As bridge and infrastructure owners across Canada along with their designers are realizing the long-term benefits and performance of GFRP reinforcement in providing the solution to corrosion, Pultrall Inc and its Canadian produced V-ROD® reinforcing bar continue to set the benchmark and lead the industry.

**PL-3 Barrier crash test successful**

In December 2011, V-ROD® proved again why it remains atop the leaderboard in the FRP composite industry with the successful crash test of its 60GPa GFRP headed bar in the PL-3 concrete traffic barrier.

**Crash test parameters** - In a collaborative effort with Ryerson University, a research partner of the MTO (Ontario Ministry of Transportation) and Texas Transportation Institute, crash test results verified the performance of V-ROD® that satisfies the Canadian Highway Bridge Design Code. Provisions currently in place in the Code allow GFRP in other performance level barriers and parapets. However, PL-3 barriers are to be crash tested based on requirements of NCHRP Report 350 protocol.

The MASH test protocol involves a 36,000kg tractor trailer (cab behind engine model) impacting the built barrier at a constant nominal speed of 80 km/hr and an impact angle of 15 degrees. The test evaluates the strength of the barrier in containing and redirecting the vehicle.

**Objectives** - The Ryerson University research objective was to provide technical information on the ultimate strength and serviceability in the use of V-ROD 60Gpa GFRP bars with headed ends in the barrier wall-deck slab connection. This was achieved by conducting an on-site crash test along with static load tests on the constructed barrier.

**Methodology** - Ryerson University and Pultrall Inc had agreed to conduct the test in two phases; 1) design, construct and crash test the barrier and 2) perform the static load tests on the barrier. A 27.6m long barrier was constructed with control joints and wall reinforcement as per the MTO PL-3 barrier standard.
V-ROD® Specifications in crash test

V-ROD is only GFRP bar available in the market that meets all three grades (40GPa, 50GPa and 60GPa) as per the CSA S-807 FRP Specification

Nano-technology improved sand coating and bond strength up to 25 MPa

Highest grade 60GPa bar was used - #4 (12m) 1312 MPa and 65.6GPa - #5 (16m) 1184 MPa and 62.5GPa

Pull-out values of latest generation of anchor heads tested are 148kN (16m) and 182kN (20m) ; the highest in the industry

Pultrall is the only manufacturer that largely exceeds the CSA requirements for temperature resistance (Tg) with their anchor heads which are produced from a toughened polymer with high glass content for improved durability and strength

The full report from Ryerson University on the successful full scale PL-3 crash tests with V-ROD 60GPa headed bar in Texas will be available shortly along with the actual test footage which will also be available on U-tube.

Please do not hesitate to consult with us and our design team in assessing your applications and working together with your team to ensure optimizing the various grades of bar and provide an economic and long-term sustainable structure.