration response. He has also developed a range of miniature data loggers and computer aided remote monitoring systems to

evaluate the dynamics of structures such as stress, movement, humidity, temperature, corrosion and motion changes.

Prior to forming PJ Materials Consultants in 1989 as an independent consulting operation based in Guelph, Ontario, **Paul Jeffs** was employed for over 25 years within the construction industry around the world, including Europe, the Middle East and South-East Asia and the Far East. Paul has provided materials related expertise as a consultant for numerous industries and regularly investigates problems with both concrete and masonry structures prior to the development of restoration strategies. Paul provides technical courses across Canada on a variety of topics related to concrete and masonry. He also regularly presents public and in-house courses in the Middle East. Paul has been a guest lecturer for several Canadian universities, as well as the Canadian Society for Civil Engineering. He has been a speaker at many conferences and has authored or co-authored numerous technical articles.

