“Torsional Vibration Solutions for Modern Powertrains” by Fluidampr / Vibratech TVD

The latest *Race Industry Now* webinar, produced by **EPARTRADE** in partnership with **RACER** and hosted by **Brad Gillie** of SiriusXM (*Late Shift*), featured a deep technical session with **Brian LeBarron**, Market Development at **Fluidampr / Vibratech TVD**. The discussion centered on **torsional vibration dynamics** and the advanced solutions available today for modern powertrains across motorsport, automotive, marine, defense, and industrial applications.

A Century of Innovation

The Fluidampr and Vibratech TVD story stretches back over 100 years. Vibratech’s lineage began in **1919**, and in **1946**, the company invented the **viscous damper** in the United States — originally created to meet the needs of heavy-duty trucking during the post-war boom in interstate commerce. By the **1980s**, high-performance racing teams and engine builders recognized the need for dampers that could withstand the punishing conditions of V8 race engines. Vibratech responded by downsizing their heavy-duty designs, giving birth to **Fluidampr** as a motorsports-focused brand. By **2015**, OEM high-performance automotive, marine, and defense programs began adopting Fluidampr technology, and today the two brands operate in tandem to supply **OEM-quality vibration solutions**.

Understanding Torsional Vibration

LeBarron explained torsional vibration as the **end-to-end twisting of a rotating shaft** — typically on a crankshaft, but also on camshafts, drivelines, and even electric drive motors. As engines become smaller, lighter, and more powerful, these vibrations have intensified.

- **Higher Power Density:** Modern engines produce more power per cylinder at higher RPMs (8,000–11,000+), creating extreme vibration spikes.
- **Heat Buildup:** Packaging constraints and limited airflow around engines trap heat, which can compromise durability if not properly managed.
- **Durability Requirements:** In motorsports, a component may only need to last one race, but OEM partners require at least **five years / 60,000 miles** of reliability.

This dual requirement — racing durability at peak power and OEM longevity under warranty — drives Fluidampr’s innovation strategy.

Advanced Damper Technologies

Over the last decade, Fluidampr and Vibratech have pioneered several new damper designs to meet evolving demands:

- **Traditional Fluid Damper:** Uses an internal inertial ring suspended in silicone within a shear gap only a few thousandths of an inch wide. As the ring twists against vibration, the silicone shears, converting vibration into heat.
- **Nested Design:** Incorporates two inertial weights with a bearing between them, tuned to resonate at different frequencies. This broadens coverage across the RPM range, handling primary, secondary, and tertiary vibration modes.
- **Dual-Chamber Cooling Design:** Splits the chamber and adds fins to double cooling surface area, ideal for **high-power engines (250 hp per liter)** and applications with limited airflow such as off-road or marine.
- **Oil-Cooled Dampers:** For extreme cases (e.g., a 1,000hp, 11,000 RPM V12 with dual overhead cams), dampers can be installed inside the engine and cooled directly with oil jets, ensuring thermal stability at the highest levels of performance.
- **Patented "Twist Lock" Housing:** Developed in endurance racing, this design allows dampers to be disassembled post-race for silicone sampling. Tests showed viscous dampers not only survive **24-hour endurance races**, but also last entire seasons — a major leap in motorsport durability.

Motorsport Proven, OEM Trusted

Fluidampr's innovation pipeline is constantly validated at the track. For example, endurance racing prototypes such as the **Corvette C8.R** have run Fluidampr solutions developed in partnership with OEM programs. The patented Twist Lock system, tested in IMSA competition, proved that dampers could sustain not just races but seasons without performance degradation.

LeBarron emphasized that this **cross-industry expertise** — from natural gas compressors and marine engines to defense vehicles and hypercars — allows Fluidampr to pull proven solutions from one sector and adapt them for another, accelerating development for motorsports.

Hybrid and EV Integration

As hybrid and electric powertrains enter motorsport and OEM programs, torsional vibration challenges evolve. Fluidampr works directly with manufacturers to conduct **torsional vibration testing**, measuring frequency ranges and available packaging space before engineering custom solutions. Each hybrid or EV program requires a unique approach, but the principles of vibration management remain critical to performance and durability.

Made in the USA

LeBarron closed by highlighting the company's commitment to **American manufacturing**. All engineering, testing, and production take place at Vibratech's facility south of Buffalo, NY, ensuring quality, rapid turnaround, and just-in-time inventory for OEMs and race teams alike.

"Engines are getting smaller, power density is increasing, and heat is harder to manage," said LeBarron. *"By leveraging our experience across racing, automotive, marine, and industrial sectors, Fluidampr delivers advanced damping solutions that ensure both peak performance and long-term durability."*

For more information, **watch the full webinar here.**