

Swift Springs Explains Why Spring Engineering Matters More Than Ever in Modern Race Cars

EPARTRADE Race Industry Now webinar explores how materials, manufacturing processes, and close collaboration with chassis builders are redefining suspension performance.

As race cars continue to evolve with stiffer chassis, improved tire technology, and increasingly sophisticated suspension designs, the humble coil spring has become one of the most critical tuning tools in motorsports. During the latest EPARTRADE Race Industry Now webinar, **"Why Swift Springs Are Different: Engineering, Materials & Performance,"** Frank Simonetti, Motorsports Director for Swift Springs, joined Tony Eury Jr., Director of Chassis Development at GMS Race Cars, to explain why modern spring technology is far more advanced than simply selecting a spring rate.

Hosted by Brad Gillie of SiriusXM's Late Shift on Channel 90, the discussion examined the engineering philosophy behind Swift Springs, the importance of manufacturing consistency, and how continuous collaboration between spring engineers and race teams helps competitors find performance across virtually every form of motorsports.

A Spring Is More Than Just a Number

One of the central themes throughout the webinar was that many racers still evaluate springs almost exclusively by their published spring rate. Simonetti explained that this approach overlooks how a spring actually behaves throughout its working range.

As a suspension compresses, coil geometry changes. If the spring is not properly engineered, individual coils begin to stack together, effectively turning what should be a linear spring into a progressively stiffer one. While the advertised rate may appear correct, the actual force required throughout the travel can increase dramatically, changing vehicle balance and reducing predictability.

For Swift Springs, maintaining an accurate spring rate throughout the usable range is one of the company's defining engineering objectives.

Rather than allowing significant rate spikes as coils approach solid height, Swift designs springs to remain as linear as possible until the final stages of compression. This provides drivers with a more consistent chassis response and allows suspension tuning changes to produce repeatable results.

Engineering Begins With Materials and Manufacturing

Simonetti explained that producing a high-performance racing spring involves far more than winding steel wire into a coil.

Swift controls multiple aspects of the manufacturing process, including heat treatment, grinding, tempering, and surface finishing. One differentiator highlighted during the discussion is the company's proprietary coating process.

Instead of relying on traditional powder coating, Swift uses a process that penetrates into the wire itself. Combined with the company's heat-treating methods, this helps temper the spring throughout its core rather than only at the surface.

The result is improved durability, greater fatigue resistance, and more consistent long-term performance—particularly important for professional teams competing night after night under extremely high suspension loads.

For racers competing in series where suspension components experience repeated high-cycle loading, consistency over an entire season can be just as valuable as outright performance.

Today's Race Cars Demand New Spring Technology

Tony Eury Jr. emphasized that suspension development has accelerated because race cars themselves have changed dramatically over the past decade.

Modern chassis are considerably stiffer than previous generations thanks to improved tubing materials and construction techniques. Suspension geometries continue to evolve, while tire technology has advanced significantly across dirt, asphalt, road racing, and drag racing.

Each of these changes alters how loads are transferred through the chassis.

As compliance disappears from the chassis, springs assume an even greater role in controlling vehicle dynamics. A spring package that worked several years ago may no longer provide the optimal balance on today's race cars.

Eury explained that changes in chassis stiffness, suspension mounting locations, third-link geometry, motion ratios, and tire characteristics all influence spring selection. Rather than treating springs as fixed components, successful teams continually adapt them to complement evolving vehicle designs.

Collaboration Between Manufacturers and Race Teams

Throughout the webinar, both speakers stressed that product development is driven by constant communication between Swift engineers and race teams.

Simonetti noted that Swift's technical staff spends much of the racing season at tracks across the country, working directly with competitors to understand changing vehicle dynamics and emerging setup trends.

Instead of designing products in isolation, Swift gathers feedback from teams competing at the highest levels before refining spring designs to match new chassis configurations and racing conditions.

Eury described this relationship as a major advantage for race teams.

Rather than selecting from a catalog of generic springs, engineers can work directly with Swift to develop products tailored to specific chassis architectures, suspension layouts, and performance objectives.

That collaboration shortens development time while allowing teams to better understand how spring changes affect overall vehicle balance.

Education Is Part of the Product

Another recurring topic was racer education.

Simonetti believes supplying premium components is only part of the equation. Helping customers understand how those components behave—and how to properly evaluate them—is equally important.

Many racers compare springs solely by their labeled rates without measuring how force changes throughout compression. By educating customers about linearity, coil bind characteristics, and dynamic loading, Swift helps racers make more informed setup decisions while avoiding common tuning mistakes.

For many teams, understanding *why* a spring performs differently can be just as valuable as the spring itself.

Racing Technology Never Stands Still

Looking toward the future, both speakers agreed that suspension technology will continue evolving alongside race car design.

New chassis materials, changing tire construction, increasingly rigid platforms, and constantly shifting vehicle architectures ensure that spring development remains an active engineering discipline rather than a mature product category.

As Simonetti noted, race cars built only a few years apart can require significantly different suspension strategies because nearly every component influencing chassis behavior has evolved.

For manufacturers like Swift Springs, staying ahead means continually refining manufacturing techniques, improving materials, expanding trackside support, and maintaining close relationships with chassis builders and professional race teams.

The webinar demonstrated that while springs may appear simple, they remain one of the most technically sophisticated—and influential—components in modern motorsports. Precision manufacturing, material science, and engineering collaboration continue to make suspension performance one of racing's most important competitive advantages.

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