Jewell Instruments

Monitoring Bridge Seismic Impact

- **Objectives:** Measure effect of seismic activity on bridge structure
- **Solution:** Jewell Instruments **LSOX Inclinometer**
- **Benefits:** High-precision in extreme conditions
- **Results:** Reliable measurements of structural health

Overview

The Samuel de Champlain Bridge, colloquially known as the Champlain Bridge, is a cable-stayed bridge built to replace the original Champlain Bridge over the Saint Lawrence River in Quebec, between Nuns' Island in the borough of Verdun in Montreal and the suburban city of Brossard on the South Shore. A second, connected bridge links Nuns' Island to the main Island of Montreal. It is the second busiest bridge in Canada, behind only the Port Mann Bridge in Vancouver, carrying approximately 137,000 vehicles per day annually.

Jewell Instruments LSOX Inclinometer

The new Samuel de Champlain Bridge carries eight lanes of automobile traffic of the A-10, A-15, and A-20 - with one lane in each direction dedicated for buses. It also includes a multi-use lane for cyclists and pedestrians. The central portion of the bridge deck carries the South Shore branch of the Réseau express métropolitain (REM) automated light metro system. At 60 meters (200 ft) wide, the new Bridge is the widest cable-stayed bridge in the world that uses two planes of cables and one of the widest bridges of any type in the world. The design of the Champlain Bridge addressed seismic activity, soil liquefaction, light-rail transit loading, ship collision, and ice loading. The bridge achieves structural safety and longevity through advanced corrosion-resistant materials, a 125-year design lifespan, robust ice and seismic engineering, and continuous active traffic management.

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Project

The bridge was constructed using duplex stainless-steel reinforcement in 100% of deck slabs and salt-exposed areas to prevent destructive rust. The bridge employs high performance, high-strength mixes engineered to resist ice abrasion on river piers. The tension cables are easy to inspect, and the Samuel de Champlain Bridge is engineered to withstand severe St. Lawrence River winter conditions, heavy winds, and seismic hazards.

The Samuel de Champlain Bridge is safe and relies on an advanced structural health monitoring network, including embedded corrosion sensors, integrated via an operational intelligence platform to track safety in real time. To monitor ground movements, monitor angle changes, and to help determine when the seismic qualified support pads need to be replaced, the engineers selected and installed nine (9) of the Jewell Instruments LSOX-LC-3 inclinometers on the beams. The Jewell LSOX Single-Axis Analog Inclinometers are a rugged, high precision tilt sensor designed for peak performance in extreme conditions. These sensors feature a fluid damped mechanism to deliver superior noise rejection in high shock and vibration environments as well as excellent output stability.

About Jewell Instruments

Jewell Instruments is a world leader in the design, manufacture, and distribution of high-precision products. Our expertise includes acceleration and tilt sensors, electronic compasses, avionics components, and panel meters. The extensive application knowledge we have obtained through decades of experience allows us to provide custom solutions for a diverse group of industries. In fact, customers from all over the globe contact us for solutions to aerospace, medical, industrial, and telecommunications applications, to name a few.

To find out more, visit our website!

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