Project Spotlight

Port Mann Bridge Tremie Sealed Cofferdams

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Project Details

Owner:
British Columbia Ministry of Transportation and Infrastructure

Location:
Coquitlam, British Columbia

General Contractor:
Kiewit-Flatiron

Architect/Engineer:
T.Y. Lin International

Placers and Finishers:
Kiewit-Flatiron

Innovative Product:
Agilia® Architectural

Volume of Innovative Product:
7500-10 000m^3

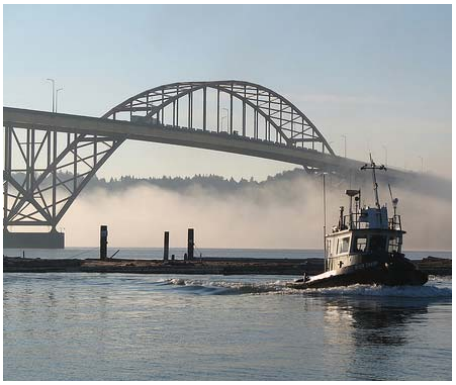
Date of Pour:
March 2010

Port Mann Bridge Tremie Sealed Cofferdams

Agilia® provides economical alternative to cofferdam construction.

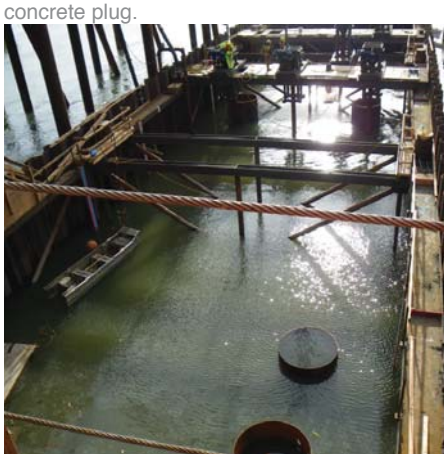
The Opportunity

Opened on June 12, 1964, the Port Mann Bridge was, at time of its construction, the most expensive stretch of highway in Canada. Originally carrying 4 lanes, the Port Mann Bridge spanned the Fraser River to connect Coquitlam to Surrey. In 2001, a fifth east bound HOV lane was added. However, in recent years, traffic congestion on the Port Mann Bridge has become a major concern. In 2005, the British Columbia Ministry of Transportation introduced the Gateway Program: a multi-billion dollar transportation project that proposed to twin the Port Mann Bridge to ease traffic congestion. In 2009, the government modified these plans to replace the Port Mann Bridge entirely with a new 10-lane bridge.



The Port Mann Bridge will soon be replaced by a new 10-lane bridge as a means to deal with increased traffic congestion

Cofferdams are constructed using interlocking steel sheet piles. Once the cofferdam is in place, concrete is poured in to form a tremie concrete plug.



The Challenge

Constructing a bridge is always a challenging undertaking; this challenge only increases when the bridge needs to cross a body of water. To facilitate the construction of the footings for the new Port Mann Bridge and create a safe and dry working environment for workers, Kiewit-Flatiron needed to construct five tremie sealed cofferdams.

Cofferdams are temporary enclosures that are often used in the repair or construction of oil platforms, dams, and bridges and consist of interlocking steel sheet piles that are driven into the ground. Once the enclosure is made, concrete is poured into the bottom to form a tremie concrete plug.

"USING AGILIA® SAVED US TIME AND LABOUR. IT WAS EASY TO USE AND THE BATCHING WAS CONSISTENT. WE WERE ABLE TO PLACE IT VERY FAST."

- GEORGE STEIL
CONCRETE PLACEMENT SUPERINTENDANT
PORT MANN BRIDGE/HW1 PROJECT

The Challenge Continued...

These tremie concrete plugs serve two purposes. First, they act as a counterweight to prevent the cofferdam from floating out of the ground. Second, the tremie concrete plug makes a solid foundation that will not heave or quicken from water pressure.

Due to the nature of the pour, the cofferdam plugs needed to be completed in one continuous pour. Kiewit-Flatiron, therefore, required a high flow concrete with SCC properties that would provide consistent and reliable results under water.

Agilia® Architectural was used to create tremie concrete plugs for 5 cofferdams across the Fraser River. It's high level of flow, SCC properties, and paste retention made it well suited for an underwater pour.

Left: Two 52 meter pumps were used to pour Agilia® Architectural into the cofferdams. A 36 meter concrete pump and a box remixer were used to feed one of the larger pumps.

The Lafarge Solution

Lafarge's Agilia® Architectural was a good fit for this application due to its ability to be placed in water without significant paste loss. Just as effective and more economical than an anti-washout concrete, Agilia® Architectural's high flow and SCC properties meant that Kiewit-Flatiron could complete the cofferdam plugs in one continuous pour while uniformly filling the cofferdams to create a safe, flat surface for workers.

Right: Water is pumped out of a cofferdam revealing the flat surface of the Agilia® Architectural concrete plug underneath.

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