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## October 2019 Seminar

### NOTABLE REHABILITATION OF WESTHAM ISLAND BRIDGE & ALEXANDRA BRIDGE

<b>Date:</b>	Wednesday - October 23, 2019
<b>Venue:</b>	Room C300 Theatre, UBC Robson Square @ 800 Robson Street, Vancouver
<b>Time:</b>	Refreshments at 6:00pm, followed by presentation at 6:30pm
<b>Presenter:</b>	Casey Leggett, M.Eng., P.Eng., Principal Project Engineer (Westham Island Bridge Rehabilitation) Arman Shahnaz, M.Eng., P.Eng., P.E., Project Engineer (Westham Island Bridge Rehabilitation) Jason Dowling, PhD, Bridge Engineer (Extending the Life of the Alexandra Bridge)
<b>Cost:</b>	Free for SEABC Members and \$85 for non-members Registration is required: <a href="http://www.seabc.ca/Bridge-Rehab">www.seabc.ca/Bridge-Rehab</a>

#### NOTABLE REHABILITATION OF THE WESTHAM ISLAND BRIDGE

The Westham Island Bridge, originally constructed between 1909 and 1912, is a 325-meter long bridge of 34 variable length spans. Comprised of trestle-style approaches and constructed largely of timber elements, several of its spans are supported by steel stringers. Its approaches provide access to a 38-meter timber Howe Truss, a 50-meter steel Callender-Hamilton Truss, and a two-span, 44-meter movable steel Howe Truss – Swing Span.

One of Metro Vancouver's oldest and historic structures, the Westham Island Bridge is the single gateway onto Westham Island in Delta, BC. Entering its 110<sup>th</sup> year, the Westham Island Bridge has gone through numerous rehabilitations over the years. Most recently, the bridge underwent rehabilitation in 2019 addressing significant deterioration in several components. The ongoing project includes an additional phase addressing scour at the West Approach, which is planned for construction in 2020. Annual monitoring and maintenance of the bridge continues.



#### EXTENDING THE LIFE OF THE ALEXANDRA BRIDGE

The iconic Alexandra Bridge, is 487-meter long and built in the early 1960's to carry the Trans-Canada Highway 1 traffic across the Fraser River. It comprises of a 257-meter long riveted steel arch main span and multiple steel girder approach spans with concrete decks. Its detailed condition assessment and renewal options report in 2009 concluded that the bridge needed major deck rehabilitation and seismic retrofit. Subsequent rehabilitation design work addressed structural safety, structure deterioration and functionality concerns by incorporating a partial-depth reinforced concrete deck overlay and addressing concrete deterioration while facilitating widening of the roadway deck to 12.2-meters with new barriers. The main components of its seismic retrofit included re-articulation of the

approach spans with installation of link decks across breather joints near the arch crown and installation of new elastomeric bearings. In its approach spans, the deck was selectively made composite with the girder top flanges using shear studs for increased capacity. The approach girders were also strengthened for shear and moment at select locations. Rehabilitation work also included deck joint replacements, concrete substructure repairs, and drainage modifications to improve structural durability. Several of the rehabilitation features fulfilled multiple functions to extend the usable life of this iconic bridge structure long into the future.



## SPEAKERS

**Casey Leggett** is a principal project engineer at Mott MacDonald with 12 years of experience performing structural design. He has a broad range of technical expertise, ranging from undertaking analyses and developing preliminary and detailed designs, to construction support services. Casey has been involved in all phases of delivery for both large projects with significant interdisciplinary requirements and smaller, discrete assignments for public and private sector clients. For the Westham Island Bridge, Casey performed detailed condition assessment, live load evaluation, rehabilitation design and engineering field services for the most recent rehabilitation tasks.



**Arman Shahnaz** is a structural engineer with Mott MacDonald with 6 years of experience ranging from structural design, project coordination and field engineering services for various highway bridges.

Much of Arman's career has been working on various highway infrastructure projects for the Ministry of Transportation and Infrastructure, TransLink, and Parks Canada Agency. For the Westham Island Bridge, Arman served as the engineer on record for construction field services on the most recent rehabilitation work tasks.

**Jason Dowling** is a Bridge Engineer at Associated Engineering with a broad range of experience in bridge rehabilitation, earthquake and structural engineering research and education. His experience includes seismic assessment of existing simple-span, arch and suspension bridges; static and dynamic analysis of structures; design of seismic retrofit and rehabilitation works for concrete and steel bridges; forensic engineering. Jason has experience working on the dynamic analysis of piles and large pile groups; linear and nonlinear site response analysis; calculation of seismic hazard and de-aggregated hazard for different return periods and site classes; and probabilistic liquefaction assessment. Jason holds a PhD from University College Dublin, where his research focussed on the dynamic response of bridges and developing accurate methods and algorithms for the measurement of dynamic load effects.

