

PILE LOAD TEST

Massey Bridge Pile Load Test

A CUSTOMER SUCCESS STORY

BY RST INSTRUMENTS LTD.



Pile test setup with Massey Tunnel entrance in background.

BACKGROUND

The Massey Tunnel in Delta, BC was built in the 1950's and is a congested tunnel structure. It averages 86,000 vehicle trips through it on a daily basis. A replacement bridge (Massey Bridge) was proposed to replace the tunnel and improve traffic congestion. The proposed capital cost of the project was \$3.5 billion.

OBJECTIVE

The replacement bridge design required a pile load test for a 2m diameter, 67m long, 60MN capacity steel pipe pile which required driving five 2m diameter pipe piles (1 test pile and 4 reaction piles) adjacent to the existing, operating Massey Tunnel.

During the pile load test, the following parameters were monitored: loading from the hydraulic jacks, load transfer down the pile and displacement of the pile.

CHALLENGES

Due to the complex nature of the project, and the large capacity of the proposed bridge piles, traditional instrumentation was not suitable for the test.

The driving of 5-2m pipe piles adjacent to the tunnel required crack and vibration monitoring of the existing tunnel structure.

The project site is adjacent to the Fraser River where the ground consists of unconsolidated, fine-grained, river sediments which are prone to settlement and liquefaction under seismic conditions.

SOLUTION

RST worked in collaboration with Golder Associates to supply an elaborate instrumentation package, which included custom products, to precisely monitor the pile load test in the challenging environment.

KEY FACTS

LOCATION

Delta, BC, Canada

PROJECT PARTNERS

Owner:
BC Ministry of Transportation and Infrastructure
Consultant:
Golder Associates

PROJECT DETAILS

The Massey Tunnel is a congested tunnel structure which is being considered to be replaced by a new bridge. The tunnel averages 86,000 vehicle trips per day.

SCOPE/OBJECTIVE

The replacement bridge required large capacity piles with precise monitoring during a pile load test for a 2m diameter, 67m long, 60MN capacity steel pipe pile.

BENEFITS

The custom instrumentation allowed Golder to monitor the site parameters in real-time to allow for quick decisions to be made during the test, and for full analysis later on.

Potential safety concerns and costly disruptions related to the impact of the pile testing on the existing tunnel were minimized.

RESULTS

Golder was able to obtain high quality real-time data for the various parameters they monitored. Without the custom solutions RST provided, the data quality would not have been sufficient.

INSTRUMENTATION

12 High Capacity Strain Gauge Load Cells
Vibrating Wire Strain Gauges
Custom Tell Tales
Custom High Precision Liquid Settlement System
2 FlexDAQ Data Loggers
Vibrating Wire Crack Meters
Instanetel Vibration Monitors

COMPLETION DATE

August 2016



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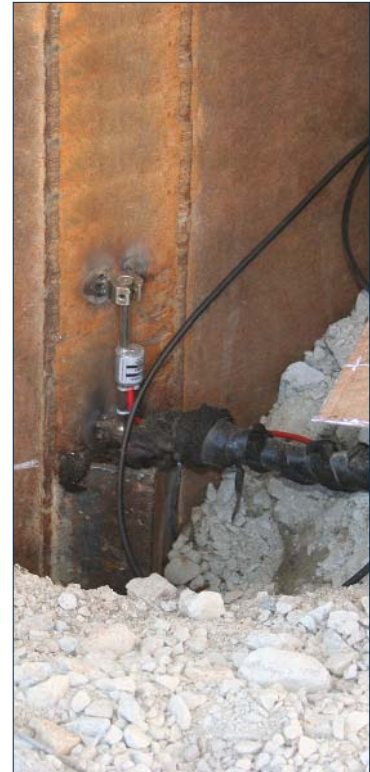
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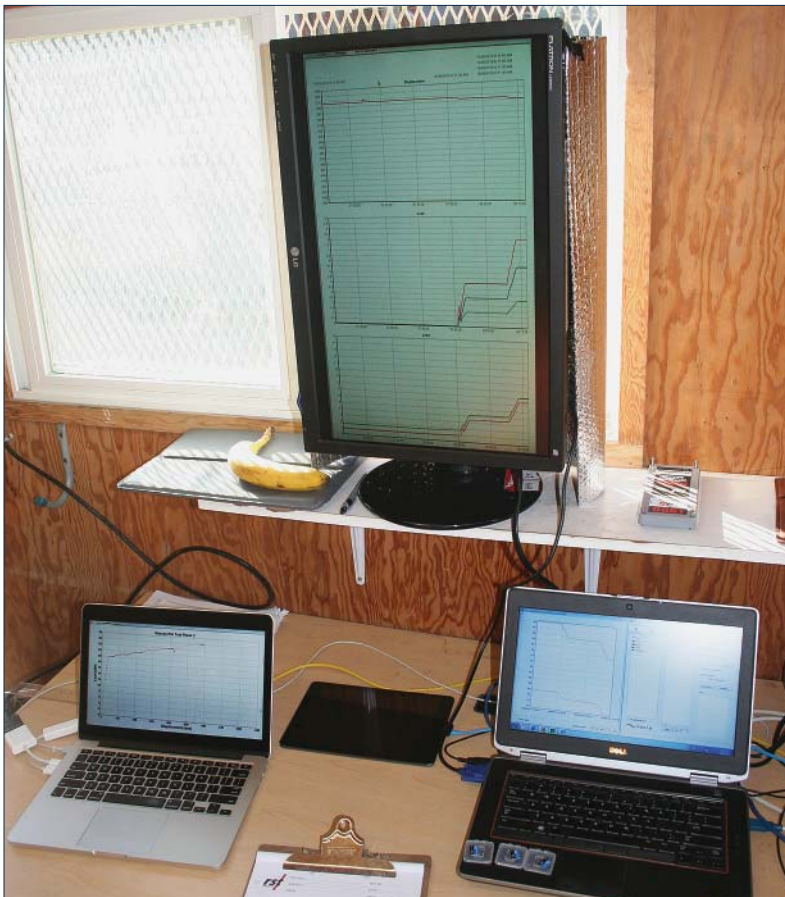
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High Capacity Strain Gauge Load Cells and Hydraulic Jacks ready for the test.



Vibrating Wire Strain Gauge on test pile.



Read-time data being displayed inside the site trailer.



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