

Safety Innovation Takes Center Stage in Open-Wheel Racing

EPARTRADE Webinar Highlights Engineering-Driven Solutions from MPD Racing & Ti22 Performance

EPARTRADE's *Race Industry Now* webinar series recently featured a deep technical discussion on evolving safety standards in sprint car and open-wheel racing. The session, **"Meeting Safety Trends in Open Wheel Racing,"** spotlighted engineering-led innovations from MPD Racing and Ti22 Performance, presented by industry veteran **Eddie Smith**, Category Manager for Open Wheel Racing Products at Motor State Distributing and Brand Manager for both product lines.

Hosted by SiriusXM's Brad Gillie, the session focused on how structured engineering solutions are replacing improvised trackside fixes as vehicle speeds increase and sanctioning bodies push for standardized safety compliance.

Engineering Safety for a Faster Era of Sprint Car Racing

As sprint car performance envelopes expand—with higher cornering loads, increased track grip, and tighter competition—vehicle containment systems must evolve accordingly. Smith emphasized that modern safety development is less reactive and more preventative, shaped by accumulated track data and collaboration between sanctioning bodies, manufacturers, and teams.

Rather than a single catalytic incident, safety gains have emerged from repeated failure-pattern analysis observed across race weekends. Smith noted that the increasing professionalization of sprint car racing — including national live broadcasts and expanded streaming coverage — has amplified scrutiny on component reliability and debris containment.

Key Safety Systems Transforming Open-Wheel Competition

Front-End Tether Systems

Front-end tether assemblies are now critical in preventing axle and wheel separation during high-energy frontal impacts. Mounted via axle clamps and chassis anchor points, these systems:

- Prevent detached assemblies from entering spectator areas
- Reduce secondary car-to-debris impacts

- Limit track cleanup delays
- Maintain crash energy within the chassis envelope

Smith cited early implementations where catastrophic front-end separation occurred but tether systems successfully retained the entire assembly, preventing potentially severe secondary incidents.

Six-Point Fuel Cell Mounting Architecture

Modern sprint cars carry large methanol fuel cells (~28 gallons), making containment under impact a high-priority risk area. The transition from four-point mounting to six-point retention systems significantly increases load distribution and failure resistance.

Key engineering improvements include:

- Multi-plane load support
- Reinforced seat-bar anchoring
- Improved clamp architecture
- Reduced tank ejection probability during rollovers

Smith emphasized that methanol fires can burn nearly invisible, increasing the importance of secure fuel containment.

Wheel Cover Retention Systems

Traditional quick-release fasteners have proven unreliable under racing vibration and pit-stop time pressure. Modern bolt-on retention kits:

- Replace spring-based quick fasteners
- Provide higher torque retention
- Reduce in-race detachment
- Minimize flying debris risk

The move to impact-wrench-compatible fasteners ensures both security and serviceability during pit cycles.

Driveline Integrity Components

Smith also discussed torsion arm construction failures observed during violent impacts. Transitioning from aluminum to high-strength steel variants helps:

- Maintain rear axle alignment
 - Prevent suspension collapse
 - Reduce cockpit intrusion risks
 - Limit uncontrolled drivetrain movement
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Human Factors: The Most Overlooked Safety Variable

While component engineering is advancing rapidly, Smith emphasized that improper installation remains the most common safety failure at local racing levels.

Frequent issues include:

- Incorrect seat belt geometry and anchor angles
- Improper harness webbing routing
- Seat mounting using non-graded hardware
- Misunderstood cockpit restraint systems

Improper belt mounting angles can significantly reduce restraint performance due to increased stretch vectors during deceleration events.

Smith advocated broader use of manufacturer installation guides and standards published by SFI Foundation, as well as greater education through digital video resources.

Fire Protection: Beyond the Suit

Modern sprint car safety now integrates:

- Onboard fire suppression systems
- Multi-layer fire-retardant driver suits
- Improved cockpit egress openings
- Head-and-neck restraint adoption

Smith noted that thermal transfer — not just flame exposure — is a critical injury mechanism. Laboratory testing at international certification facilities has revealed that improper suit layering dramatically reduces thermal protection windows.

Recent rule updates mandating larger cockpit openings further improve emergency extraction times for both drivers and rescue crews.

Industry-Wide Standardization Remains a Challenge

While premier series have adopted comprehensive mandates, regional inconsistency continues to create safety disparities. Smith called for broader alignment among sanctioning bodies to ensure:

- Uniform implementation timelines
- Reduced equipment redundancy costs
- Clear compliance pathways for grassroots teams
- Improved secondary market availability

He cited international racing frameworks where centralized rule governance accelerates universal safety adoption.

Manufacturer Collaboration Driving Rapid Development

A key advantage within the sprint car ecosystem is the tight feedback loop between teams, distributors, and manufacturers. Smith noted that product refinements often emerge directly from trackside conversations with crew chiefs and drivers.

This collaborative engineering environment enables:

- Short product iteration cycles
 - Immediate real-world validation
 - Targeted problem-solving
 - Cost-conscious material selection
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A Culture Shift Toward “Safety-First Engineering”

Smith concluded with a philosophy increasingly shared across motorsports disciplines:

“The goal isn’t just to finish races — it’s to make sure drivers can race again next week.”

As sprint cars continue pushing performance boundaries, safety systems are evolving from optional upgrades to foundational engineering requirements.

For more information, [watch the full webinar here.](#)